ES-301 **Administrative Topics Outline** **Form ES-301-1**

Facility: Harris Nuclear Plant Date of Examination: November 16, 2020

Examination Level: RO ☒ SRO ☐ Operating Test Number: 05000400/2020301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Determine Axial Flux Difference with AFD Monitor Inoperable using OST-1021 and OP-163 (OST-1021) (JPM ADM-083-a) *K/A G 2.1.25* **2020 NRC RO A1-1**
Conduct of Operations	M, R	Determine Required boric acid flow using AOP-017 Attachment 4 and OP-107.01 (AOP-017) (JPM ADM-081-a) *K/A G2.1.23* **2020 NRC RO A1-2**
Equipment Control	M, R	Determine Clearance requirements for a CCW Pump (AD-OP-ALL-0200) (JPM ADM-003-b) *K/A G2.2.13* **2020 NRC RO A2**
Radiation Control	M, R	Given a set of conditions, determine and apply the facility dose limits (AD-RP-ALL-2000) (JPM ADM-028-c) *K/A G 2.3.7* **2020 NRC RO A3**
Emergency Plan	N/A	NOT SELECTED FOR RO

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

* Type Codes & Criteria:

(C)ontrol room, (S)imulator, or Class(R)oom	**(4)**
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)	**(0)**
(N)ew or (M)odified from bank (≥ 1)	**(4)**
(P)revious 2 exams (≤ 1; randomly selected)	**(0)**

2020 NRC RO Admin JPM Summary

2020 NRC RO A1-1 - Determine Axial Flux Difference with AFD Monitor Inop (OST-1021)
(JPM ADM-083-a) **NEW**

K/A G2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.
(CFR: 41.5 / 43.5 / 45.12 / 45.13) RO 4.4 / SRO 4.7

The plant is at 90% power with a load reduction in progress when the load reduction is stopped to evaluate AFD following power oscillations. The candidate must perform Attachment 5 of OST-1021, Daily surveillance Requirements to determine the current AFD limit and if the AFD Monitor Alarm is operable or in operable.

2020 NRC RO A1-2 - Determine Required boric acid flow using AOP-017 Attachment 4 and OP-107.01 (AOP-017)
(JPM ADM-081-a) **MODIFIED**

K/A G2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.
(CFR: 41.10 / 43.5 / 45.2 / 45.6) RO 4.3 SRO 4.4

The plant is in Mode 3. Instrument air header pressure is 45 psig and stable making automatic blender operating unavailable. VCT level is currently 19% and stable. The CRS directed the candidate perform a manual make to the VCT using the applicable procedure. The candidate will be provided with initial data and then be required to obtain AOP-017 which will direct the remaining values to be determined using OP-107.01, Attachment 7, calculate the maximum makeup flow rate to achieve the required boron concentration in the VCT along with the required boric acid flow rate and dilution flow rate.

NOTE: Modified by varying the initial data which will required the candidate to obtain different valves for the maximum makeup flow rate to achieve the required boron concentration in the VCT along with the required boric acid flow rate and dilution flow rate

2020 NRC RO Admin JPM Summary

RO Admin JPMs (continued)

2020 NRC RO A2 - Determine clearance requirements for a CCW Pump per AD-OP-ALL-0200 (AD-OP-ALL-0200)
(JPM ADM-021-f) **MODIFIED**

K/A G2.2.13 - Knowledge of tagging and clearance procedures.
(CFR: 41.10 / 45.13) RO 4.1 SRO 4.3

The plant is defueled. CCW Pump 1A-SA is required to be placed under a clearance for seal replacement. Cooling water and lube oil systems are NOT required to be placed under clearance. The candidate will be directed to determine the clearance requirements for CCW Pump 1A-SA using the SFDs, CWD and System Operating Procedures, as necessary. The candidate must provide electrical and mechanical protection and provide the necessary vent and drain paths.

NOTE: Modified by changing the component from the CSIP 1A-SA to the CCW Pump 1A-SA which will required the candidate to evaluate a different set of drawings to obtain the components required to be isolated to provide an adequate isolation boundary.

2020 NRC RO A3 - Given a set of conditions, determine and apply the facility dose limits (AD-RP-ALL-2000) (JPM ADM-028-c) **MODIFIED**

K/A G2.3.7 - Ability to comply with radiation work permit requirements during normal or abnormal conditions.
(CFR: 41.12 / 45.10) RO 3.5 SRO 3.6

The candidate will be supplied a survey map of a location in the RAB, a copy of AOP-36.08 and the required RWP for the radioactive area. The location also contains one or more hot spots. They must determine the individual stay time prior to exceeding the dose limits of the RWP. They will be provided Survey Maps, Simplified plant drawings to locate valves, Plant Maps of the area and a plant valve list to determine the location of the valves they will be required to operate in order to complete the task. The given information will supply the accumulated annual whole body dose for the AOs. They must perform their calculations based on RWP Stop Work Limits established for the RWP.

NOTE: Modified by varying the initial data which will required the candidate to obtain different valves for the required stay times based on updated limits for the RWP along with the dose rates of the survey map location. Additionally the candidate is required to determine when the RWP Stop Work Limit is reached vice the Facility dose limit

2020 NRC RO A4 – Not selected

Facility: Harris Nuclear Plant Date of Examination: November 16, 2020

Examination Level: RO ☐ SRO ☒ Operating Test Number: 05000400/2020301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Determine Axial Flux Difference with AFD Monitor Inoperable and Evaluate Technical Specifications using OST-1021 (OST-1021) (JPM ADM-083-a-SRO) *K/A G 2.1.25* **2020 NRC SRO A1-1**
Conduct of Operations	M, R	During a loss of shutdown cooling, determine the time that the RCS will reach core boiling and core boil-off conditions (AOP-020) (JPM ADM-005-c-SRO) *K/A G 2.1.25* **2020 NRC SRO A1-2**
Equipment Control	D, R	Review (for approval) the Completed OST-1017, Pressurizer PORV Block Valve Full Stroke Test (OST-1017) (JPM ADM-035-c-SRO) *K/A G2.2.12* **2020 NRC SRO A2**
Radiation Control	N, R	Review and complete Operations Actions of AP-545, Attachment 3, Section II. Pre-Entry Planning Actions (AP-545) (JPM ADM-075-a-SRO) *K/A G 2.3.13* **2020 NRC SRO A3**
Emergency Plan	N, R	Classify an Event (CSD-EP-HNP-0101-01) (JPM ADM-074-a-SRO) *K/A G2.4.41* **2020 NRC SRO A4**

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

* Type Codes & Criteria:		
	(C)ontrol room, (S)imulator, or Class(R)oom	**(5)**
	(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)	**(1)**
	(N)ew or (M)odified from bank (≥ 1)	**(4)**
	(P)revious 2 exams (≤ 1; randomly selected)	**(1)**

2020 NRC SRO Admin JPM Summary

2020 NRC SRO A1-1 - Determine Axial Flux Difference with AFD Monitor Inop and Evaluate Technical Specifications
(OST-1021)
(JPM ADM-083-a-SRO) **NEW**

K/A G2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.
(CFR: 41.5 / 43.5 / 45.12 / 45.13) RO 4.4 / SRO 4.7

The plant is at 90% power with a load reduction in progress when the load reduction is stopped to evaluate AFD following power oscillations. The candidate must perform Attachment 5 of OST-1021, Daily surveillance Requirements to determine the current AFD limit and if the AFD Monitor Alarm is operable or in operable.

2020 NRC SRO A1-2 - During a loss of shutdown cooling, determine the time that the RCS will reach core boiling and core boil-off conditions (AOP-020)
(JPM ADM-005-c-SRO) **MODIFIED**

K/A G2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.
(CFR: 41.10 / 43.5 / 45.12) RO 3.9 SRO 4.2

The candidate will be provided with initial plant conditions. A plant shutdown for refueling is in progress with the Reactor Vessel head off when a loss of RHR has occurred. The crew is implementing AOP-020, Loss of RCS Inventory or Residual Heat Removal While Shutdown. The SRO candidates must first determine which of the four plant curves to use (H-X-8 through H-X-11) and then calculate the time the RCS will reach core boiling and core boil-off based on the figures.

NOTE: Modified by changing the dates and times of plant shutdown and values of the core thermocouples. These changes have made the calculated answer substantially different than the bank JPM answer.

2020 NRC SRO A2 - Review (for approval) the Completed OST-1017, Pressurizer PORV Block Valve Full Stroke Test (OST-1017)
(JPM ADM-035-c) **DIRECT**

K/A G2.2.12 - Knowledge of surveillance procedures.
(CFR: 41.10 / 45.13) RO 3.7 / SRO 4.1

The candidate will be given a completed copy of OST-1017 to complete the Certification and Review by the CRS. The OST contains three (3) errors that the candidate must identify.

2020 NRC SRO Admin JPM Summary

SRO Admin JPMs (continued)

2020 NRC SRO A3 – Review and complete Operations Actions of AP-545, Attachment 3, Section II. Pre-Entry Planning Actions (AP-545)
(JPM ADM-075-a-SRO) **NEW**

K/A G2.3.13 - Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

(CFR: 41.12 / 43.4 / 45.9 / 45.10) RO 3.4 SRO 3.8

The candidate will be supplied a partially completed copy of AP-545, Attachment 3, Containment Entry Permit, along with a JPM information sheet, an LCO Tracking Record and the most recently completed OST-1082 for the Containment Airlock. The candidate will be required to review the package and complete the Operations section for the Pre-Entry Planning section. Once the review is complete the candidate should determine that the PAL is considered Operable, however OST-1082 is required to be performed because it is beyond its periodicity.

2020 NRC SRO A4 - Classify an Event (CSD-EP-HNP-0101-01)
(JPM-ADM-082-a) **NEW**

K/A G2.4.41 - Knowledge of the emergency action level thresholds and classifications
(CFR: 41.10 / 43.5 / 45.11) RO 2.9 SRO 4.6

Given a set of initial conditions and the EAL Flow Matrix, the candidate must classify the appropriate Emergency Action Level for the event in progress.

Facility: Harris Nuclear Plant	Date of Examination: November 16, 2020
Exam Level: RO ☒ SRO-I ☒ **SRO-U (Bold)** ☒	Operating Test Number: 05000400/2020301

Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for **SRO-U**

	System/JPM Title	Type Code*	Safety Function
a.	BTRS End of Life Dilution Operation (OP-108) (JPM-CR-280-a) K/A 004 A4.07	A, D, S	1
b.	Place Excess Letdown In Service (OP-107) (JPM-CR-211-b) *K/A 004 A4.06*	D, P, S	2
c.	**Take Corrective Action For Failure of CSIP Mini-Flow Valves to Re Position (EOP-E-0)** **(JPM-CR-225-e)** **K/A 006 A4.07**	**A, D, E, P, S**	**3**
d.	**Start an RCP (return to service following maintenance) w/ Spray Valve Failure (AOP-019)** **(JPM-CR-005-g)** ***K/A 002 A1.01***	**A, E, L, M, S**	**4P**
e.	Return the Containment Fan Coolers to normal following a Safety Injection actuation. (OP-169) (JPM CR-260-a) *K/A 022 A4.01*	D, EN, L, S	5
f.	**Shutdown EDG A-SA from MCB (for maintenance) Field Flash stays energized (OP-155)** **(JPM-CR-292-a)** ***K/A 064 A4.06***	**A, EN, M, S**	**6**
g.	Power Range NI Gain Adjustment (OP-105) (JPM CR-210-a) **RO Only** *K/A 015 A4.02*	D, S	7
h.	Align CCW to Support RHR System (OP-145) (JPM CR-085-b) *K/A 008 A4.10*	D, L, S	8

In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for **SRO-U**		
i. Restore Power To An Emergency Bus (OP-155) (JPM IP-239-a) *K/A 068 AA1.10*	A, M, EN, L	6
j. Place the ASI System in Standby Alignment (OP-185) (JPM-IP-291-a) ***K/A 004 A4.11***	**D, L, R**	**2**
k. Isolate the SI Accumulators After a Control Room Evacuation (AOP-004) (JPM-IP-232-a) ***K/A APE 068 AG2.1.30***	**D, E, EN, L**	**8**

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for R /SRO-I/SRO-U		
(A)lternate path	4–6/4–6 /2–3	(5, 5, 3)	
(C)ontrol room			
(D)irect from bank	≤ 9/≤ 8/≤ 4	(8, 7, 3)	
(E)mergency or abnormal in-plant	≥ 1/≥ 1/≥ 1	(1, 1, 1)	
(EN)gineered safety feature	≥ 1/≥ 1/≥ 1	(2, 2, 1)	(control room system)
(L)ow-Power/Shutdown	≥ 1/≥ 1/≥ 1	(6, 6, 3)	
(N)ew or (M)odified from bank including 1(A)	≥ 2/≥ 2/≥ 1	(3, 3, 2)	
(P)revious 2 exams	≤ 3/≤ 3/≤ 2	(2, 2, 1)	(randomly selected)
(R)CA	≥ 1/≥ 1/≥ 1	(1, 1, 1)	
(S)imulator			

2020 NRC Control Room/In-Plant JPM Summary

Simulator JPMs

JPM a – BTRS End of Life Dilution Operation (OP-108)
(JPM-CR-280-a)

K/A 004 A4.07 – Ability to manually operate and/or monitor in the control room: Boration/dilution (CFR: 41/7 / 45.5 to 45.8) RO 3.9 / SRO 3.7

Evaluated position: Operator at the Controls (OATC) responsibilities.

Turnover: The candidate will assume the watch with the unit operating at 100% and the CRS has directed you to place BTRS in service for End of Life Dilution Operation per OP-108. The candidate will be informed that BTRS was initially placed in service earlier this week and the previously in service resin bed will be removed from service and realigned. The candidate will be directed to start at step 2 of section 8.9.2

Task: Place BTRS in service for EOL operations and respond to the failure of HC-387, BTRS Demin Bypass to operate.

Verifiable actions: The candidate will have to determine if flushing of the BTRS system to the RHT is required. Flushing of the BTRS system is required based on the realignment of the in service resin bed. The candidate will attempt to place BTRS in service and will not get the correct response for the White DIL light when repositioning HC-387.

Alternate Path – YES. When the White DIL Light is determined to be NOT illuminated and HC-387 is incorrectly operating the candidate will have to verify open the BTRS bypass and verify shut the BTRS inlet.

JPM completion: Once the candidate initiates a work request, evaluation on this JPM is complete.

JPM b –Place Excess Letdown in Service (OP-107)
(JPM-CR-211-b) – Direct - **Previous** from the 2016 Exam. (Randomly selected from the Simulator JPM bank)

K/A 004 A4.06 – Ability to manually operate and/or monitor in the control room: Letdown isolation and flow control valves
(CFR: 41/7 / 45.5 to 45.8) RO 3.6 / SRO 3.1

Evaluated position: Operator at the Controls (OATC) responsibilities.

Turnover: The plant is at 100%, steady state power middle of life (MOL). Normal Letdown needs to be secured for maintenance due to a problem with PCV-145. The CRS has directed the OATC to establish Excess Letdown to the VCT per OP-107, Section 8.2.

Task: Establish Excess Letdown to the VCT in accordance with OP-107, Section 8.2

Simulator JPMs (continued)

JPM b (continued)

Verifiable actions: The candidate will perform a valve lineup to establish a flow path from Excess Letdown to the Reactor Coolant Drain Tank. This flow path will be used to flush the lines to establish the same boron concentration as the RCS. They will then establish a valve lineup to the VCT and adjust a hand control valve to establish Excess Letdown flow at a rate that does not cause Excess Letdown temperature to exceed 174°F or pressure to exceed 150 psig. The MCB has indications and alarms for the parameters. Temperature and pressure limits prevent damage to the Excess Letdown Heat Exchanger and prevent lifting a relief in the Excess Letdown line.

Alternate Path – No - There are no failures with this JPM.

JPM completion: Excess letdown is in service and is flowing with temperature < 174°F and pressure < 150 psig in accordance with OP-107, Section 8.2.

JPM c – Take Corrective Action For Failure of CSIP Mini-Flow Valves to Re-Position (EOP-E-0)

(JPM-CR-225-e) SRO Upgrade - Direct - Previous from the 2018 Exam. (Randomly selected from the Simulator JPM bank)

K/A 006 A4.07 Ability to manually operate and/or monitor in the control room: ECCS pumps and valves (CFR: 41.7 / 45.5 to 45.8) RO 4.4 SRO 4.4

Evaluated position: Operator at the Controls (OATC) responsibilities.

Turnover: The plant was operating at 100% when a technician's error resulted in an automatic Reactor Trip / Safety Injection signal. The crew is performing EOP-E-0, Reactor Trip or Safety Injection and is at step 37. The CRS has directed the OATC to begin at step 37 and continue performing EOP-E-0.

Task: Obtain adequate flow through a running CSIP.

Verifiable actions: The candidate will be required to change valve positions and stop one CSIP to secure the ECCS High Head injection flow path and establish a Normal Charging flow path from the lineup to RCS.

Alternate Path – YES. During the valve alignment 1CS-214, Common Normal Mini-flow Isolation Valve, will fail to open. This failure will require the operator to use RNO actions to ensure minimum Charging Flow is established for the running CSIP prior to terminating SI flow by shutting BIT outlet valves 1SI-3 and 1SI-4.

JPM completion: When Charging + Seal Injection flow is being maintained at >60 gpm the CRS will notify the OATC that the task is complete and another operator will continue implementing the procedure.

2020 NRC Control Room/In-Plant JPM Summary

Simulator JPMs (continued)

JPM d – **Start a RCP and respond to a subsequent Spray valve failure (OP-100, AOP-019) (JPM-CR-005-g) SRO Upgrade - Alternate Path - Modified**

K/A 002 A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCS controls including: Primary and secondary pressure (CFR: 41.5 / 45.7) RO 3.8 SRO 4.1

Evaluated position: Operator at the Controls (OATC) responsibilities

Turnover: A plant startup will be in progress with the 'B' and 'C' RCPs in operation. Maintenance has been completed on the 'A' RCP. The CRS has directed the OATC to start the 'A' RCP in accordance with OP-100, Reactor Coolant System.

Task: Start the 'A' RCP, identify the associated PRZ Spray valve (1RC-107) fails open and must be manually shut.

Verifiable actions: The candidate will be required to operate the RCP and its Oil Lift system to start the 'A' RCP in accordance with OP-100, while monitoring progress using MCB indicators and computer screens (ERFIS). The candidate will be required to operate the PRZ Spray valve (1RC-107).

Alternate Path – YES. After the RCP is started the 'A' RCP Spray valve will fail open resulting in lowering RCS pressure and various MCB annunciators. The candidate will be expected to enter AOP-019, Malfunction Of RCS Pressure Control and perform the immediate actions to take manual control of the spray valve and shut the valve. This will preclude an RCS pressure reduction to a Safety Injection actuation setpoint.

JPM completion: When the candidate has shut the RCP 'A' Spray valve, 1RC-107 and the SRO has been informed that the task is unsuccessful, evaluation on this JPM is complete.

Modification: Modified by changing the affected RCP from RCP 'A' to RCP 'B''. This will require the candidate to locate control switches and indications additionally the plant response will vary from the original JPM due to response of the PRZ Pressure system with RCP 'B' secured. RCP 'B' is the dominant Spray valve due to its location in reference to the Pressurizer the system is faster to respond to the changes in pressure.

JPM e – Return the Containment Fan Coolers to normal following an SI actuation. (OP-169) (JPM-CR-260-a) - Direct

K/A 022 A4.01 Ability to manually operate and/or monitor in the control room: CCS fans (CFR: 41.7 / 45.5 to 45.8) RO 3.6 SRO 3.6

Evaluated position: Balance of Plant (BOP) Operator responsibilities.

Turnover: The plant is tripped due to an inadvertent SI initiation has occurred and the control room staff has entered EOP-E-0 and EOP-ES-1.1. Attachment 1 of EOP-ES-1.1 is being performed to realign plant systems. The CRS has directed the BOP to realign CMNT

2020 NRC Control Room/In-Plant JPM Summary

Simulator JPMs (continued)

JPM e (continued)

Fan Coolers in accordance with OP-169 Section 8.4. The candidate will be directed to align the A Train of CNMT Fan Coolers for normal service.

Task: Place Containment Cooling Fans in Max Cooling Mode.

Verifiable actions: The candidate will secure both A Train CNMT Fan Coolers and verify proper damper alignment for the secured fans. The candidate will restart the A Train Fans per section 5.1 of OP-169. To minimize the starting current required for Hi-Speed operation the fans are initially started in Lo-Speed, then stopped and restarted in Hi-Speed

Alternate Path – NO.

JPM completion: Once the B Train of CNMT Fan Coolers are in standby and the determination is made that Maximum Cooling Mode is NOT required, evaluation on this JPM is complete.

JPM f – Shutdown EDG A-SA from MCB (for maintenance) Field Flash stays energized (OP-155)
(JPM-CR-292-c) SRO Upgrade - Alternate Path - Modified

K/A 064 A4.06 – Ability to manually operate and/or monitor in the control room: Manual start, loading, and stopping of the ED/G
(CFR: 41.7 / 45.5 to 45.8) RO 3.9 SRO 3.9

Evaluated position: Balance of Plant (BOP) Operator responsibilities.

Turnover: The plant is operating at 100% power steady state middle of life (MOL). The 'A' EDG is running in parallel with the grid to support testing of the governor. Testing of the governor is complete and the previous shift has reduced the EDG load from 6.0 MW to 2.3 MW and 1 MVAR over the last 30 minutes per OP-155, Diesel Generator Emergency Power System, Section 7.1. The CRS has directed the BOP to observe the NOTE prior to OP-155 section 7.1.2, Step 4, and continue shutting down the 'A' EDG.

Task: Shutdown EDG A-SA from the MCB.

Verifiable actions: The candidate will have to reduce load from 2.2 MW to 0.5 MW during this time and divorce the 'EDG from the grid in accordance with OP-155, Diesel Generator Emergency Power System, Section 7.1.2. Once the 'A' EDG is separated from the grid after stack exhaust temperatures are checked the 'A' EDG is stopped.

Alternate Path – YES. The 'A' field breaker will remain shut and field voltage will remain on the 'A' EDG which will require the candidate to emergency stop the 'A' EDG in order to remove the field flashing voltage from the 'A' EDG.

JPM completion: When the candidate emergency stops the 'A' EDG and the SRO is informed, evaluation on this JPM is complete.

2020 NRC Control Room/In-Plant JPM Summary

Simulator JPMs (continued)

JPM f (continued)

Modification: Modified by changing the affected EDG from EDG 'B' to EDG 'A'. This will require the candidate to locate control switches and indications from a different section of the MCB.

JPM g – Power Range NI Gain Adjustment (OP-105)
(JPM CR-210-a) **RO Only - Direct**

K/A 015 A4.02 Ability to manually operate and/or monitor in the control room: NIS indicators (CFR: 41.7 / 45.5 to 45.8) RO 3.9 SRO 3.9

Evaluated position: Balance of Plant (BOP) Operator responsibilities.

Turnover: The plant is operating at 100% power steady state middle of life (MOL). Maintenance on PR Channel N-41, all required testing has been completed and the channel is ready to be returned to service. A calorimetric has just been performed per OST-1000, Power Range Heat Balance, ERFIS Online Calculation, Daily Interval, Mode 1 (Above 15% Power). The calculated power is 99.64%. The CRS has directed the BOP to perform the Power Range NI Gain Adjust for PR channel N-41 in accordance with OP-105, Excore Nuclear Instrumentation, Section 8.3 and Attachment 2.

Task: Power Range NI Gain Adjustment.

Verifiable actions: The candidate will be required to perform a calculation to determine the difference in the calculated power and the current indicated power of the Nuclear instrument and place the Rod Control system in manual to properly align the plant in accordance with OP-105, Excore Nuclear Instrumentation, Attachment 2, while monitoring progress using MCB.

Alternate Path – NO.

JPM completion: When the adjustments to return the NI's within 2% are complete and the switches are in the original configuration, evaluation on this JPM is complete.

JPM h – Align CCW to Support RHR System (OP-145)
(JPM CR-085-b) Direct

K/A 008 A4.10 Ability to manually operate and/or monitor in the control room: Conditions that require the operation of two CCW coolers
(CFR: 41.7 / 45.5) RO 3.1 / SRO 3.1

Evaluated position: Operator at the Controls (OATC) responsibilities.

Turnover: The plant is in Mode 4, going to Mode 5. Preparations are underway to place both trains of RHR in service. Both ESW trains are in service. CCW Pump "A" is running. The CRS has directed the OATC to align CCW to support RHR operation in accordance with OP-145, Component Cooling Water.

2020 NRC Control Room/In-Plant JPM Summary

Simulator JPMs (continued)

JPM h (continued)

Task: Align CCW to Support RHR System.

Verifiable actions: The candidate will be required to start a second CCW pump and realign the CCW system to supply the A and B train essential header to supply RHR, and isolate the A train essential header of the CCW from the non-essential header in accordance with OP-145, Component Cooling Water, Section 8.9 and 5.2 while monitoring CCW system operating parameters using MCB level and pressure indicators and computer screens (ERFIS).

Alternate Path – NO.

JPM completion: When the candidate contacts the AO to verify CCW flow locally then evaluation on this JPM is complete.

Modification: The most current revision of this OP has a new attachment which will modify this JPM by having the Operator document as found values for the RHR HX and RHR Pump Cooler Outlet flows along with the as left values of these flows. This attachment provides a new table for the operator to document the information along with new opportunities for the operator to direct local actions.

2020 NRC Control Room/In-Plant JPM Summary

In-Plant JPMs

JPM i – Restore Power to an Emergency Bus (OP-155)
(JPM IP-239-a) Alternate Path - Modified

K/A 068 AA1.10 Ability to operate and / or monitor the following as they apply to the Control Room Evacuation: Power distribution: ac and dc
(CFR 41.7 / 45.5 / 45.6) RO 3.7 / SRO 3.9

Evaluated position: EDG Building / Balance of the Plant Operator (BOP) responsibilities during AOP-004 implementation.

Turnover: AOP-004 has been entered due to a fire in the MCR. 'B' Safety bus is not energized due to a SUT fault. EDG 1B-SB was in standby operation but did not automatically start. AOP-004 has directed that the 'B' EDG be locally started and 'B' safety bus energized. Both safety and non-safety Plant DC Distribution Systems are in operation per OP-156.01 to support EDG operation. The manual transfer to LOCAL has been completed at the Main Transfer Panel 1B-SB.

Task: Locally start the 'B' EDG IAW OP-155 Section 8.14.2

Verifiable actions: Note- all actions will be simulated. Locate the EDG 1B-SB push to start pushbutton and start the 1B-SG EDG by depressing the pushbutton. Locate the K1 relay and position the switch in the reset position.

Alternate Path – YES. The EDG should automatically flash the field of the Generator once EDG speed is greater than approximately 200 RPM. This failure requires the candidate to locate the K1 relay behind the GCP left section door to manually reset the K2 relay.

JPM completion: Once the candidate has simulated starting the 'B' EDG and the K1 relay has been reset the JPM is complete.

Modification: This JPM has been modified by changing status of the K1 relay which requires the candidate to complete alternative field actions to reset the K1 relay to allow the EDG field to flash.

JPM j – Place the ASI System in Standby Alignment (OP-185)
(JPM-IP-291-a) SRO Upgrade - Direct

K/A 004 A4.11 Ability to manually operate and/or monitor in the control room: RCP Seal injection flow
(CFR: 41.7 / 45.5 to 45.8) RO 3.4 / SRO 3.3

NOTE: This JPM is inside the RCA.

Evaluated position: Auxiliary Operator in the RAB (AO RAB)

Turnover: The plant is in Mode 4 and a heat up is in progress. The CRS directs the candidate to place the ASI system in automatic standby alignment in accordance with OP-185 section 5.1.

Task: Locally place the ASI system in automatic standby alignment.

In-plant JPMs (continued)

JPM j (continued)

Verifiable actions: The candidate will verify the ASI supply header isolation valves are open and the de-energized status of the ASI system control panel. The candidate will realign the ASI pump to automatic and return the Squib valve bypass control switches to normal alignment on the ASI control panel. The candidate will turn on the ASI system control panel feeder supply breaker and the ASI pump power supply breaker. The candidate will recheck the indications on the ASI system control panel for the proper standby alignment of the system.

Alternate Path – NO.

JPM completion: Once the candidate proceeds to section 5.1.3, Automatic Standby alignment configuration control closeout the evaluation on this JPM is complete.

JPM k – Isolate the SI Accumulators After a Control Room Evacuation (AOP-004) (JPM-IP-232-a) SRO Upgrade - Direct

K/A APE 068 AG2.1.30 Ability to locate and operate components, including local controls. (CFR: 41.7 / 45.7) RO 4.4 / SRO 4.0

Evaluated position: Auxiliary Operator in the Turbine Building (AO TB)

Turnover: The unit Main Control Room has been evacuated due to a fire. The crew is performing a cooldown in accordance with AOP-004, Remote Shutdown. The CRS will direct the candidate to isolate SI Accumulators. The candidate will perform AOP-004 step 30.

Task: Locally isolate the SI accumulators after Control room evacuation.

Verifiable actions: The JPM cues include information of the proper status of the power supply light indications. The candidate will be required to locate each breaker cubicle and reposition both breakers, then obtain the key for the Auxiliary Transfer Panel in order to reposition the SI Accumulator isolation valves from this location. The candidate will be required to identify the individual indicating lights on the local control panel and operate the control panel pushbuttons.

Alternate Path – NO.

JPM completion: Once the CRS is notified that AOP-004, step 30 is complete and the SI Accumulators are isolated then evaluation on this JPM is complete.

ES-301 **Operating Test Review Worksheet** **Form ES-301-7**

Facility: Harris												**Exam Date: Nov 2020**	
Admin JPMs	1 ADMIN Topic and K/A	2 LOD (1-5)	3 Attributes							4 Job Content		5 U/E/S	6 Explanation
			I/C Focus	Cues	Critical Steps	Scope (N/B)	Overlap	Perf. Std.	Key	Minutia	Job Link		
RO A1-1	COO	2										E	
RO A1-2	COO	2										E	
RO A2	EC	2										E	
RO A3	RAD	2										E	
SRO A1-1	COO	2										E	
SRO A1-2	COO	2										E	
SRO A2	EC	2										E	
SRO A3	RAD	2										E	
SRO A4	EP	2											
													Comments attached.

ES-301 **Operating Test Review Worksheet** **Form ES-301-7**

Facility: Harris **Exam Date: Nov 2020**

Simulator/In-Plant JPMs	1 Safety Function and K/A	2 LOD (1-5)	3 Attributes							4 Job Content		5 U/E/S	6 Explanation
			I/C Focus	Cues	Critical Steps	Scope (N/B)	Overlap	Perf. Std.	Key	Minutia	Job Link		
A	1	2										S	Minor discrepancies on critical step designations were
B	2	2										S	noted on some JPMs. They will be evaluated on
C	3	2										S	Prep week.
D	4P	2										S	
E	5	2										S	
F	6	2										S	
G	7	2										S	
H	8	2										S	
I	6	2										S	
J	2	2										S	
K	8	2										S	
													Comments attached.

Instructions for Completing This Table:

Check or mark any item(s) requiring a comment and explain the issue in the space provided using the guide below.

1. Check each JPM for appropriate administrative topic requirements (COO, EC, Rad, and EP) or safety function requirements and corresponding K/A. Mark in column 1. (ES-301, D.3 and D.4)

2. Determine the level of difficulty (LOD) using an established 1–5 rating scale. Levels 1 and 5 represent an inappropriate (low or high) discriminatory level for the license that is being tested. Mark in column 2 (Appendix D, C.1.f)

3. In column 3, "Attributes," check the appropriate box when an attribute is **not met**:
   - The initial conditions and/or initiating cue is clear to ensure the operator understands the task and how to begin. (Appendix C, B.4)
   - The JPM contains appropriate cues that clearly indicate when they should be provided to the examinee. Cues are objective and not leading. (Appendix C, D.1)
   - All critical steps (elements) are properly identified.
   - The scope of the task is not too narrow (N) or too broad (B).
   - Excessive overlap does not occur with other parts of the operating test or written examination. (ES-301, D.1.a, and ES-301, D.2.a)
   - The task performance standard clearly describes the expected outcome (i.e., end state). Each performance step identifies a standard for successful completion of the step.
   - A valid marked up key was provided (e.g., graph interpretation, initialed steps for handouts).

4. For column 4, "Job Content," check the appropriate box if the job content flaw **does not meet** the following elements:
   - Topics are linked to the job content (e.g., not a disguised task, task required in real job).
   - The JPM has meaningful performance requirements that will provide a legitimate basis for evaluating the applicant's understanding and ability to safely operate the plant. (ES-301, D.2.c)

5. Based on the reviewer's judgment, is the JPM as written (U)nacceptable (requiring repair or replacement), in need of (E)nhancement, or (S)atisfactory? Mark the answer in column 5.

6. In column 6, provide a brief description of any (U)nacceptable or (E)nhancement rating from column 5.

Save initial review comments and detail subsequent comment resolution so that each exam-bound JPM is marked by a (S)atisfactory resolution on this form.

Facility: Harris					Scenario: 1				Exam Date: Nov 2020
1 Event	2 Realism/Cred.	3 Required Actions	4 Verifiable actions	5 LOD	6 TS	7 CTs	8 Scen. Overlap	9 U/E/S	10 Explanation
1								S	
2								S	
3								S	
4					X			S	
5								S	
6					X			S	Acceptance criteria for leak rate calc needed.
7						X	X	S	
8						X		S	
9								S	
									Comments attached.

Facility: Harris					Scenario: 2				Exam Date: Nov 2020
1 Event	2 Realism/Cred.	3 Required Actions	4 Verifiable actions	5 LOD	6 TS	7 CTs	8 Scen. Overlap	9 U/E/S	10 Explanation
1								S	
2					X			S	
3					X			S	
4								S	
5						X	X	S	CT – manual RPS actuation is also CT failure.
6						X	X	S	CT – manual RPS actuation is also CT failure.
7						X		S	
8								S	
9						X		S	
									Note; No MCAF for RO.
									Comments attached.

Facility: Harris					Scenario: 3				Exam Date: Nov 2020
1 Event	2 Realism/Cred.	3 Required Actions	4 Verifiable actions	5 LOD	6 TS	7 CTs	8 Scen. Overlap	9 U/E/S	10 Explanation
1								S	
2							X	S	
3								S	
4					X		X	S	
5					X	x		S	CT – manual RPS actuation is also CT failure.
6							X	S	
7								S	
8						X	X	S	
9						X		S	
10								S	
									Note: No MCAF for BOP.
									Comments attached.

Facility: Harris					Scenario: 4				Exam Date: Nov 2020
1 Event	2 Realism/Cred.	3 Required Actions	4 Verifiable actions	5 LOD	6 TS	7 CTs	8 Scen. Overlap	9 U/E/S	10 Explanation
1								S	
2					X			S	
3					X			S	
4								S	
5					X	X		S	CT – manual RPS actuation is also CT failure.
6					X	X		S	CT – manual RPS actuation is also CT failure.
7								S	
8								S	
9								S	
10								S	
									Note: No MCAF for RO.
									Comments attached.

Instructions for Completing This Table:

Use this table for each scenario for evaluation.

2 Check this box if the events are not related (e.g., seismic event followed by a pipe rupture) **OR** if the events do not obey the laws of physics and thermodynamics.

3, 4 In columns 3 and 4, check the box if there is **no** verifiable or required action, as applicable. Examples of required actions are as follows: (ES-301, D.5f)

- opening, closing, and throttling valves
- starting and stopping equipment
- raising and lowering level, flow, and pressure
- making decisions and giving directions
- acknowledging or verifying key alarms and automatic actions (Uncomplicated events that require no operator action beyond this should **not** be included on the operating test unless they are necessary to set the stage for subsequent events. (Appendix D, B.3).)

5 Check this box if the level of difficulty is **not** appropriate.

6 Check this box if the event has a TS.

7 Check this box if the event has a critical task (CT). If the same CT covers more than one event, check the event where the CT started **only.**

8 Check this box if the event overlaps with another event on any of the last two NRC examinations. (Appendix D, C.1.f)

9 Based on the reviewer's judgment, is the event as written (U)nacceptable (requiring repair or replacement), in need of (E)nhancement, or (S)atisfactory? Mark the answer in column 9.

10 Record any explanations of the events here.

In the shaded boxes, sum the number of check marks in each column.

- In column 1, sum the number of events.
- In columns 2–4, record the total number of check marks for each column.
- In column 5, based on the reviewer's judgement, place a checkmark only if the scenario's LOD is not appropriate.
- In column 6, TS are required to be ≥ 2 for each scenario. (ES-301, D.5.d)
- In column 7, preidentified CTs should be ≥ 2 for each scenario. (Appendix D; ES-301, D.5.d; ES-301-4)
- In column 8, record the number of events not used on the two previous NRC initial licensing exams. A scenario is considered unsatisfactory if there is < 2 new events. (ES-301, D.5.b; Appendix D, C.1.f)
- In column 9, record whether the scenario as written (U)nacceptable, in need of (E)nhancement, or (S)atisfactory from column 11 of the simulator scenario table.

Facility: Harris **Exam Date: Nov 2020**

Scenario	1 Event Totals	2 Events Unsat.	3 TS Total	4 TS Unsat.	5 CT Total	6 CT Unsat.	7 % Unsat. Scenario Elements	8 U/E/S	11 Explanation
1	9	0	2	0	2	0	0	S	
2	9	0	2	0	4	0	0	S	
3	10	0	2	0	3	0	0	S	
4	10	0	4	0	3	0	0	S	

Instructions for Completing This Table:

Check or mark any item(s) requiring comment and explain the issue in the space provided.

1, 3, 5 For each simulator scenario, enter the **total** number of events (column 1), TS entries/actions (column 3), and CTs (column 5).
This number should match the respective scenario from the event-based scenario tables (the sum from columns 1, 6, and 7, respectively).

2, 4, 6 For each simulator scenario, evaluate each event, TS, and CT as (S)atisfactory, (E)nhance, or (U)nsatisfactory based on the following criteria:

a. Events. Each event is described on a Form ES-D-2, including all switch manipulations, pertinent alarms, and verifiable actions. Event actions are balanced between at-the-controls and balance-of-plant applicants during the scenario. All event-related attributes on Form ES-301-4 are met. Enter the total number of unsatisfactory events in column 2.

b. TS. A scenario includes at least two TS entries/actions across at least two different events. TS entries and actions are detailed on Form ES-D-2. Enter the total number of unsatisfactory TS entries/actions in column 4. (ES-301, D.5d)

c. CT. Check that a scenario includes at least two preidentified CTs. This criterion is a target quantitative attribute, not an absolute minimum requirement. Check that each CT is explicitly bounded on Form ES-D-2 with measurable performance standards (see Appendix D). Enter the total number of unsatisfactory CTs in column 6.

7 In column 7, calculate the percentage of unsatisfactory scenario elements: $\left(\frac{2+4+6}{1+3+5}\right)100\%$

8 If the value in column 7 is > 20%, mark the scenario as (U)nsatisfactory in column 8. If column 7 is ≤ 20%, annotate with (E)nhancement or (S)atisfactory.

9 In column 9, explain each unsatisfactory event, TS, and CT. Editorial comments can also be added here.

Save initial review comments and detail subsequent comment resolution so that each exam-bound scenario is marked by a (S)atisfactory resolution on this form.

Site name: **Harris** **Exam Date:** **Nov 2020**

OPERATING TEST TOTALS

	Total	Total Unsat.	Total Edits	Total Sat.	% Unsat.	Explanation
Admin. JPMs	9	0	9	0		
Sim./In-Plant JPMs	11	0	0	11		
Scenarios	4	0	0	4		
Op. Test Totals:	24	0	9	33	0	

Instructions for Completing This Table:

Update data for this table from quality reviews and totals in the previous tables and then calculate the percentage of total items that are unsatisfactory and give an explanation in the space provided.

1. Enter the total number of items submitted for the operating test in the "Total" column. For example, if nine administrative JPMs were submitted, enter "9" in the "Total" items column for administrative JPMs. For scenarios, enter the total number of simulator scenarios.

2. Enter the total number of (U)nsatisfactory JPMs and scenarios from the two JPMs column 5 and simulator scenarios column 8 in the previous tables. Provide an explanation in the space provided.

3. Enter totals for (E)nhancements needed and (S)atisfactory JPMs and scenarios from the previous tables. This task is for tracking only.

4. Total each column and enter the amounts in the "Op. Test Totals" row.

5. Calculate the percentage of the operating test that is (U)nsatisfactory (Op. Test Total Unsat.)/(Op. Test Total) and place this value in the bolded "% Unsat." cell.

   Refer to ES-501, E.3.a, to rate the overall operating test as follows:
   - satisfactory, if the "Op. Test Total" "% Unsat." is ≤ 20%
   - unsatisfactory, if "Op. Test Total" "% Unsat." is > 20%

6. Update this table and the tables above with post-exam changes if the "as-administered" operating test required content changes, including the following:
   - The JPM performance standards were incorrect.
   - The administrative JPM tasks/keys were incorrect.
   - CTs were incorrect in the scenarios (not including postscenario critical tasks defined in Appendix D).
   - The EOP strategy was incorrect in a scenario(s).
   - TS entries/actions were determined to be incorrect in a scenario(s).

Simulator Scenarios

#	JPM	Comment / Question
1	General	Critical Task Criteria for many of the Critical Tasks (I.E. Scenario 2 Events 5 and 6, Scenario 4, Events 5 and 6, and Scenario 3, Event 5) state that an automatic RPS actuation must be avoided as part of successful completion. However, if an applicant manually trips the reactor in these instances, then a critical task would also be failed. The criteria needs to be updated to reflect that any RPS actuation, automatic or manual, would constitute a critical task failure.
2	Scen 1 Event 3	How accurate does the leak rate calculation need to be? A leak rate calculation is a creditable verifiable action but there needs to be an acceptance band for the answer stated in the D-2. Consideration should be given to operational impact when determining the acceptance band. In other words, the acceptance band only needs to be accurate enough so that all the correct procedural actions and Tech Specs are performed. This comment would apply for any RCS leakage within any of the scenarios.
3	Notes	I did not see Manual Control of Automatic Function for the following scenarios and board positions. I am noting them here so that you can educate me if I missed one. In any case, we just need to keep this in mind when we set up the schedule so that we plan on every applicant getting an opportunity. Scenario 2: RO Scenario 3: BOP Scenario 4: RO We will observe the 4 scenarios during prep week and then decide which one will be the spare. A contributing factor in that selection will be ensuring each applicant gets an opportunity for Manual Control of Automatic Function.

Systems JPMs

#	JPM	Comment / Question
1	General	Critical Step Designations should include all steps necessary to accomplish the originally assigned task, even when those steps will not be successful due to JPM design. There is a very good reason for this which I can explain with an AP-1000 example. JPMs "A" and "F" may have some additional steps that need to be designated as Critical Steps. I made this comment as a general comment as a reminder to review all the Alternate Path JPMs for additional Critical Steps. The exam team will evaluate these further during Prep Week as well.
2	G	Step 14 Acceptance Criteria: Is it acceptable to have criteria for the JPM that is outside of the Procedure Acceptance Criteria? The step standard may require revision.

Admin JPMs

#	JPM	Comment / Question
1	RO A1-1	ROs are responsible for knowing the one hour or less Tech Specs. Therefore, the JPM for the ROs should have them evaluate Tech Specs and the Standard should only hold them accountable for the one hour or less portions of the Tech Spec Required Actions.
2	RO A1-1 SRO A1-1	The computer point nomenclature and descriptions in the JPM step do not exactly match – should they be the same?
3	RO A1-1 SRO A1-1	Performance Step 8: plus or minus 2% would be too big of a band for evaluating axial power. 1% would be more appropriate.
4	RO A1-1 SRO A1-1	What is the purpose for making the quality of the points "bad" for the same points that are outside the limits? Would it be a better task if the values were within the limits?
5	RO A1-1 SRO A1-1	Performance Step 7: The Step Standard states that the quality codes are not acceptable for four of the points, but it then states that the AFD monitor does met (sic) the criteria for Operable status. We need to ensure the accuracy of the Step Standard.
6	RO A1-1 SRO A1-1	Performance Steps 10 and 11: The JPM states that interpolation is required. Do applicants not have access to the graph? Why would anyone interpolate?
7	SRO A1-1	The Tech Spec evaluation should include the times when the required actions must be completed. This may require a time to be specified in the Initial Conditions or Initiating Cue. Tracking the actual times when actions need to be completed will allow for a better evaluation of Tech Spec Action times.
8	RO A1-2	Based on system design, the max boric acid flow rate is 30 gpm. Therefore, in order to actually determine the maximum make-up flow, the blended flow would utilize the maximum boric acid flow rate. It would appear that the correct answer would utilize 30 gpm boric acid flow – it this not correct?
9	RO A1-2	Performance Step 3 Standard – standard should state that the applicant reads Note and consults OP-107.01, Att 7 to determine max make-up rate.
10	RO A1-2	The second bullet in the Initial Conditions that the applicant gets states that an air leak has occurred, but the other set provided for the examiner does not contain that information.
11	SRO A1-2	Procedurally, where is the normal refueling level found? Information requested to verify that the provided graph represents the normal refueling level. The figures supplied with the JPM indicate that the level is "at" the vessel flange.
12	SRO A1-2	Performance Step 5's Standard needs to be more specific. The Standard needs to state the specific information that applies from Table 1. For instance, actions must be taken to maintain level between 12 and 36 inches below the vessel flange.
13	RO A2	The Initiating Cue should not tell them to use SFDs and Plant Procedures – the applicants should know what resources they have at their disposal?
14	SRO A2	The Task Standard and Tech Spec application should be specific to the exact actions and times when those actions need to be completed. Times may need to be provided in the Initial Conditions and Initiating Cues. This will allow for a better evaluation of the applicant's understanding of application of completion times.

15	RO A3	How or why would the applicant interpolate? How would an applicant know which point to choose as his interpolation point? We need to determine a way to ensure that there is only one answer. The acceptance band can account for truncation and rounding, as long as it does not impact the integrity of the answer. But, the chosen dose rate needs to be precise so that we know they understand how to perform the calculation. Other dose rates in the area need to be such that, if the wrong dose rate is used, then the answer they would get is incorrect.
16	SRO A4	Would it be possible to make the Emergency Air Lock Late Date 11/20/2020? Would doing so negatively impact the JPM?

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ES-401, Rev. 11 **PWR Examination Outline** **Form ES-401-2**

Facility: HARRIS Date of Exam: NOVEMBER 2020

Tier	Group	RO K/A Category Points											SRO-Only Points		
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	3	3	6
	2	1	1	2				2	2			1	9	2	2	4
	Tier Totals	4	4	5				5	5			4	27	5	5	10
2. Plant Systems	1	3	2	3	2	2	3	3	2	3	3	2	28	2	3	5
	2	0	1	1	1	1	1	1	1	1	1	1	10	2	1	3
	Tier Totals	3	3	4	3	3	4	4	3	4	4	3	38	4	4	8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			2			2			3			1	2	2	2	

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 Radiation Control K/A is allowed if the K/A is replaced by a K/A from another Tier 3 Category).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7. *The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to section D.1.b of ES-401 for the applicable KAs.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics= importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note # 1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43..

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KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
007EK1.05	Reactor Trip - Stabilization - Recovery / 1	3.3	3.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Decay power as a function of time
008AA1.03	Pressurizer Vapor Space Accident / 3	2.8	2.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Turbine bypass in manual control to maintain header pressure
009EK3.02	Small Break LOCA / 3	2.8	3.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Opening excess letdown isolation valve
011EA2.13	Large Break LOCA / 3	3.7	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Difference between overcooling and LOCA indications
015AA2.11	RCP Malfunctions / 4	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	When to jog RCPs during ICC
022AK1.01	Loss of Rx Coolant Makeup / 2	2.8	3.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Consequences of thermal shock to RCP seals
025AA1.12	Loss of RHR System / 4	3.6	3.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	RCS temperature indicators
026AG2.1.23	Loss of Component Cooling Water / 8	4.3	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform specific system and integrated plant procedures during all modes of plant operation.
027AK2.03	Pressurizer Pressure Control System Malfunction / 3	2.6	2.8	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Controllers and positioners
029EK2.06	ATWS / 1	2.9	3.1	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Breakers, relays, and disconnects.
038EK1.03	Steam Gen. Tube Rupture / 3	3.9	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Natural circulation

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
054AK3.04	Loss of Main Feedwater / 4	4.4	4.6	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in EOPs for loss of MFW
056AA2.44	Loss of Off-site Power / 6	4.3	4.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Indications of loss of offsite power
057AG2.2.38	Loss of Vital AC Inst. Bus / 6	3.6	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of conditions and limitations in the facility license.
062AK3.03	Loss of Nuclear Svc Water / 4	4	4.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Guidance actions contained in EOP for Loss of nuclear service water
065AA1.04	Loss of Instrument Air / 8	3.5	3.4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Emergency air compressor
WE05EK2.2	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	3.9	4.2	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems and relations between the proper operation of these systems to the operation of the facility.
we12EG2.1.2	Steam Line Rupture - Excessive Heat Transfer / 4	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
				3	3	3	0	0	0	3	3	0	0	3	

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003AK3.05	Dropped Control Rod / 1	3.4	4.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Tech-Spec limits for reduction of load to 50% power if flux cannot be brought back within specified target band
	Changed to 003AK3.06 - see ES-401-4														
024AA2.06	Emergency Boration / 1	3.6	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	When boron dilution is taking place
059AK3.04	Accidental Liquid RadWaste Rel. / 9	3.8	4.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in EOP for accidental liquid radioactive-waste release
061AA1.01	ARM System Alarms / 7	3.6	3.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Automatic actuation
069AA1.01	Loss of CTMT Integrity / 5	3.5	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Isolation valves, dampers and electropneumatic devices.
we02EG2.4.45	SI Termination / 3	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to prioritize and interpret the significance of each annunciator or alarm.
WE07EA2.1	Saturated Core Cooling Core Cooling / 4	3.2	4.0	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
WE13EK2.1	Steam Generator Over-pressure / 4	3.0	3.1	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features.
WE16EK1.2	High Containment Radiation / 9	2.7	3.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Normal, abnormal and emergency operating procedures associated with (High Containment Radiation).
				1	1	2	0	0	0	2	2	0	0	1	

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003K4.07	Reactor Coolant Pump	3.2	3.4	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Minimizing RCS leakage (mechanical seals)
004K5.44	Chemical and Volume Control	3.2	3.4	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Pressure response in PZR during in-and-out surge
005K2.03	Residual Heat Removal	2.7	2.8	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	RCS pressure boundary motor-operated valves
006A3.03	Emergency Core Cooling	4.1	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	ESFAS-operated valves
007K4.01	Pressurizer Relief/Quench Tank	2.6	2.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Quench tank cooling
008K1.05	Component Cooling Water	3.0	3.1	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Sources of makeup water
008K3.03	Component Cooling Water	4.1	4.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RCP
010A3.01	Pressurizer Pressure Control	3.0	3.2	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	PRT temperature and pressure during PORV testing
012A1.01	Reactor Protection	2.9	3.4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Trip setpoint adjustment
012K6.02	Reactor Protection	2.9	3.1	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Redundant channels
013K1.15	Engineered Safety Features Actuation	3.4	3.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	MFW System

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
013K6.01	Engineered Safety Features Actuation	2.7	3.1						☑						Sensors and detectors
022K1.02	Containment Cooling	3.7	3.5	☑											SEC/remote monitoring systems
026A1.03	Containment Spray	3.5	3.5							☑					Containment sump level
026K3.02	Containment Spray	4.2	4.3			☑									Recirculation spray system
039A3.02	Main and Reheat Steam	3.1	3.5									☑			Isolation of the MRSS
039G2.1.30	Main and Reheat Steam	4.4	4.0											☑	Ability to locate and operate components, including local controls.
059A4.01	Main Feedwater	3.1	3.1										☑		MFW turbine trip indication
061K2.03	Auxiliary/Emergency Feedwater	4.0	3.8		☑										AFW diesel driven pump
061K5.05	Auxiliary/Emergency Feedwater	2.7	3.2					☑							Feed line voiding and water hammer
062A2.04	AC Electrical Distribution	3.4	3.1								☑				Effect on plant of de-energizing a bus
063A2.01	DC Electrical Distribution	2.5	3.2								☑				Grounds

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
063A4.03	DC Electrical Distribution	3.0	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Battery discharge rate
064K6.07	Emergency Diesel Generator	2.7	2.9	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Air receivers
073A1.01	Process Radiation Monitoring	3.2	3.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Radiation levels
076G2.4.46	Service Water	4.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify that the alarms are consistent with the plant conditions.
078K3.01	Instrument Air	3.1	3.4	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Containment air system
103A4.03	Containment	2.7	2.7	☐ 3	☐ 2	☐ 3	☐ 2	☐ 2	☐ 3	☐ 3	☐ 2	☐ 3	☑ 3	☐ 2	ESF slave relays

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
002K5.14	Reactor Coolant	3.8	4.2	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Consequences of forced circulation loss
015K6.01	Nuclear Instrumentation	2.9	3.2	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Sensors, detectors and indicators
016K3.12	Non-nuclear Instrumentation	3.4	3.6	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	S/G
027K2.01	Containment Iodine Removal	3.1	3.4	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fans
028A1.02	Hydrogen Recombiner and Purge Control	3.4	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Containment pressure
034A2.03	Fuel Handling Equipment	3.3	4.0	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Mispositioned fuel element
071K4.06	Waste Gas Disposal	2.7	3.5	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Sampling and monitoring of waste gas release tanks
072G2.4.21	Area Radiation Monitoring	4.0	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the parameters and logic used to assess the status of safety functions
075A4.01	Circulating Water	3.2	3.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Emergency/essential SWS pumps
086A3.01	Fire Protection	2.9	3.3	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Starting mechanisms of fire water pumps

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.1	Conduct of operations	3.8	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of conduct of operations requirements.
G2.1.27	Conduct of operations Changed to G2.1.29 - see ES-401-4.	3.9	4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system purpose and or function.
G2.1.5	Conduct of operations	2.9	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate and use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.
G2.2.2	Equipment Control	4.6	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.
G2.2.42	Equipment Control	3.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize system parameters that are entry-level conditions for Technical Specifications
G2.3.5	Radiation Control	2.9	2.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use radiation monitoring systems
G2.3.7	Radiation Control	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to comply with radiation work permit requirements during normal or abnormal conditions
G2.4.1	Emergency Procedures/Plans	4.6	4.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of EOP entry conditions and immediate action steps.
G2.4.32	Emergency Procedures/Plans	3.6	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of operator response to loss of all annunciators.
G2.4.4	Emergency Procedures/Plans	4.5	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
055EA2.06	Station Blackout / 6	3.7	4.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Faults and lockouts that must be cleared prior to re-energizing buses
058AG2.1.19	Loss of DC Power / 6	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
	Cahnged to 058AG2.1.7 - see ES-401-4.														
077AA2.08	Generator Voltage and Electric Grid Disturbances / 6	4.3	4.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Criteria to trip the turbine or reactor
WE04EA2.2	LOCA Outside Containment / 3	3.6	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.
we11EG2.4.2	Loss of Emergency Coolant Recirc. / 4	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of operational implications of EOP warnings, cautions and notes.
we12EG2.4.1	Steam Line Rupture - Excessive Heat Transfer / 4	3.3	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the specific bases for EOPs.
											3	0	0	3	

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
005AG2.4.31	Inoperable/Stuck Control Rod / 1	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of annunciators alarms, indications or response procedures
032AA2.06	Loss of Source Range NI / 7	3.9	4.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Confirmation of reactor trip
051AG2.1.7	Loss of Condenser Vacuum / 4	4.4	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior and instrument interpretation.
WE03EA2.1	LOCA Cooldown - Depress. / 4	3.4	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
											2	0	0	2	

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
004A2.03	Chemical and Volume Control	3.6	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Boundary isolation valve leak
006A2.13	Emergency Core Cooling	3.9	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Inadvertent SIS actuation
010G2.2.25	Pressurizer Pressure Control	3.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.
076G2.2.40	Service Water	3.4	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to apply technical specifications for a system.
103G2.2.12	Containment	3.7	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of surveillance procedures.

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KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001G2.1.32	Control Rod Drive	3.8	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to explain and apply all system limits and precautions.
011A2.09	Pressurizer Level Control	2.9	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	High ambient reflux boiling temperature effect or indicated PZR level
014A2.04	Rod Position Indication	3.4	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Misaligned rod
											2			1	

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.41	Conduct of operations	2.8	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the refueling processes
G2.2.15	Equipment Control	3.9	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to determine the expected plant configuration using design and configuration control documentaion
G2.2.18	Equipment Control	2.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for managing maintenance activities during shutdown operations.
G2.3.14	Radiation Control	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities
G2.3.6	Radiation Control	2.0	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to aprove release permits
G2.4.26	Emergency Procedures/Plans	3.1	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.
G2.4.8	Emergency Procedures/Plans	3.8	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.

Tier / Group	Randomly Selected K/A	Reason for Rejection
	RO	
T1/G2	003AK3.05	Phonecon 8/20/2020: HNP discussed being concerned with overlap between the Operating Test and this Written Exam K/A, so selected a new K/A, keeping APE topic 003, Dropped Control Rod and determined a different randomly selected K/A: New K/A 003AK3.06: Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod: Reset of demand position counter to zero.
T3	G2.1.27	Phonecon 7/2/2020: HNP discussed being unable to create a generic T3 question based on system purpose and/or function for the generic K/A topic knowledge of system purpose and /or function, so selected a new K/A, keeping Generic topic 2.1, Conduct of Operations and determined a different randomly selected K/A: New K/A G2.1.29: Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.

Tier / Group	Randomly Selected K/A	Reason for Rejection
	SRO	
T1/G1	058AG2.1.19	Phonecon 9/17/2020: HNP discussed being unable to create an SRO level question with the Abnormal Evolution tied to the generic Conduct Of Operation K/A selected, based on ability to use plant computers for the generic K/A topic, so selected a new K/A, keeping Generic topic 2.1, Conduct of Operations and determined a different randomly selected K/A: New K/A 058AG2.1.7: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.

ES-401	Written Examination Quality Checklist	Form ES-401-6

Facility: Harris Nuclear Plant Test No. 05000400/2020301 Date of Exam: November 16, 2020 Exam Level: RO ■ SRO ■

Item Description					Initial a	Initial b*	Initial 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	—	—	
		41 / 9	8 / 1	26 / 15	✓	✓	
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		—	—	
		36 / 6	39 / 19		✓	✓	
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	Richard (JR) Horton /	11/4/2020
b. Facility Reviewer (*)	Scott Rua /	11/4/2020
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.

ES-401 **Written Examination Quality Checklist** **Form ES-401-6**

Facility: Harris	Date of Exam: Nov 2020	Exam Level: RO **X** SRO **X**

Item Description					Initial a	Initial b*	Initial c*#
1.	Questions and answers are technically accurate and applicable to the facility.						MB
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)						MB
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401						MB
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).						MB
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 X the licensee certifies that there is no duplication, or __ other (explain).						MB
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			MB
		41/9	**8/1**	**26/15**			MB
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			MB
		36/6		**39/19**			MB
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.						MB
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.						MB
10.	Question psychometric quality and format meet the guidelines in Appendix B.						MB
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.						MB

		Printed Name/Signature	Date
a.	Author	See copy supplied by licensee for their signatures.	
b.	Facility Reviewer (*)	See copy supplied by licensee for their signatures.	
c.	NRC Chief Examiner (#)	Mark A. Bates / *Mark A. Bates*	11/5/20
d.	NRC Regional Supervisor	Gerald J. McCoy / *Gerald J. McCoy*	11/5/20

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.

Harris 2020-301

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																Chief Examiner's Reminders - Ensure not too many questions come from a single exam. - Ensure Tier 1 questions test procedures. - Ensure H/F LOK are tallied. (Initial count was one short on Higher Cog Questions – see suggestion on Q68) - Double check references supplied to students - Check question statements use "in accordance with"

IMPORTANT TIER 1 QUESTION GUIDANCE
The intent of Tier 1 questions is to test emergency and abnormal condition procedure knowledge. This was clarified on the NRC website in April 2020 with an update to item 401.55 located in the Feedback Section of the Operator Licensing Webpage. Because the information that was previously posted, in some ways, contradicted the information that was posted in April 2020, Tier 1 questions not testing emergency or abnormal condition procedures for this exam will not require revision based solely on not meeting the K/A because of a failure to test emergency/abnormal procedure knowledge. This discretion is being exercised because a significant portion of the exam development had already been performed when the contradictory information was publicly posted by the NRC. This is a one-time allowance due to the unfortunate timing of the updated guidance. This decision is being technically supported by the fact that sufficient questions exist within Tiers 2 and 3 of the RO exam that "do" require emergency or abnormal condition procedure knowledge, providing adequate balance of coverage of required topics. A copy of the updated guidance will be transmitted with the email that contains this document. All future exam submittals should attempt to test the intent of Tier 1 questions by requiring emergency or abnormal condition procedure knowledge to arrive at the correct answer, versus being able to determine the correct answer with system design knowledge alone.

RO EXAM																
1	F	1<LOD<5										x		N	~~E~~ S	007EK1.05 The intent of Tier 1 is to test emergency/abnormal procedure knowledge. The intent of this Tier 1 KA is not met because the question can be answered using reactor physics and system design knowledge. Question does not need to be modified based solely on K/A mismatch due to the Tier 1 question not requiring emergency/abnormal condition procedure knowledge to arrive at the correct answer. See explanation at beginning of this document. Question not modified based on Chief Examiner's comments above. JRG 9/22/20 Q is sat.

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
2	H	1<LOD<5												N	S	008AA1.03 Q is sat.
3	H	1<LOD<5		x		x	x							N	~~U~~ ~~E~~ U S	009EK~~3.12~~ 3.02 (Pre-submittal Q1) Partial: Safety Injection causes a phase 'A', therefore one may be able to successfully argue that Safety Injection is an alternate correct answer. If Safety Injection does cause a phase 'A', then it is the Safety Injection that causes the CCW isolation. Even though the question statement speaks to the "signal", it would still be arguable that the Safety Injection Signal resulted in the CCW isolation. Cred. Dist.: Plausibility of B(2) and D(2) - There are no indications stated in the stem that would cause someone to question whether high activity is a concern. Furthermore, B(2) and D(2) are not plausible because RCS activity reduction can never be the reason because excess letdown never passes through the demins. Reworded first part of question to have the candidate determine the signal that must be reset to allow Excess letdown to be un-isolated and established Revised B(2) and D(2) to read "prevent RCS over pressurization" which may result if the RCS is allowed to go water solid. JRH 5/16/20 Part 1 of Question: It is understandable that phase 'A' must be reset to reposition the valves. If a safety injection causes a phase 'A', does the safety injection signal need to be reset prior to the phase 'A' being reset? If a standing safety injection signal exists when the phase 'A' is reset, would the phase 'A' re-initiate? These questions are being asked to ensure that the modifications do not still result in two correct answers. But, the better question here, which may allow for a more plausible distractor, is whether or not Safety Injection must be reset prior to repositioning the valves. The safety injection signal to Phase A is a single shot relay which does not seal in. Once this signal is actuated, only the associated train of Phase A is required to be reset to allow the opening of an individual Phase A isolation valve. JRH 6/1/20

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																Suggest rewording the first part question as follows: The safety injection signal (IS)/ (IS NOT) required to be reset to unisolate CCW to the Excess Letdown Heat Exchanger and establish Excess Letdown. Part 2 of Question: A subset issue exists in the second part of the question. If over-pressurization was concern, then it would be as the result of an inventory concern. It is not possible to separate the over-pressurization choice from the inventory choice. The logic argument goes as follows: If the reason for placing excess letdown in service was due to an over-pressure concern, then that same concern would also apply for inventory because it is through the reduction of inventory that excess letdown can help the over-pressure concern. MAB Revised second part of question to address the candidates knowledge of EOP-ES-1.1 procedure implementation strategy and direction to place letdown in service as discussed with Chief Examiner per telecom on 6/9/2020. Restructured question such that the revised second part is now asked first and the original first part is now the second part. JRH 6/10/2020 Part 1 Inventory control is the obvious choice, leaving little room for plausible distractors, because excess letdown takes inventory from the RCS. Any answer that involves reducing inventory would be correct because lowering inventory would be the mechanism for any other desired goals – letdown is an inventory flowpath. This part of the question could be written as shown below and potentially resolve the issue. MAB 6/11/2020 Part 2: A subset issue still exists with the phase A and safety injection. It impacts the plausibility. Because a safety injection causes a phase A, it is a given that phase A must be reset. The more meaningful test item is whether or not safety injection must be reset. To resolve this issue, you could modify the first part of the question as shown below.

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																MAB 6/11/2020 The question has been re-written below to try to illustrate a version that may resolve the stated issues: 1. 2020 NRC RO 003/NEW/FUNDAMENTAL//EOP-ES-1.1/NONE/EARLY SUBMIT/009 EK3.02/UNSAT Given the following plant conditions: - The unit was operating at 100% power when a LOCA occurred - The Reactor was tripped and Safety Injection actuated - 1CS-11, Letdown Isolation, is shut to isolate the break in accordance with EOP-ECA-1.2, LOCA Outside Containment Subsequently: - The crew is implementing EOP-ES-1.1, SI Termination, to terminate Safety Injection Which ONE of the following completes the statements below? Following the termination of Safety Injection, the reason EOP-ES-1.1 directs establishment of excess letdown (1) to prevent RCS overpressurization. If excess letdown is established, the safety injection signal (2) required to be reset to allow restoration of CCW to the excess letdown heat exchanger. A. (1) is (2) is B. (1) is (2) is NOT C. (1) is NOT (2) is D. (1) is NOT (2) is NOT Revised question as suggested by Chief Examiner. JRH 6/16/20 I think the question statement needs to be revised slightly to ensure they answer the question based on system design

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																versus what the procedure tells them to do. We need to guard against having someone argue that safety injection "is" required to be reset because the procedure directs it to be reset prior to resetting phase "A". IF excess letdown is established, based on plant system design, the safety injection signal __(2)__ required to be reset to allow restoration of CCW to the excess letdown heat exchanger. After incorporation of the above comment, the questions should be satisfactory. MAB 6/18/2020 Revised question as suggested by Chief Examiner. JRH 6/18/20 Question is sat. MAB 6/19/2020 Cred. Dist. / Cues Licensee removed the changes that corrected the plausibility issues. It is too obvious that the Phase "A" must be reset. As discussed above, a satisfactory alternative is to ask whether the safety injection is required to be reset. Question has been classified back to unsatisfactory due to having two non-plausible distractors. Your concern with overlap with Q55 is valid, but that does not address the lack of plausibility when comparing the two answer choices for the second part of this question. The as-submitted versions of Q3 and Q55 present an overlap issue. By reading Q55, you can get a cue as to whether phase "A" must be reset. One suggestion might be to only test Phase "B" in Q55, thereby allowing my previous suggestion for this question without the overlap issue. Then, because you can meet the K/A for Q55 by testing the Phase "B", maybe you can then create a new half of the question to replace the Phase "A" piece. Cross Reference my comments on Q55. New question developed to address overlap issue with Q55. Q55 was graded an 'E' solely due to having overlap with Q3. JRG 10/19/20 Q is sat.

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
4	F	1<LOD<5										x		B	~~E~~ S	011ES2.13 The intent of Tier 1 is to test emergency/abnormal procedure knowledge. The intent of this Tier 1 KA is not met because the question can be answered using system design knowledge. Question does not need to be modified based solely on K/A mismatch due to the Tier 1 question not requiring emergency/abnormal condition procedure knowledge to arrive at the correct answer. See explanation at beginning of this document. Question not modified based on Chief Examiner's comments above. JRG 9/21/20 Q is sat.
5	H	1<LOD<5	x												~~E~~ S	015AA2.11 Stem Focus: If an RCP is started in an operable loop, would it be physically possible for CETs to remain stable after dropping 85F? With plenty of level in the "C" SG, the "C" RCP should provide enough flow to lower RCS temperatures, especially given the high delta T that could be generated across the "C" SG tubes. Would the question still work, if CETs were 1205 F and still lowering, vs. being stable? Question modified based on Chief Examiner's comments above. A value and trend of 1250 F and lowering was used for CETs to provide some margin from the procedural limit of 1200 F for starting RCPs while in FR-C.1. JRG 10/19/20 Q is sat.
6	F	1<LOD<5												B	S	022AK1.01 (Previous NRC **2018 Exam** Q28) Q is sat.
7	H	1<LOD<5												B	S	025AA1.12 (Previous NRC 2014 Exam Q75) Q is sat.

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
8	F	1<LOD<5										x		B	~~E~~ Q	026AG2.1.23 The intent of Tier 1 is to test emergency/abnormal procedure knowledge. The intent of this Tier 1 KA is not met because the question can be answered using system design knowledge. Question does not need to be modified based solely on K/A mismatch due to the Tier 1 question not requiring emergency/abnormal condition procedure knowledge to arrive at the correct answer. See explanation at beginning of this document. Question not modified based on Chief Examiner's comments above. JRG 9/21/20 Q is sat.
9	H	1<LOD<5	x									x		B	~~E~~ S	027AK2.03 (Previous NRC 2012 Exam Q38) The intent of Tier 1 is to test emergency/abnormal procedure knowledge. The intent of this Tier 1 KA is not met because the question can be answered using system design knowledge. Question does not need to be modified based solely on K/A mismatch due to the Tier 1 question not requiring emergency/abnormal condition procedure knowledge to arrive at the correct answer. See explanation at beginning of this document. Stem Focus: The question solicits the answer "in accordance with" the procedure, but isn't the answer only predicated on system design? Reference to AOP-019 removed from question stem to address stem focus issue. No additional modifications made based on Chief Examiner's comments above. JRG 9/21/20 Q is sat.
10	F	1<LOD<5												N	S	029EK2.06

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																Q is sat.
11	H	1<LOD<5												B	S	038EK1.03 (Previous NRC 2009B Exam SRO Q24) Q is sat.
12	F	1<LOD<5												M	~~E~~ S	054AK3.04 (Previous NRC **Exam 2016** Q10 - **MOD**) The background document does not directly support the correct answer. The background document actually states that one SG is used because one is enough to provide adequate heat sink for recovery actions. Is the other supporting document, that does directly support the answer, from a student training material or lesson plan? More explanation or justification is needed to support the answer as written for the second half of the question. If this is not possible, then the second half may require some revision. One suggestion may be to test whether the reason (IS/IS NOT) to ensure RCS cooldown rates are maintained within Tech Spec limits. We can discuss the accuracy to see if the submitted question will work or if it needs a slight revision. The basis for feeding only one SG comes from the WOG Background Document for EOP-FR-H.1. Discussed with Chief Examiner who agreed after reviewing the references provided that question acceptable as is. JRG 9/22/20 Q is sat.
13	H	1<LOD<5										x		N	~~E~~ S	056AA2.44 The intent of Tier 1 is to test emergency/abnormal procedure knowledge. The intent of this Tier 1 KA is not met because the question can be answered using system design knowledge. Question does not need to be modified based solely on K/A mismatch due to the Tier 1 question not requiring emergency/abnormal condition procedure knowledge to arrive at the correct answer. See explanation at beginning of this document. Question not modified based on Chief Examiner's comments

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																above. JRG 9/22/20 Q is sat.
14	H	1<LOD<5				x								B	~~E~~ S	057AG2.2.38 (Previous NRC 2009B Exam SRO Q13) Cred. Dist.: "D" may not be plausible. Is the Equipment Hatch required to be closed during Core Alts? If yes, then the plausibility of hatch closed with 8 bolts may be acceptable. If no, then 8 bolts would not be plausible if the hatch is not required to even be closed. Many sites do not have to have the hatch closed, they just have to have the capability to close the hatch within a certain time? Non-plausible distractor replaced. JRG 9/22/20 Q is sat.
15	F	1<LOD<5												B	S	062AK3.03 (Previous NRC Exam 2011 Q13) Q is sat.
16	F	1<LOD<5				x								B	S	065AA1.04 (Comanche Peak) Q is sat.
17	H	1<LOD<5												M	S	WE05EK2.2 (Previous NRC **Exam 2018** Q17 - **MOD**) Q is sat.
18	H	1<LOD<5										x		B	~~E~~ S	WE12EG2.1.20 (Previous NRC Exam 2014 Q10) The intent of Tier 1 is to test procedure knowledge. It is permissible to write a question that can be answered using systems knowledge if a procedure knowledge question cannot be written to test the K/A. Discuss options to write a procedure question. Question does not need to be modified based solely on K/A mismatch due to the Tier 1 question not requiring emergency/abnormal condition procedure knowledge to arrive at the correct answer. See explanation at beginning of this document.

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																Question not modified based on Chief Examiner's comments above. JRG 9/22/20 Q is sat.
19	F	1<LOD<5												N	S	003AK3.05 (changed to 003AK3.06) Q is sat.
20	~~H~~ F	~~4~~ 1<LOD<5	x			X X								N	~~U~~ ~~S~~ ~~E~~ S	024AA2.06 (Pre-submittal Q2) Stem Focus: Based only on the indications provided there is no way to be certain that the cause of the parameter changes was the boron valve failing to open. Maybe the dilution valve opened too much or the wrong ratio was input into the controller (I know these are not provided as choices – but you are asking for "the" cause). To ensure a more technically correct question, consider revising the question to ask for which one of the following "could" be the cause of the changing parameters. Stem Focus: The second part of the question needs to be tied to a procedure to bound the answer choices more precisely. See suggestion below for this part of the Q. Cred. Dist.: The RMWST Isolation failing to open does not make much sense with rising RCS temp and power. A consideration for trying to add some plausibility might be to test the possible causes that could create a light makeup to the VCT, such as something with a controller setting. Without doing research on your plant, I am not sure what material exists to accomplish that, but that might be an idea. Reworded first part of question to have the candidate determine the setting for FK-113 that would result in the plant conditions if the controller malfunctioned. JRH 5/22/20 Cred. Dist.: Boron concentration adjustments are usually an allowable method for reactivity changes. To add plausibility to the distractor, consider testing whether the AOP allows control rods to be used. Consider the following suggestion: "In accordance with AOP-003, control rod movement (IS) / (IS

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																NOT) permitted to mitigate the effects of the reactivity transient. K/A Match: I think the K/A match is acceptable based on the second part of the question. When the inadvertent dilution occurs, the correct response in accordance with your procedures is to use boration vs. rods. Revised the second part of the question as suggested by the Chief examiner. JRH 5/22/20 The changes to the question address the additional concerns. Question is now satisfactory. MAB Cred. Dist.: "D2" is not credible. It is not reasonable to think that "Emergency" boration should go to the top of the VCT as the first option because it would take several minutes to enter the RCS. One possible solution would be to test whether or not directing the emergency boration flowrate to the top of the VCT is sufficient iaw the procedure for emergency boration. This would require slight modification to the question stem, but it may be a possible success path. New question submitted for review regarding emergency boration flowpaths. Question is from our bank and was used on the 2008 NRC Exam (Q34). JRG 10/19/20 Q is sat.
21	F	1<LOD<5				x						x		B	~~E~~ S	059AK3.04 (Previous NRC 2013 Exam Q23) This is a clunky way to present the answer choices. The test taker uses the knowledge of whether 1FD-109 gets an auto close signal to answer different parts of the answer choices, and a similar thing can be said about the Tank Area Drain Transfer Pump. Cred. Dist.: "B1" does not appear to be plausible because the applicant needs to choose between a pump whose name matches the alarm and a pump whose names does not match the alarm. See suggestion below. K/A Match: After an applicant makes a determination on

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																whether 1FD-109 gets an auto close signal, then all they need to do is determine whether the Tank Area Drain Transfer Pump receives a trip signal. These are the two pieces of information needed to answer the question. The intent of Tier 1 is to test procedure knowledge. This question misses the intent of the K/A because it can be answered with only systems knowledge. See suggestion below. Suggestion that tests procedure knowledge, addresses the plausibility issue, and more directly asks the tested info. This question could test the exact same knowledge in a more straightforward way and also address the plausibility concern at the same time. Consider modifying the question to ask (1) 1FD-109 (DOES / DOES NOT) receive an auto close signal, and (2) the AOP (DOES / DOES NOT) direct the Tank Area Floor Drain Sump Pump to be stopped. (The Floor Drain Sump Pump is the better choice for plausibility reasons.) Question modified based on Chief Examiner's suggestion above. Due to the similarity in the names of the two pumps (Tank Area Floor Drain Sump Pump vs. Tank Area Drain Transfer Pump), the word SUMP has been capitalized in the pump name. JRG 10/19/20 Q is sat.
22	H	1<LOD<5										x		N	~~E~~ S	061AA1.01 The intent of Tier 1 is to test emergency/abnormal procedure knowledge. This question can be answered with only systems knowledge. No procedure knowledge is required. Question does not need to be modified based solely on K/A mismatch due to the Tier 1 question not requiring emergency/abnormal condition procedure knowledge to arrive at the correct answer. Question not modified based on Chief Examiner's comments above. JRG 9/21/20 Q is sat.
23	H	1<LOD<5	x								x	x		B	~~E~~	069AA1.01 (Braidwood)

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
															S	K/A: The intent of Tier 1 is to test emergency/abnormal procedure knowledge. This question can be answered with only systems knowledge. No procedure knowledge is required. Stem Focus/Backward Logic: Would one valve in each answer choice receive an auto signal to shut when a phase "A" occurs. The stem tells them to assume that one valve in each pair repositions, but why would a Phase "B" valve reposition? This display of information may appear confusing due to an element of backward logic, in that information that would normally be evaluated does not appear in the stem, but rather it appears in the answer choices. Possible solution: When there are two valves in series that close on a phase "A", are the required actions different when one of the valves fails to close, vs. when both fail to close? If so, then this may be a way to test procedure knowledge as it relates to how to operate valves that relate to containment integrity. There are no differences in required actions when one vice both phase 'A' valves fail to close. Question could not be modified to address backword logic issue. New question developed regarding AOP required actions for a loss of containment integrity which should meet Tier 1 requirements. JRG 9/22/20 Q is sat.
24	H	1<LOD<5										x		N	~~E~~ S	WE02EG2.4.45 The intent of Tier 1 is to test emergency/abnormal procedure knowledge. The intent of this Tier 1 KA is not met because the question can be answered using system design knowledge. Question does not need to be modified based solely on K/A mismatch due to the Tier 1 question not requiring emergency/abnormal condition procedure knowledge to arrive at the correct answer. Question not modified based on Chief Examiner's comments

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																above. JRG 9/22/20 Q is sat
25	H	1<LOD<5												B	S	WE07EA2.1 (Previous NRC **Exam 2016** Q26???) Q is sat.
26	F	1<LOD<5	x			x						x		N	~~U~~ S	WE13EK2.1 Cred. Dist.: "B2" and "D2" are not plausible. It would make no sense for the controller to be in MANUAL and prevent the code safety valves from opening. The second half of the question will need to be replaced. Stem Focus: The question statement should tie the answer to the procedure. I.E. In accordance with E-3, the ruptured SG PORV controller setpoint…. The intent of Tier 1 is to test emergency/abnormal procedure knowledge. The intent of this Tier 1 KA is not met because the question can be answered using system design knowledge. Question needs to be modified to test emergency/abnormal procedure knowledge. Question modified based on Chief Examiner's comments above. Added reference to EOP-E-3 in question stem to address stem focus/Tier 1 issues. The first part of the question tests emergency procedure knowledge. The second part of the question was modified to address the non-plausible distractors by testing knowledge on an E-3 time critical action (isolation of stuck open PORV). JRG 9/21/20 Q is sat.
27	H	1<LOD<5												N	S	WE16EK1.2 Q is sat.
28	H	1<LOD<5												B	~~E~~ S	003K4.07 (Robinson)

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																The question documentation incorrectly states Tier 1 / Group 2. It should state Tier 2 / Group 1. Documentation corrected to reflect Tier 2 / Group 1. JRG 9/22/20 Q is sat.
29	H	1<LOD<5?												B	S	004K5.44 (Ginna) Q is sat.
30	F	1<LOD<5												B	S	005K2.03 Q is sat.
31	H	1<LOD<5												N	S	006A3.03 Q is sat.
32	F	1<LOD<5												B	S	007K4.01 (Previous NRC Exam 2004 Q23) Q is sat.
33	F	1<LOD<5												B	S	008K1.05 Q is sat.
34	H	~~1~~ 1<LOD<5				x								B	~~U~~ ~~S~~ S S	008K3.03 (Pre-submittal Q3) (McGuire) Cred. Dist.: "Immediately" does not contain much plausibility. It is not too credible that the second you lose CCW that RCPs will drive an immediate action for reactor trip. Consider asking the first part like this: ….(1) the maximum time allowed to trip the RCPs iaw AOP-015 (IS) / (IS NOT) 10 minutes from the loss of CCW, (2) .." Revised question as suggested by Chief Examiner. JRH 5/21/20 Cred. Dist.: "Seals" does not contain an acceptable amount of plausibility when nothing is presented in the stem to question the adequacy of seal injection. Consider testing the

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																steps to re-establish CCW to the RCP bearing oil coolers iaw AOP-018, Att 3. A Caution states that the return valves must be opened prior to the supply valves. There are other options available as well, but this is just a consideration. Revised question as suggested by Chief Examiner. JRH 5/21/20 Modifications result in question being satisfactory. MAB This question appears to be different than what we agreed upon during the pre-submittal review. The replacement appears to be satisfactory. Q is sat.
35	F	1<LOD<5	x											B	~~E~~ S	010A3.01 (Previous NRC Exam 2009B Q36) Stem Focus: There is a bunch of information provided in the stem, but it appears that most of it is not necessary information. Adding window dressing does not affect whether or not knowledge of the KA is tested. The information being tested would be the same as what would be monitored during a PORV test. Does the following test the exact same information? When pressure begins to lower from NOP, the Group 'C' heaters will first receive a full ON signal when pressurizer pressure reaches __(1)___ psig AND the PRT rupture disk will blow when PRT pressure reaches a minimum of at least __(2)__ psig. Question modified per Chief Examiner's recommendation above. JRG 9/22/20 Q is sat.
36	H	1<LOD<5	x											N	~~E~~ S	012A1.01 A subset issue may exist for the second half of the question. If 2/3 channels are within 1.9 % of the reactor trip setpoint then a runback would occur. Because this is a true

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																statement, something needs to be done to enhance the specificity of the second half. Even though, the question uses the word "when" this is not quite enough to be absolutely sure that the subset issue is not present. We can discuss if my comments require clarification. Question modified to address subset issue. JRG 9/22/20 Q is sat.
37	H	1<LOD<5												B	S	012K6.02 (Previous NRC Exam 2014 Q39) Q is sat.
38	F	1<LOD<5				x								B	~~E~~ S	013K1.15 (Previous NRC Exam 2013 Q10) Question is rated as "E" because the Q was used on a prior NRC exam. Being stripped by the sequencer does not appear to be plausible. The second part of "C" and "D" must be replaced. Or the question needs to be reworked to resolve the issue. The second part of "D" is all unnecessary information. Only information that is needed to make four unique answer choices with one and only one correct answer should appear in the answer choices. Adding extra information typically has only one effect – which is to provide additional ways to eliminate distractors. Discussed with Chief Examiner need to make 2 part question for plausibility. Modified question to ask status of another MFW system component (FRVs) following a Safety Injection actuation along with the MFW pumps. JRG 9/22/20 Q is sat.
39	H	1<LOD<5												B	S	013K6.01 (Previous NRC **Exam 2016** Q40) Q is sat.
40	F	1<LOD<5	x											M	~~E~~ S	022K1.02 (Previous NRC **Exam 2016** Q58 - **MOD**) Stem Focus: The question solicits the answer "in accordance

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																with" the procedure, but isn't the answer only predicated on system design? Are the switch indications completely clear on the photo depiction of the switch? The 2016 parent question clearly stated the light status. Removed reference to procedure from question stem. Answer is solely predicated on system design. Picture provided in color for review. JRG 9/25/20 Q is sat.
41	F	1<LOD<5	x											N	~~E~~ S	026A1.03 Stem Focus: Should the second half question statement solicit the answer "in accordance with" the procedure? Question modified per Chief Examiner's recommendation above. JRG 10/9/20 Q is sat.
42	H	1<LOD<5												B	S	026K3.02 (Previous NRC Exam 2007) Q is sat.
43	F	1<LOD<5												B	S	039A3.02 (Previous NRC **Exam 2018** Q43) Q is sat.
44	F	1<LOD<5												N	S	038G2.1.30 Q is sat.
45	H	1<LOD<5				x								N	~~U~~ S	059A4.01 Cred. Dist.: The loss of the DC bus does not appear to be plausible because the switch lights are illuminated. I could not accurately see the words and indications on the associated photo, so I could not fully evaluate the question.

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																Modified question to ask loss of which AC power source would result in the indications provided. Indications are clear when photo presented in color. JRG 9/22/20 Q is sat.
46	F	1<LOD<5												N	S	061K2.03 Q is sat.
47	H	1<LOD<5												B	S	061K5.05 (Previous NRC Exam 2013 Q47) Q is sat.
48	H	1<LOD<5				x								N	~~U~~ S	062A2.04 Cred. Dist.: "A2" and C2" are not plausible. The "A" train DC bus has been lost, therefore it is not reasonable for an applicant to believe that the "B" train EDG would be impacted by the "A" Train DC bus loss. Opening breakers locally does not contain a reasonable level of credibility. Correct me if I'm wrong, but the nomenclature of the DC bus tells me which train the power supply is. Discussed with Chief Examiner scope of K/A. Based on discussion, developed new question. JRG 9/22/20 Q is sat.
49	H	1<LOD<5				x								B	~~E~~ S	063A2.01 (Previous NRC Exam 2014 Q50) Question was rated as "E" due to appearing on a recent NRC exam. Cred. Dist.: A subset issue exists in the first part of the question. If a BC trips due to a ground, then that would impact the reliability of the DC system. The correct answer is so broad that it encompasses the more specific answer choice listed in the distractor, thereby creating a subset issue, which degrades the plausibility of the distractors. One suggestion for fixing the subset issue if to use the distractor in the first part and ask a WILL / WILL NOT

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																question. I.E.: The battery charger(s) (WILL / WILL NOT) automatically trip on a high ground condition if left in service. Using the original correct answer in the WILL / WILL NOT format does not work well because any issue with the system could be argued to degrade reliability. However, there is a clear correct answer if using the original distractor in the (WILL / WILL NOT) format. If using my suggestion ensure that the second half is not impacted negatively by the change to the first half (I don't think it does, but just double check). Appears could be interplay issue if applicant believes battery charger will trip on high ground condition as second part of question addresses plant condition with one battery charger in service (normal operations). To avoid this issue, a different impact was asked for the first part of the question (indications of a DC ground). AEP-2 is a plausible distractor since this would be a location an operator would go to confirm the existence of an AC bus ground. The second part of the question remains unchanged. JRG 10/19/20 Q is sat.
50	F	1<LOD<5												N	S	063A4.03 Q is sat.
51	F	1<LOD<5				x								N	~~E~~ S	064K6.07 Cred. Dist.: What is the normal starting air pressure? Does 200 psig have any significance as it pertains to the EDG starting air system? Are there any alarms that would come in that could be used in place of 200 psig? 200 psig was the approximate setpoint of the low starting air pressure alarm. Revised to include exact setpoint of 202 psig. JRG 9/22/20 Q is sat.
52	F	1<LOD<5												B	S	073A1.01 (Previous NRC Exam 2014 Q68) Q is sat.

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
53	H	1<LOD<5												M	S	076G2.4.46 (Previous NRC **Exam 2018** Q52 - **MOD**) Q is sat.
54	F	1<LOD<5												B	S	078K3.01 (Previous NRC Exam 2013 Q54) Close to overlapping with Q16, but one question does not give away the answer for either. Q is sat.
55	H	2												B	~~E~~ S	103A4.03 This Q is actually satisfactory. It was only flagged as "E" as a reminder that there is an issue that requires follow-up. See comments on Q3. Suggestion. Consider deleting the phase "A" part to eliminate the overlap with potential Q3 modifications. It may be possible to get two parts by testing Phase "B" actuation in the first part, then using something similar to the current Q for Phase "B" reset. We can discuss options – I was attempting to think of alternatives that would minimize rework and provide a quick path to a successful modification. Also need to ensure that revisions do not negatively impact other questions. New question developed for Q3 which should alleviate overlap concern with this question. As such, no changes made to originally submitted version. JRG 10/19/20 Q is sat.
56	H	1<LOD<5												B	~~E~~ S	002K5.14 (VCSummer) The question statement first part question statement should be tied to the procedure. I.E. In accordance with E-3 the RCS will be depressurized using __(1)__. Modified question per Chief Examiner's recommendation above. JRG 9/22/20

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																Q is sat.
57	H	1<LOD<5												B	S	015K6.01 (Previous NRC Exam 2002) Q is sat.
58	H	1<LOD<5												B	S	016K3.12 (Previous NRC Exam 2014 Q59) Q is sat.
59	F	1<LOD<5												M	S	027K2.01 (Previous NRC **Exam 2016** Q59 - **MOD**) Q is sat.
60	H	1<LOD<5												M	S	028A1.02 (Previous NRC **Exam 2016** Q60 - **MOD**) Q is sat.
61	F	1<LOD<5	x			x								N	~~U~~ S	034A2.03 Most of the stem appears like it is window dressing, in that it could largely be deleted and have no impact on the question. Stem Focus: Would the first part of the question be simplified if the question just asked about EITHER the underload or overload setpoint? If just one was chosen to test in part one, then the question statement could be simplified. Cred. Dist.: 1200 pounds does not contain an acceptable amount of plausibility. Suggest using 200 pounds, which is associated with the dummy assembly. Modified question per Chief Examiner's comments above. Window dressing deleted. First part of question asks overload setpoint only. 1200 lbs replaced with credible distractor 430 lbs (slack cable interlock). 430 lbs provides some additional margin to the correct answer of 150 lbs. JRG 9/22/20 Q is sat.
62	F	1<LOD<5												B	S	071K4.06 (Previous NRC Exam 2002)

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																Q is sat.
63	F	1<LOD<5												N	S	072G2.4.21 Q is sat.
64	H	1<LOD<5												B	S	075A4.01 Q is sat.
65	H	1<LOD<5				x								M	~~E~~ S	086A3.01 (Previous NRC **Exam 2016** Q65 – **MOD**) Cred. Dist.: It makes no sense that the Diesel Fire Pump would start prior to Motor Driven Pumps. In other words, "B" is not plausible. It would not make sense for a fire pump to automatically secure with a fire in progress. Discussed with Chief Examiner. Question modified using jockey pump status to address plausibility concerns (plausible since pump auto stops while the other fire pumps do not). JRG 9/22/20 Q is sat.
66	F	1<LOD<5					x							N	~~E/ U~~ S	G2.1.1 At Harris, in accordance with administrative procedures, can a SM delegate most of his duties to another SRO? Does Harris admin procedures contain a list of tasks/responsibilities that belong to the SM, but are not delegable to another SRO? I.E. Acting as Emergency Director, operability determinations, approval of temporary modifications, etc. If the SM can delegate this responsibility to the CRS, then there are two correct answers for this question. Ambiguity could exist with the answer "if" there is a list somewhere in the Operations Admin Procedures that states those items that cannot be delegated. By exclusion, then everything else could procedurally be delegated. Discussed with Chief Examiner and question modified per suggestion. JRG 10/19/20

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																Q is sat.
67	F	1<LOD<5												B	S	G2.1.29 (Robinson) Q is sat.
68	F	1<LOD<5												B	S	G2.1.5 Note: If low out of range on Higher Cog questions, this would be an easy one to make Higher Cog by stating conditions that would be indicative of Mode 4, rather than telling them they are in Mode 4. (My initial count was that the exam was one short on higher Cog questions). Q is sat. – no changes made.
69	F	1<LOD<5	x			x								N	~~U~~ S	G2.2.2 Stem Focus: Procedures allow for ECP to be other than 90 steps. This part of the question needs to be worded to solicit what the Note in the procedure states. I.E.: The Note in GP-004 states that most startups will use 90 steps on Bank D as the target for criticality. Credible Distractor: Criticality, at 90 Steps on Bank "C" does not appear to be very credible. A more credible choice would be 130 Steps on Bank "D". An operator should know the content of this Note because if 130 Steps appears on the ECP, the operator should at least question reactor engineering on why 130 steps is being used. Suggest for second part something like: "The Note in GP-004 states that most startups will use (90 / 130) steps on Bank D as the target for criticaliy." Modified per Chief Examiner's suggestion above. JRG 10/9/20 Q is sat.
70	H	~~1~~				x								B	~~U~~	G2.2.42 (Pre-submittal Q4) (Previous NRC Exam 2011 Q69)

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
		1<LOD<5													S	Cred. Dist.: "C" is not credible for the same reason you claim that it is incorrect. It is not reasonable to select "C" when "B" exceeded the same value a half hour earlier. Cred. Dist.: "D" also not plausible because 100 F was exceeded earlier. Suggestion: You use two pieces of info to create the correct answer (100 F in an hour limit) and plausibility of one distractor (50 Fin an hour limit). You need another item to get the other plausible distractors. You could provide instantaneous (or in this case 15 minute rates) that are greater than 100 F/hr and 50 F/hr. The timeline would then need to be constructed to support the following answer choices: A. Time 1 - 50 F instantaneous limit exceeded. B. Time 2 - 100 F instantaneous limit exceeded. C. Time 3 - 50 F in an hour exceeded (with Tcold less than 350 F) D. Time 4 - 100 F in an hour exceeded. K/A match for Tier 3 is acceptable because the generic knowledge of "Applicability" is needed to arrive at the correct answer. The limits change based on the applicability statement in Tech Specs. Revised question as suggested by Chief Examiner. JRH 5/21/20 With the revised Tcold history, why are the answer choices not as follows? a. 0900 (18F in 15 min is 1st time 50F/hr exceeded) b. 0930 (51F in 60 min is 1st time 50F in hr exceeded) c. 0945 (40F in 15 min is 1st time 100F/hr exceeded) d. 1030 (correct answer) The 1015 Tcold value is exactly 100F in one hour. This may be so close to the limit that someone could argue that even a fraction of a degree more than 100F would make this correct. Consider changing the 0915 Tcold to 479F. Revised distractors as suggested by Chief Examiner. Adjusted the cooldown timeline such that distractor c. 1st time

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																15 min is > 100F/hr occurs at 1000 to maintain distractor balance at 30 minute intervals. Revised the 0915 Tcold reading to 477F for a 99F/hr rate at 1015 JRH 6/1/20 Comments resolved. Q is sat. MAB 6/11/2020 Question remains satisfactory with the Draft submittal. Q is sat.
71	F	1<LOD<5												N	S	G2.3.5 Q is sat.
72	H	1<LOD<5												N	S	G2.3.7 Coded as "H" LOK. Q is sat.
73	F	1<LOD<5					x						x	N	~~U~~ S	G2.4.1 Does the second part require SRO-only procedure selection knowledge? If this is going to remain on the RO exam, I would want a written statement from Operations and Training Management that states that this is RO knowledge and it is appropriate for NRC to use for a licensing decision. Partial: The second part of the question does not contain enough precision. A CRS may enter more than one AOP, and in doing so he is making a decision based on priority. A CRS may also enter more than one AOP and prioritize which one he performs first and could even switch between them. A subtle subset issue exists between the two answer choices. In other words, concurrently entering IS prioritizing entry. Second part of question removed. Replaced with notification requirement per procedure when Event Procedure entry conditions are met. JRG 9/22/20 Q is sat.
74	H	1<LOD<5	x												~~E~~	G2.4.32 (Previous NRC Exam 2009 Q74)

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
															S	Stem Focus: The question statement asks the question "in accordance with" Tech Specs, but isn't part of the answer "in accordance with" the procedures? Question modified per Chief Examiner's recommendation above. JRG 9/22/20 Q is sat.
75	F	1<LOD<5										x		B	~~U~~ S	G2.4.4 (Pre-submittal Q5) (Previous NRC Exam 2013 Q73) K/A: A generic concept is not being tested, which is required for a Tier 3 question. One suggestion would be to write a Safety Function Status Tree question that tests the general rules of usage of which procedure is required to be entered based on hierarchy of safety functions and their color. Replaced question with another bank question to test the concept suggested by Chief Examiner. JRH 5/21/20 Modifications result in question being satisfactory. MAB Question remains satisfactory with the Draft submittal. Q is sat.
SRO EXAM																
76	H	1<LOD<5												N	S	055EA2.06 Q is sat.
77	H	1<LOD<5										x		N	~~U~~ S	058AG2.1.19 changed to 058AG2.1.7 K/A: The first part of the question is the part that tests knowledge required by the K/A; however, this part of the question can be answered using only systems knowledge. Therefore, the K/A has not been tested at the SRO-only level. The second part is SRO-only information, but it does not test

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																knowledge required by the K/A. Some avenues to consider are using the plant computer to determine a loss of power's impact on "Loss of Safety Function" as it pertains to operability and Tech Specs. Loss of Safety Function has not appeared on this exam, so this may be an option and also add some breadth to the SRO exam. Could not write a discriminatory question to the SRO level. New K/A provided by Chief Examiner: 058AG2.1.7, Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. JRG 9/25/20 Q is sat.
78	H	1<LOD<5												N	S	077AA2.08 Q is sat.
79	F	1<LOD<5												B	S	WE04EA2.2 Q is sat.
80	H	1<LOD<5	x											N	~~E~~ S	WE11EG2.4.20 (Pre-submittal Q6) Add to the first question statement, "In accordance with EOP-ECA-1.1, SG depressurization …" Can "inside Containment" be deleted from the first bullet? I think all Large Break LOCAs occur inside containment. FYI: There are a few typos in the Q. Second part of Q needs to be reworded to ask for what the operators are required to do. This is a more specific way to write the question statement. In general, this should be applied to the entire exam – asking for what is required, versus what "should" be done or what "will" be done. Suggest adding "step in effect" to the end of A(2) and C(2). Just to be sure the applicant does not think that the choice is

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																stating to start at the beginning of E-1. K/A match is acceptable by acknowledging the foldout page as a form of caution or note to be applied when performing the procedure. Revised question as suggested by Chief Examiner. Added Step 1 to the end of B(2) and D(2) to maintain distractor balance. JRH 5/16/20 All comments incorporated except for stating the second question statement as what the operators are "required" to do, as opposed to what they "will" do. This question is pretty closely tied to the procedures, but the general comment is that I have seen many incorrect things that an operator "will" do, but there can only be one thing that the procedure "requires" them to do. Suggest wording the second question statement as follows: If emergency coolant recirculation capability is restored during SG depressurization, EOP-ECA-1.1 requires the crew to transition from EOP-ECA-1.1 to __(2)__ . MAB Revised second statement question as suggested by Chief Examiner. JRH 6/1/20 Comments incorporated. Q is sat. MAB 6/11/2020 Question remained unchanged from what we agreed to during pre-submittal review. OK Q is sat.
81	F	1<LOD<5				x								N	~~U~~ S	WE12EG2.4.18 Cred. Dist.: Transition to E-3 is not plausible. There is no data presented in the stem of the question that would cause an applicant to incorrectly believe that a SGTR was occurring. A possible solution would be to add normal radiation levels to the stem, which would add credibility to transition to E-3, because the applicant would need to recognize the magnitude of rad level as normal. Modified question per Chief Examiner's recommendation

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																above. JRG 9/23/20 Q is sat.
82	H	1<LOD<5				x							x	N	~~E~~ S	005AG2.4.31 Cred. Dist./SRO: The first question statement would be better to test whether or not control rod D4 is OPERABLE iaw Tech Specs, rather than trippable. Systems information can be used to determine trippability, but OPERABILITY is more in line with SRO-only knowledge. Although in agreement with control operability being a better test item, the reference provided for Q#93 aides the applicant in answering the operability status of control rod D4. As such, even though part 1 of the question (trippability) is at the RO level, the answer for part 2 of the question comes from Technical Specification bases which is at the SRO level. HNP recommendation is to leave question as is to avoid this conflict with Q#93. Q is sat.
83	H	1<LOD<5												B	S	032AA2.06 (Watts Bar) Q is sat.
84	H	1<LOD<5												B	S	051AG2.1.7 Q is sat.
85	H	1<LOD<5												B	S	WE03EA2.1 Q is sat.
86	H	1<LOD<5				x								N	~~U~~ S	004A2.03 Cred. Dist.: For the choice involving UNIDENTIFIED LEAKAGE, a leak rate needs to be stated in the stem in order to analyze whether a mode change could be made. The inability to make a determination on whether the LCO is met based on unidentified leak rate makes the two distractors containing unidentified leakage non-plausible. Suggest

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
																adding a calculated leak rate of 5 gpm. Modified question per Chief Examiner's suggestion above. JRG 9/23/20 Q is sat.
87	H	1<LOD<5												N	S	006A2.13 (Pre-submittal Q7) Question remained unchanged from what we agreed to during pre-submittal review. OK Q is sat.
88	F	1<LOD<5												B	S	010G2.2.25 (Pre-submittal Q8) Reformatted question to match 2 x 2 format of other questions for consistent appearance throughout exam. JRH 5/22/20 Question is satisfactory. Q is sat.
89	F	1<LOD<5												N	~~E~~ S	076G2.2.40 (Pre-submittal Q9) As a matter of policy, we typically do not hold applicants to know from memory – greater than one hour tech spec actions. If Harris requires this knowledge then this question may be acceptable as written; however, I would need to see some documentation that this particular knowledge is a memory item at Harris, or that all greater than one hour actions are required from memory at Harris. This comment is made to protect against a post-exam challenge to the question by the applicant that they do not need to know greater than one hour tech spec actions from memory. Suggestion: Because there is a potential that there is nothing to support knowing all greater than one hour tech spec actions – I would suggest writing a completion time extension question using the pumps. Completion time extension questions usually have the ability to allow for plausible distractors and would meet the K/A.

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
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																Revised question as suggested by Chief Examiner. JRH 5/16/20 Perhaps I did not explain my comment clearly. My comment was directed at Completion Time Extension as it pertains to an inoperable pump, followed by a second inoperable pump, then having the first pump become operable again. The question was modified to address Surveillance Testing Interval extension, which does not make much sense when the surveillance is already in progress and a pump has failed during the test. My previous suggestion may have been more appropriate for those plants using Standardized Tech Specs. As an alternative for the second part, a question could be written that incorporates testing knowledge of making a mode change. I.E. Pump is inop while in Mode 5. Can mode 4 be entered? a. Change to mode 4 is not permitted. b. Change to mode 4 is permitted. You may be able to combine this with your first part to have a complete question. Revised second part of question to address the candidates knowledge of T.S. 3.7.4 bases as discussed with Chief Examiner per telecom on 6/9/2020. JRH 6/10/2020 I was expecting that the Tech Spec Bases Information would be information that would be necessary to “apply” the Tech Spec so that it would test knowledge required of the KA. Only testing that the LCO is designed to ensure adequate cooling during normal and emergency conditions is not knowledge required to “apply” the tech spec. Basis info would be appropriate as long as it tests knowledge that is used to correctly implement the tech spec. I apologize if I misunderstood anything from our phone call. I spent some time reviewing the Tech Spec Bases for this systems and I did not see much info that could be used for tech spec implementation. I think the best option will be to utilize the Tech Spec Rules of usage in association with the LCO implementation. Below I wrote a question that utilizes LCO 3.0.3 knowledge for the ESW system. You mentioned a

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																desire to use a Mode change question for a Tier 3 K/A, so I stayed clear of testing Mode change knowledge on my recommended question below. I retained your basis knowledge in half the question. I had to replace the other part because when researching the ESW system, I realized that the booster pumps were located on the discharge side of the ESW pumps. The purpose of preventing pump runout did not appear to be plausible if the booster pumps were on the discharge side of the ESW pumps. MAB 6/11/2020 Initial plant conditions: - The unit is operating at 100% power Subsequent plant conditions at 10:00: - Emergency Service Water (ESW) Pumps 1A-SA and 1B-SB are determined to be not OPERABLE due to a common cause, although they remain available Subsequent plant conditions at 10:30: - Downpower is initiated to shutdown the plant Which ONE of the following completes the statements below? In accordance with Technical Specification 3.7.4, Emergency Service Water, the bases for the Limiting Condition of Operation is to ensure that sufficient cooling capacity is available for continued operation of safety related equipment during ___(1)___ conditions. The latest time the plant is required to be in HOT STANDBY is ___(2)___. A. (1) ONLY accident (2) 16:30 B. (1) normal AND accident (2) 16:30 C. (1) ONLY accident (2) 17:00 D. (1) normal AND accident (2) 17:00 Revised question as suggested by Chief Examiner. JRH

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																6/16/20 Question is now satisfactory. MAB 6/18/2020 Question remained unchanged from what we agreed to during pre-submittal review. OK Q is sat.
90	H	1<LOD<5				x								N	E S	103G2.2.12 Cred. Dist.: December 2 is not plausible. It is not reasonable to believe that if you miss the surveillance, then you get to do nothing until the surveillance would be due as if it had actually been performed on time. This is a difficult question to develop four good single answer choices. The question may be better suited to using the two most plausible parts of the original question and then developing a second part. November 3 is the most plausible of the distractors, and would be the logical distractor to choose alongside the correct answer if writing a 2x2 question. Then a second part would need to be developed. Modified question per Chief Examiner's suggestion above. JRG 9/23/20 Q is sat.
91	H	1<LOD<5				x								B	~~E~~ S	001G2.1.32 (Previous NRC **Exam 2016** SRO Q91) Question was rated as enhance due to being on a recent NRC exam. The second part has four unique answer choices. This may make it possible to delete the first half in its entirety. If the the wording becomes too confusing to simply ask the second half without the first half, then a two-part question may be OK. But, typically when a question presents four unique answer choices in one half of the question, it is an indicator that the other half of the question can be eliminated. Cred. Dist.: "A2" and "C2" are not plausible because of the wording of the question statement. It makes no sense to

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																"~~restore~~" power to less than 67% or 51% when power was never below that to begin with. The initial power level for this question started out above that point. This can easily be solved by moving the word "restore" down to the answer choices for "B2" and "D2". Then add the word "reduce" to the beginning of "A2" and "C2". Cred. Dist,: "A2" does not make sense the way the information is displayed. There is a timeline of power and rod position for the load reduction. So, the applicant can look at the timeline and say that the power is already less than 67% at 0700, so no more power reduction is needed to comply. Because it is not clear of what point in time the question is being asked, ambiguity is created around "A2". Discussed with Chief Examiner. Modified question to add words "restore" and "reduce" to answer choices and to added "based on entry time" to question stem to address plausibility issue with "A2". JRG 9/23/20 Q is sat.
92	H	1<LOD<5												M	S	011A2.09 (Previous NRC **Exam 2018** SRO Q 92 - **MOD**) Q is sat.
93	H	1<LOD<5												N	~~E~~ S	014A2.04 Typo in last bullet: "….to faulty indocator." Typo in last bullet corrected. JRG 9/23/20 Q is sat.
94	F	~~1~~ 1<LOD<5				x	x							N	~~U~~ S	G2.1.41 (Pre-submittal Q10) Cred. Dist.: "C" & "D" are not plausible because there is no Refueling SRO signature. Refueling SRO signature is pretty much a given. Suggestion: Reword the question to ask for who else in addition to the Refueling SRO must provide permission. A. Shift Manager

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																B. Reactor Services Supervisor C. Reactor Engineer D. Refueling Equipment Engineer Revised question as suggested by Chief Examiner. JRH 5/16/20 Modifications result in satisfactory question. MAB Question remained unchanged from what we agreed to during pre-submittal review. OK Q is sat.
95		1<LOD<5		x			x							N	~~E~~ S	G2.2.15 Is it possible to ask the question in accordance with the procedure? I.E. "…..process for this clearance in accordance with AD-OP-ALL-0200?" Cue: Is it possible to delete the reason from the correct answer? The reason does not appear to be needed to create a unique answer choice. Partial: "D" may be argued as correct because single valve isolation is only allowed when the conditions for single valve isolation exist. Consider the following: Which one of the following completes the statement below regarding the approval process for this clearance in accordance with AD-OP-ALL-0200? The clearance can be approved _____. A. using single isolation without designating as an "Exceptional Clearance" B. using single isolation only if it is designated an "Exceptional Clearance" and approved by the shift manager C. using single isolation only if it is designated an "Exceptional Clearance" but approval by the shift manager is not required

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																D. using double isolation (single isolation is not allowed) Question modified per Chief Examiner's recommendation above. JRG 10/9/20 Q is sat.
96	F	1<LOD<5												N	S	G2.2.18 Q is sat.
97	F	1<LOD<5												B	S	G2.3.14 (Previous NRC Exam 2013 SRO Q22) Q is sat.
98	F	1<LOD<5				x	x							B	~~E~~ S	G2.3.6 (Previous NRC Exam 2014 SRO Q24) Partial: Can the Shift Manager delegate this responsibility to the CRS. At many facilities this is one of the many Shift Manager tasks that can be delegated. On a previous question, I asked if there was a list of Shift Manager duties that were not allowed to be delegated. If so, is this on the list? If this function can ever be performed by the CRS on behalf of the SM, then there is more than one correct answer. Cred. Dist.: It is also true that the SM can assume duties of the CRS in most cases, which affects plausibility and multiple correct answer concerns. Suggest: The better method to ask this question is to ask whether or not the CRS has the authority to approve the permit. This requires the exact same knowledge to answer as compared to the submitted question; however, it eliminates the subset issue which degrades plausibility and potentially creates an alternate correct answer. Question modified per Chief Examiner's suggestion above. JRG 10/9/20 Q is sat.
99	F	1				x								N	~~U~~	G2.4.26

Q	1.	2.	3. Psychomeric Flaws					4. Job Content Flaws				5. Other		6.	7.	8. Explanation
	LOK (F/H)	LOD (1-5)	Stem Focus	Cues	T / F	Cred. Dist	Partial	Job-Link	Minutia	# Unit	Back ward	Q – K/A	SRO Only	B, M, N	U, E, S	
															S	Cred. Dist./LOD: Shift Manager, the person in charge of the shift, is such an obvious answer that it does not allow for a plausible distractor and results in an unacceptable LOD. Modified question to address LOD issue (replaced part 1). Industry bank was used as source of material for part 1 of question. Question still examines knowledge of the SM (SRO) responsibility for providing qualified Fire Brigade staffing IAW AD-OP-ALL-0207. JRG 9/23/20 Q is sat.
100	H	1<LOD<5												B	S	G2.4.8 (Indian Point) Q is sat.