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

Facility: Turkey Point Units 3 & 4 Date of Examination: 1/7/2019

Examination Level: RO ☒ SRO ☐ Operating Test Number: 2019-301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Calculate Emergency Boration for Stuck Rods 2.1.20: Ability to interpret and execute procedure steps. (RO 4.6)
Conduct of Operations	D, R	Calculate Primary Water Required to Raise Power from 80% to 100% 2.1.25: Ability to interpret reference materials, such as graphs, curves, tables, etc. (RO 3.9)
Equipment Control	N, R	Check HHSI Alignment for 380F 2.2.44: Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (RO 4.2)
Radiation Control	N, R	Respond to Failed ARMS Channel 2.3.13: 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. (RO 3.4)
Emergency Plan		NOT SELECTED FOR RO EXAM

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

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JPM SUMMARY STATEMENTS

A.1.a	Calculate Emergency Boration for Stuck Rods: The examinee is given a blank copy of 3-ONOP-046.1, Emergency Boration, and PTN Technical Specifications as a reference. The examinee is also given the status of Unit 3 and Unit 4 as well as an initial average boric acid storage tank level, and concentration, and RWST level. The examinee is given the conditions of a reactor trip with three control rods failing to insert and is told that an emergency boration is in progress due to the stuck control rods. The examinee is also given the conditions that the emergency boration valve failed. The examinee must interpret the information related to the valve failure to determine the source and flowpath of boration flow and use that information to determine the procedurally required amount of boration time required for each stuck control rod. The examinee must then use this information to determine if the BASTs or the RWST will lower during the boration and calculate the final values for these tanks at the completion of the boration. The examinee must also determine that the RWST level will remain unchanged based on the determined boration source. The examinee must then review and interpret the Tech Spec requirements for borated water sources to determine that the minimum amount of boric acid required for two "operating" units is not met. The examinee must also determine that the remaining level in the RWST is enough to satisfy the minimum Tech Spec requirements.
A.1.b	Calculate Primary Water Required to Raise Power from 80% to 100%: The examinee is given a blank copy of 0-OP-046, Attachment 5, Reactivity Worksheet, and all of the Plant Curve Book, Section 2, Estimated Critical Conditions. The examinee is given the initial conditions of reactor power, boron concentration, rod height and core burnup and the final desired configuration for reactor power and rod height. The examinee must choose and interpret the applicable Plant Curve Book curves related to Integral Rod Worth, Power Defect and Integral Boron Worth accounting for core burnup. The examinee must then perform the required calculations using the reactivity worksheet to determine a final desired boron concentration. The examinee must then interpret whether a boration or dilution is required and then calculate the required amount of dilution.
A.2	Check HHSI Alignment for 380F: The examinee is informed of RCS temperature, pressure and heat-up rate and given pictures of the SI Valve Status Panel and control room switches related to the HHSI system. The examinee is also given a blank copy of 3-GOP-503, Attachment 4, Control Room Switch Alignment Prior to Exceeding 380F. The examinee must identify that the correct alignment is required before reaching 380F and calculate the amount of time, based on the heatup rate, before the alignment must be verified. The examinee must also review the given pictures, interpret the valve position indications, and compare them to the requirements of 3-GOP-503 and identify a valve that is out of position.
A.3	Respond to Failed ARMS Channel: The examinee is given blank copies of the Annunciator Response Procedure for ANN X 4/1, ARMS HI RADIATION, and 0-ONOP-066, High Area Radiation Monitoring System Alarm. The examinee is also informed that the unit is in Mode 5, ANN 4/1 is in alarm and ARMS Channel RI-3-1401B is alarming at a specific value. The examinee is directed to determine the expected reading on RI-3-1401B when the high alarm pushbutton is depressed and list the required actions in response to the alarming ARMS channel. The examinee must use an attachment of 0-ONOP-066, consider current plant conditions to determine the expected alarm setpoint and then determine that the alarm setpoint is set too high. Since the ARMS channel alarmed at a value other than the alarm setpoint, the examinee must determine that the channel is failed and the correct action is to acknowledge the alarm and direct RP to install a portable area radiation monitor with alarm.
A.4	NOT SELECTED FOR RO EXAM

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Facility: Turkey Point Units 3 & 4 Date of Examination: 1/7/2019

Examination Level: RO ☐ SRO ☒ Operating Test Number: 2019-301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Calculate Emergency Boration for Stuck Rods 2.1.20: Ability to interpret and execute procedure steps. (SRO 4.6)
Conduct of Operations	D, R	Determine Shift Manning Technical Specification Requirements 2.1.5: Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. (SRO 3.9)
Equipment Control	N, R	Check ECCS Alignment During Heatup 2.2.44: Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (SRO 4.4)
Radiation Control	N, R	Approve a Gas Decay Tank Release 2.3.6: Ability to approve release permits. (SRO 3.8)
Emergency Plan	N, R	Classify Events 2.4.41: Knowledge of the emergency action level thresholds and classifications. (SRO 4.6)

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

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

JPM SUMMARY STATEMENTS

A.1.a	Calculate Emergency Boration for Stuck Rods: The examinee is given a blank copy of 3-ONOP-046.1, Emergency Boration, and PTN Technical Specifications as a reference, and the status of Unit 3 and Unit 4 as well as an initial average boric acid storage tank level and concentration. The examinee is given the conditions of a reactor trip with three control rods failing to insert and is told that an emergency boration is in progress due to the stuck control rods. The examinee is also given the conditions that the emergency boration valve failed and the manual emergency boration valve is in use. The examinee must interpret the information related to the valve failures to determine the source and flowpath of boration flow and use that information to determine the procedurally required amount of boration time required for each stuck control rod. The examinee must then calculate the total boration duration based on the number of stuck control rods. The examinee must then calculate, from the number of minutes and boration flowrate, the total amount of boric acid used. The examinee must then determine from the average boric acid storage tank level, the total amount of boric acid available at the start of the event and subtract the amount of boric acid used to determine the amount of boric acid remaining when the procedural boration requirements are met. The examinee must then review and interpret the Tech Spec requirements for boric acid to determine that the minimum amount of boric acid required for two “operating” units is not met and determine the required action to restore boric acid storage tank level within 70 hours.
A.1.b	Determine Shift Manning Technical Specification Requirements: The examinee is given a list of operators and their qualifications. The examinee is also given three work schedules. For the first two work schedules, the examinee must determine if the minimum shift crew composition required by Technical Specifications is met. The second schedule shows one of the RCOs had to leave early due to sickness and their position was vacant for a period of time. Finally, the examinee must review the third work schedule, which includes a sick call for the STA, and determine how to change the schedule to meet the minimum Technical Specification requirements for staffing using only the operators listed.
A.2	Check ECCS Alignment During Heatup: The examinee is given unit temperature and pressure as well as PTN Technical Specifications and blank copies of 3-GOP-503, Attachment 3, Control Room Switch Alignment Check Prior to Exceeding 350F, and Attachment 4, Control Room Switch Alignment Check Prior to Exceeding 380F. The examinee is also given pictures of the HHSI Valve Status Panel and control switches and a DCS screen applicable to the HHSI system. The examinee must interpret the pictures to determine valve positions and determine that two valves are out of position based on the requirement to go above 350F. The examinee must also interpret the Tech Spec surveillance requirement related to valve positions with power removed and determine the suction flowpath from the RWST is inoperable. The examinee must determine that the inoperable flowpath is required at the existing RCS temperature and list the required Tech Spec actions and time requirements.
A.3	Approve a Gas Decay Tank Release: The examinee is given background information describing the need to release a particular Gas Decay Tank. The examinee is also given a Gas Decay Tank Release Permit that has been prepared and approved by the Chemistry Department. The examinee must determine that the Permit cannot be approved due to errors. The examinee must identify errors related to which tank was sampled, an expected PRMS value that is above an administrative allowed value, incorrect sample and count duration and a PRMS alarm setpoint that is below the expected channel response value.
A.4	Classify Events: The examinee is given blank copies of the Hot and Cold EAL Classification Tables. The examinee is given initial conditions for both units and a timeline of events that involves casualties to the feed systems and a failure of the Reactor Protection System to automatically trip the reactor. The Reactor Trip Switch on the Vertical Panel fails to function, but the Reactor Trip Switch on the console functions properly. The examinee is required to identify the highest classification level in the Fission Product Barrier Recognition Category which requires an analysis of all three fission product barriers. The examinee is also required to identify the highest classification level in the System Malfunction Recognition Category which requires an understanding of what is considered an automatic trip function and a manual action taken in the control room. Both classifications are required for satisfactory performance of the JPM.

ES-301 **Control Room/In Plant Systems Outline** **Form ES-301-2**

Facility: Turkey Point Units 3 & 4 Date of Examination: 1/7/2019

Examination Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test Number: 2019-301

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. APE 001 Continuous Rod Withdrawal (AA1.05, 4.3) Respond to Continuous Rod Withdrawal	A, N, S	1
b. 006 Emergency Core Cooling System (ECCS) (A2.02, 3.9) Respond to Loss of Cold Leg HHSI Injection Path	A, EN, N, S	2
c. APE 027 Pressurizer Pressure Control System Malfunction (AA1.01, 4.0) Respond to Pressurizer Pressure Malfunction	A, N, S	3
d. 005 Residual Heat Removal System (RHRS) (A4.01, 3.6) Respond to Loss of RHR	A, D, L, S	4P
e. 061 Auxiliary / Emergency Feedwater (AFW) System (A1.05, 3.6) Test Auxiliary Feedwater System	EN, N, S	4S
f. APE 056 Loss of Offsite Power (AA2.44, 4.3) Align 3A Bus to the Unit 4 Startup Transformer	A, N, S	6
g. 012 Reactor Protection System (RPS) (A4.04, 3.3) Trip Bistables for PT-447 Failure	N, S	7
h. 008 Component Cooling Water System (CCWS) (A2.02, 3.2) Investigate and Respond to a Ruptured CCW Header	D, S	8
In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i. 004 Chemical and Volume Control System (CVCS) (K6.17, 4.4) Lineup Unit 4 Boric Acid Transfer Pump to Unit 3	D, R	1
j. EPE 055 Loss of Offsite and Onsite Power (Station Blackout) (EA1.02, 4.3) Recover from Unit 3 EDG Auto Start Failure	A, D, E	6
k. APE 065 Loss of Instrument Air (AK3.08, 3.7) Re-establish Instrument Air to Unit 3	N, E	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 RO /SRO-I/SRO-U
(A)lternate path	4–6/4–6 /2–3
(C)ontrol room	
(D)irect from bank	≤ 9/≤ 8/≤ 4
(E)mergency or abnormal in-plant	≥ 1/≥ 1/≥ 1
(EN)gineered safety feature	≥ 1/≥ 1/≥ 1 (control room system)
(L)ow-Power/Shutdown	≥ 1/≥ 1/≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2/≥ 2/≥ 1
(P)revious 2 exams	≤ 3/≤ 3/≤ 2 (randomly selected)
(R)CA	≥ 1/≥ 1/≥ 1
(S)imulator	

JPM SUMMARY STATEMENTS

a. Respond to Continuous Rod Withdrawal: The examinee is informed that TM-408, Median Selector Signal, has failed and the immediate operator actions for 3-ONOP-028, Reactor Control System Malfunction, are completed. The examinee is directed to continue 3-ONOP-028. The examinee will verify the Immediate Operator Actions were performed correctly, determine that expected Tref for the current power level is above the current Tave, and determine the need to withdrawal control rods. The examinee will withdraw control rods in increments not to exceed four steps per withdrawal. After some incremental rod withdrawals, the rod control system will fail and control rods will continue to withdrawal. The examinee must then perform a different set of immediate operator actions from 3-ONOP-028 and trip the reactor.

b. Respond to Loss of Cold Leg HHSI Injection Path: The examinee enters the scenario after an automatic reactor trip and automatic safety injection. The cause of the accident is not given. The examinee is informed that the immediate operator actions and the foldout page actions of 3-EOP-E-0, Reactor Trip or Safety Injection, are complete. The examinee is directed to perform Attachment 3, Prompt Action Verification, of 3-EOP-E-0. After working through the attachment, the examinee will discover that the HHSI Cold Leg Injection valves, MOV-3-843A/B are both open, and all HHSI pumps are running, but there is no cold leg injection flow. If investigated, the examinee will be informed that 3-867, Cold Leg SI Boundary Isolation, was found closed and the valve is stuck. Per procedural guidance, the examinee will direct breaker closure for the Hot Leg Injection valves. When the examinee attempts to open SI to Hot Leg Isolation valve MOV-3-869, the valve will not open from the control room or locally. The operator will direct local operation of the MOV-3-869 bypass valve and then open additional Hot Leg Injection valves to establish a flowpath. Note: The misposition of 3-867 is based on previously identified actual events in the plant history.

c. Respond to Pressurizer Pressure Malfunction. The examinee enters the scenario in Mode 1, 100% power, and is directed to respond to plant conditions. After assuming the watch, Pressurizer Pressure Transmitter, PT-3-444 fails high. This causes the Pressurizer Pressure Controller, PC-3-444J, to raise demand which causes the spray valves to fully open and PORV PCV-3-455C to open. The examinee will attempt to close PORV PCV-3-455C but will find the PORV is failed open. The examinee will close its associated block valve and then manually close the Pressurizer Spray valves. The examinee will identify that pressurizer pressure continues to lower with the spray valves closed and the PORV block valve closed because the block valve has a small amount of leak-by. The examinee will enter 3-ONOP-041.5, Pressurizer Pressure Control Malfunction, identify that pressure cannot be maintained greater than 2000 psig, and will trip the reactor prior to reaching the low pressure safety injection setpoint.

d. Respond to Loss of RHR: The JPM starts with the unit in Mode 4 with RHR cooling in service. The examinee is directed to swap RHR pumps per 3-OP-050. After the RHR pumps are swapped, RHR suction valve MOV-3-750 fails closed. The examinee will enter 3-ONOP-050, Loss of RHR, stop the running RHR pump and attempt to re-open the RHR suction valve, which will remain failed closed. The examinee will direct the isolation of any containment openings. After determining that RCS temperature is rising, the examinee will evacuate containment, initiate containment isolation Phase A, and establish control of RCS temperature using the Steam Dumps to Atmosphere.

e. Test Auxiliary Feedwater System: The examinee is directed to perform 3-OSP-075.1, Auxiliary Feedwater Train 1 Operability Verification, for the A AFW Pump. The examinee will verify the Train 1 AFW flow controllers are set properly and configure the Calorimetric Program to account for the increased AFW flow using DCS. The examinee will start the A AFW pump, interpret indications to determine Train 1 AFW flowrates, and determine that the surveillance acceptance criteria is met.

f. Align 3A Bus to the Unit 4 Startup Transformer: From the initial conditions, the examinee is informed that a loss of offsite power has occurred and both units have tripped. All EDGs initially performed properly and are energizing their respective 4KV busses. Due to a problem with the fuel system for the 3A EDG, the crew has commenced the realignment of the busses to offsite power, which has been restored. However, the 3A EDG runs out of fuel before this can be completed. The examinee is directed to restore offsite power to the 3A 4KV bus per 3-ONOP-004.1, System Restoration Following Loss of Offsite Power. When the examinee attempts to close 3AA05, Startup Transformer 3A 4KV Bus Supply, the breaker will fail to close and the examinee must interpret the procedure and transition to 3-ONOP-004.2, Loss of 3A 4KV Bus. The examinee will determine the 3A EDG is not available for bus restoration, direct operators to locally rack in breaker 3AA22, 3A 4KV Bus Emergency Tie to Unit 4 Startup Transformer, and energize the 3A 4KV bus from the Unit 4 Startup Transformer.

g. Trip Bistable for PT-447 Failure: The examinee is informed that PT-3-447, Turbine Inlet Pressure, has failed low and the crew is responding with 3-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels. The examinee is directed to continue with 3-ONOP-049.1. The examinee will determine that all bistables associated with PT-3-447 can be placed in the tripped condition without an undesired RPS or ESF actuation. The examinee will obtain the required key and located the applicable protection racks (multiple), locate the applicable bistables and place them in the test position. The examinee will then verify proper system response by checking bistable indications and annunciators. The examinee will continue to interpret 3-ONOP-049.1, direct local AMSAC actions, and reset the steam dumps to condenser arm signal.

h. Investigate and Respond to a Ruptured CCW Header: The examinee is informed that the unit is at 100% power with no equipment out of service and directed to respond to plant conditions. After the examinee takes the watch, a CCW rupture will initiate and CCW head tank will lower. The examinee will enter 3-ONOP-030, Component Cooling Water Malfunction, and commence makeup to the CCW system which will slow, but not stop, the reduction in CCW system inventory. The examinee will trip the reactor, stop all RCPs, isolate letdown and direct personnel to establish emergency cooling water to a charging pump and search for a CCW system leak.

i. Lineup Unit 4 Boric Acid Transfer Pump to Unit 3: The examinee is given initial conditions describing a situation where the control room has the need to borate but neither of the Unit 3 boric acid pumps is available. The examinee is directed to realign the 4A Boric Acid Pump to supply Unit 3 per a specific step in 3-ONOP-046.4, Malfunction of the Boron Concentration Control System. The examinee is required to locate and manipulate specific valves which are located in close proximity to Unit 3, Unit 4 and Common valves and components. Operation of these valves allows the 4A boric acid pump to deliver flow to the Unit 3 CVCS system while still maintaining unit separation of the boric acid system as required by Tech Specs.

j. Recover from a Unit 3 EDG Auto Start Failure: The examinee is given an initial condition describing a Loss of Offsite Power where the only operable EDG failed to start. The examinee is directed to respond to the EDG failure per 3-ONOP-023.2, Emergency Diesel Generator Failure. First, the examinee has to locate the procedure, which is stored on the wall of the EDG room for this type of event. Then the examinee will assess the EDG status by observing various status lights, alarms and relays and identify that a start failure exists and the EDG is locked out. The examinee will reset the start failure and the lockout relay which will start the EDG. The examinee will then assess EDG voltage and frequency indications and manipulate the local synchronizer and breaker control switch to energize the applicable 4KV bus from the associated EDG.

k. Re-establish Instrument Air to Unit 3: Based on the initial conditions, the examinee is informed of a loss of instrument air impacting both units where none of the instrument air compressors are available. As a result, CV-3-1605, Unit 3 Instrument Air Crosstie Isolation Control Valve, automatically closes. A Unit 4 Instrument Air Compressor is then restored; however, this instrument air is not available to Unit 3 after the crosstie valve has automatically closed. The examinee is directed to locally re-establish instrument air to Unit 3 per a specific step in 3-ONOP-013, Loss of Instrument Air. The examinee will locate and manipulate Instrument Air Crosstie Header Bypass Isolation Valves from both units to restore instrument air pressure to Unit 3. The examinee will then manipulate sensing line and vent valves associated with CV-3-1605 to re-open this isolation valve.

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Facility: Turkey Point Units 3 & 4 Date of Examination: 1/7/2019

Examination Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test Number: 2019-301

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. APE 001 Continuous Rod Withdrawal (AA1.05, 4.2) Respond to Continuous Rod Withdrawal	A, N, S	1
b. 006 Emergency Core Cooling System (ECCS) (A2.02, 4.3) Respond to Loss of Cold Leg HHSI Injection Path	A, EN, N, S	2
c. APE 027 Pressurizer Pressure Control System Malfunction (AA1.01, 3.9) Respond to Pressurizer Pressure Malfunction	A, N, S	3
d. 005 Residual Heat Removal System (RHRS) (A4.01, 3.4) Respond to Loss of RHR	A, D, L, S	4P
e. 061 Auxiliary / Emergency Feedwater (AFW) System (A1.05, 3.7) Test Auxiliary Feedwater System	EN, N, S	4S
f. APE 056 Loss of Offsite Power (AA2.44, 4.3) Align 3A Bus to the Unit 4 Startup Transformer	A, N, S	6
g. NOT SELECTED FOR SRO EXAM	N/A	N/A
h. 008 Component Cooling Water System (CCWS) (A2.02, 3.5) Investigate and Respond to a Ruptured CCW Header	D, S	8
In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i. 004 Chemical and Volume Control System (CVCS) (K6.17, 4.6) Lineup Unit 4 Boric Acid Transfer Pump to Unit 3	D, R	1
j. EPE 055 Loss of Offsite and Onsite Power (Station Blackout) (EA1.02, 4.4) Recover from Unit 3 EDG Auto Start Failure	A, D, E	6
k. APE 065 Loss of Instrument Air (AK3.08, 3.9) Re-establish Instrument Air to Unit 3	N, E	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 RO /SRO-I/SRO-U
(A)lternate path	4–6/4–6 /2–3
(C)ontrol room	
(D)irect from bank	≤ 9/≤ 8/≤ 4
(E)mergency or abnormal in-plant	≥ 1/≥ 1/≥ 1
(EN)gineered safety feature	≥ 1/≥ 1/≥ 1 (control room system)
(L)ow-Power/Shutdown	≥ 1/≥ 1/≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2/≥ 2/≥ 1
(P)revious 2 exams	≤ 3/≤ 3/≤ 2 (randomly selected)
(R)CA	≥ 1/≥ 1/≥ 1
(S)imulator	

JPM SUMMARY STATEMENTS

a. Respond to Continuous Rod Withdrawal: The examinee is informed that TM-408, Median Selector Signal, has failed and the immediate operator actions for 3-ONOP-028, Reactor Control System Malfunction, are completed. The examinee is directed to continue 3-ONOP-028. The examinee will verify the Immediate Operator Actions were performed correctly, determine that expected Tref for the current power level is above the current Tave, and determine the need to withdrawal control rods. The examinee will withdraw control rods in increments not to exceed four steps per withdrawal. After some incremental rod withdrawals, the rod control system will fail and control rods will continue to withdrawal. The examinee must then perform a different set of immediate operator actions from 3-ONOP-028 and trip the reactor.

b. Respond to Loss of Cold Leg HHSI Injection Path: The examinee enters the scenario after an automatic reactor trip and automatic safety injection. The cause of the accident is not given. The examinee is informed that the immediate operator actions and the foldout page actions of 3-EOP-E-0, Reactor Trip or Safety Injection, are complete. The examinee is directed to perform Attachment 3, Prompt Action Verification, of 3-EOP-E-0. After working through the attachment, the examinee will discover that the HHSI Cold Leg Injection valves, MOV-3-843A/B are both open, and all HHSI pumps are running, but there is no cold leg injection flow. If investigated, the examinee will be informed that 3-867, Cold Leg SI Boundary Isolation, was found closed and the valve is stuck. Per procedural guidance, the examinee will direct breaker closure for the Hot Leg Injection valves. When the examinee attempts to open SI to Hot Leg Isolation valve MOV-3-869, the valve will not open from the control room or locally. The operator will direct local operation of the MOV-3-869 bypass valve and then open additional Hot Leg Injection valves to establish a flowpath. Note: The misposition of 3-867 is based on previously identified actual events in the plant history.

c. Respond to Pressurizer Pressure Malfunction. The examinee enters the scenario in Mode 1, 100% power, and is directed to respond to plant conditions. After assuming the watch, Pressurizer Pressure Transmitter, PT-3-444 fails high. This causes the Pressurizer Pressure Controller, PC-3-444J, to raise demand which causes the spray valves to fully open and PORV PCV-3-455C to open. The examinee will attempt to close PORV PCV-3-455C but will find the PORV is failed open. The examinee will close its associated block valve and then manually close the Pressurizer Spray valves. The examinee will identify that pressurizer pressure continues to lower with the spray valves closed and the PORV block valve closed because the block valve has a small amount of leak-by. The examinee will enter 3-ONOP-041.5, Pressurizer Pressure Control Malfunction, identify that pressure cannot be maintained greater than 2000 psig, and will trip the reactor prior to reaching the low pressure safety injection setpoint.

d. Respond to Loss of RHR: The JPM starts with the unit in Mode 4 with RHR cooling in service. The examinee is directed to swap RHR pumps per 3-OP-050. After the RHR pumps are swapped, RHR suction valve MOV-3-750 fails closed. The examinee will enter 3-ONOP-050, Loss of RHR, stop the running RHR pump and attempt to re-open the RHR suction valve, which will remain failed closed. The examinee will direct the isolation of any containment openings. After determining that RCS temperature is rising, the examinee will evacuate containment, initiate containment isolation Phase A, and establish control of RCS temperature using the Steam Dumps to Atmosphere.

e. Test Auxiliary Feedwater System: The examinee is directed to perform 3-OSP-075.1, Auxiliary Feedwater Train 1 Operability Verification, for the A AFW Pump. The examinee will verify the Train 1 AFW flow controllers are set properly and configure the Calorimetric Program to account for the increased AFW flow using DCS. The examinee will start the A AFW pump, interpret indications to determine Train 1 AFW flowrates, and determine that the surveillance acceptance criteria is met.

f. Align 3A Bus to the Unit 4 Startup Transformer: From the initial conditions, the examinee is informed that a loss of offsite power has occurred and both units have tripped. All EDGs initially performed properly and are energizing their respective 4KV busses. Due to a problem with the fuel system for the 3A EDG, the crew has commenced the realignment of the busses to offsite power, which has been restored. However, the 3A EDG runs out of fuel before this can be completed. The examinee is directed to restore offsite power to the 3A 4KV bus per 3-ONOP-004.1, System Restoration Following Loss of Offsite Power. When the examinee attempts to close 3AA05, Startup Transformer 3A 4KV Bus Supply, the breaker will fail to close and the examinee must interpret the procedure and transition to 3-ONOP-004.2, Loss of 3A 4KV Bus. The examinee will determine the 3A EDG is not available for bus restoration, direct operators to locally rack in breaker 3AA22, 3A 4KV Bus Emergency Tie to Unit 4 Startup Transformer, and energize the 3A 4KV bus from the Unit 4 Startup Transformer.

g. NOT SELECTED FOR SRO EXAM

h. Investigate and Respond to a Ruptured CCW Header: The examinee is informed that the unit is at 100% power with no equipment out of service and directed to respond to plant conditions. After the examinee takes the watch, a CCW rupture will initiate and CCW head tank will lower. The examinee will enter 3-ONOP-030, Component Cooling Water Malfunction, and commence makeup to the CCW system which will slow, but not stop, the reduction in CCW system inventory. The examinee will trip the reactor, stop all RCPs, isolate letdown and direct personnel to establish emergency cooling water to a charging pump and search for a CCW system leak.

i. Lineup Unit 4 Boric Acid Transfer Pump to Unit 3: The examinee is given initial conditions describing a situation where the control room has the need to borate but neither of the Unit 3 boric acid pumps is available. The examinee is directed to realign the 4A Boric Acid Pump to supply Unit 3 per a specific step in 3-ONOP-046.4, Malfunction of the Boron Concentration Control System. The examinee is required to locate and manipulate specific valves which are located in close proximity to Unit 3, Unit 4 and Common valves and components. Operation of these valves allows the 4A boric acid pump to deliver flow to the Unit 3 CVCS system while still maintaining unit separation of the boric acid system as required by Tech Specs.

j. Recover from a Unit 3 EDG Auto Start Failure: The examinee is given an initial condition describing a Loss of Offsite Power where the only operable EDG failed to start. The examinee is directed to respond to the EDG failure per 3-ONOP-023.2, Emergency Diesel Generator Failure. First, the examinee has to locate the procedure, which is stored on the wall of the EDG room for this type of event. Then the examinee will assess the EDG status by observing various status lights, alarms and relays and identify that a start failure exists and the EDG is locked out. The examinee will reset the start failure and the lockout relay which will start the EDG. The examinee will then assess EDG voltage and frequency indications and manipulate the local synchronizer and breaker control switch to energize the applicable 4KV bus from the associated EDG.

k. Re-establish Instrument Air to Unit 3: Based on the initial conditions, the examinee is informed of a loss of instrument air impacting both units where none of the instrument air compressors are available. As a result, CV-3-1605, Unit 3 Instrument Air Crosstie Isolation Control Valve, automatically closes. A Unit 4 Instrument Air Compressor is then restored; however, this instrument air is not available to Unit 3 after the crosstie valve has automatically closed. The examinee is directed to locally re-establish instrument air to Unit 3 per a specific step in 3-ONOP-013, Loss of Instrument Air. The examinee will locate and manipulate Instrument Air Crosstie Header Bypass Isolation Valves from both units to restore instrument air pressure to Unit 3. The examinee will then manipulate sensing line and vent valves associated with CV-3-1605 to re-open this isolation valve.

Facility:							**Exam Date:**						
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 A1a		2					X					E	Straight Forward calculation. See below.
RO A1b		3										S	Calculation. Does it make sense to have both COO JPMs calculations? COO can include any of the following: • shift turnover • shift staffing requirements • access controls for vital/controlled plant areas • operator responsibilities and procedure usage • purpose, function, and controls for plant systems • fuel handling and refueling Personally, I think this JPM is more discerning than the first one.
RO A2		3		X				X				E	Cue sheet typo, 3rd bullet should be "The plant heatup rate is 10 F/hr. The second question implies the answer to the first question. Maybe if we swapped the questions and asked when the attachment was required to be completed SAT. If the applicant identifies more than the one issue, he should fail the JPM, so we need to adjust that critical task.
RO A3		>1			X	N						E/U	Notifying RP is a weak critical step. Are there any portable monitors that the operators required to know how to use?
SRO A1a		3										S	Better version of RO JPM since it has TS implications.
SRO A1b		3										S	No comment
SRO A2		3		X								E	It appears that the later questions imply answers to earlier questions. Maybe combine the first two questions into something like "Describe the status of the ECCS including any TS implications, including actions" The last two questions could be combined to ask "If heatup continued at current rate what other TS implications occur and when". The why to the questions are important.
SRO A3		3										S	This looks OK
SRO A4		3										S	This looks OK

Simulator/In-Plant JPMs	1 Safety Function and K/A												
a	1											S	OK
b	2				X							E	What happens if the pump switches are not placed in OFF in Performance Step 4? Is Performance Step 10 not critical because SI was reset earlier?
c	3											S	OK
d	4P				X							E	Performance step 4 appears critical Performance step 7 appears critical What happens if Performance step 12 is not completed (in reality)? Repeating is probably not critical in Performance Step 14
e	4S				X							E	Is Performance Step 5 required to be completed to successfully finish this task? Is recording the correct time to 405 gpm critical (i.e., what happens if it is too fast or slow)? If not, I'm not sure that this is critical.
f	6				X							E	Performance Step 3 should be critical, but the way the task standard is written it is no. What if the applicant went straight to Performance Step 5?
g (RO)	7				X							E	It appears that Performance Step 3 is critical, at least to get the keys. If the JPM cannot be completed successfully without Performance Step 6, then that step is critical.
h	8				X							E	Is Performance Step 10 critical?
i	1											S	OK
j	6											S	OK
k	8											S	OK
Generic Comment													Your task standards tend to be very detailed. They almost appear to be a list of critical steps. I'm more use to the task standard as looking like "Complete task A in accordance with procedure x, section c". For alternate path JPMs, there would be an additional statement that would discuss the failure and expected path.

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: Turkey Point					Scenario: 1				Exam Date: January 2019
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				X		E	For event 2, it is possible that they fail to control level and the plant should auto trip. However, the auto trip is failed. If they get to trip criteria and don't manually trip, this will be handled as a failed critical task.
3								S	
4								S	
5								S	
6								S	
7						X		E	Is the 1 minute time limit for CT 1 absolute? Do the applicants know that there is a 1 minute expectation for an ATWS?
8						X		E	Can we tie failure of CT2 to entry into an orange or red path in integrity? The listed criteria is OK, if it is impossible to get into OR not get into a red or orange path.
	0	1	0	0	0	3	0	E	

Facility: Turkey Point				**Scenario: 2**				**Exam Date: January 2019**	
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						X		E	What happens if the crew doesn't start the 3A Condensate Pump? Is there any negative consequence?
2								S	
3								S	
4								S	
5					X			E	Any time there is a failure that can affect pressure, there should be a potential TS call for DNB added.
6								S	
7								S	
8								S	
	0	0	0	0	1	1	0	E	

Facility: Turkey Point				Scenario: 3				Exam Date: January 2019	
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						X		E	Is there a basis for the 5 minutes for CT1? If not, is the 5 minute criteria something on which the applicants have been trained?
2								S	
3								S	
4								S	
5								S	
6						X		E	For CT3, have the applicants been trained on the 10 minute criteria? We need to be certain that we do not perform the local actions until the crew has had an opportunity to fail this CT.
7								S	
8								S	
	0	0	0	0	0	2	0	E	

Facility: Turkey Point			**Scenario: 4**					**Exam Date: January 2019**	
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						X		E	What happens if the crew does not start the standby ICW pump within 30 minutes? What is the change in PRA? I'm looking at ensuring that the safety significance is large enough to count this as a CT. Are the applicants trained on this time limit?
4								S	
5								S	
6								S	
7								S	
8								s	
	0	0	0	0	0	1	0	E	

Facility:	**Turkey Point**			**Scenario: 5**				**Exam Date: January 2019**	
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	Good CTs. Well defined.
2								S	
3								S	
4								S	
5								S	
6								S	
7								S	
8								S	
	0	0	0	0	0	0	0	S	

Facility: Turkey Point					Scenario: 6				Exam Date: January 2019
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	X					X		E	B Train is protected but B equipment is OOS. Is this normal? What is the consequence of not refilling the RWST for CT1? Will the scenario go on long enough for this to occur?
2								S	
3								S	
4								S	
5								S	
6								S	
7								S	
8								S	
	1	0	0	0	0	1	0	E	

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:							Exam Date:		
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	8	0	2	0	2	0	0	E	
2	8	0	2	0	2	0	0	E	
3	8	0	2	0	3	0	0	E	
4	8	0	2	0	2	0	0	E	
5	8	0	2	0	2	0	0	S	
6	7	0	2	0	2	0	0	E	

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:			Exam Date:			
OPERATING TEST TOTALS						
	Total	Total Unsat.	Total Edits	Total Sat.	% Unsat.	Explanation
Admin. JPMs	9	0	4	5		
Sim./In-Plant JPMs	11	0	6	5		
Scenarios	6	0	5	1		
Op. Test Totals:	26	0	15	11	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).

Facility: **Turkey Point** Date of Exam: **January 2019**

Tier	Group	RO K/A Category Points												SRO-Only Points						
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2		G*		Total		
1. Emergency and 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	2	3	3	3	3	2	2	3	1	3	3	28	3		2		5		
	2	1	1	1	1	1	1	1	1	0	1	1	10	-	2	1		3		
	Tier Totals	3	4	4	4	4	3	3	4	1	4	4	38	5		3		8		
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7		
		3			2			2			3			2	2	1	2			

Note:
1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outline sections (i.e., except for one category in Tier 3 of the SRO-only section, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 radiation control K/A is allowed if it 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 outline. Systems or evolutions that do not apply at the facility should be deleted with justification. Operationally important, site-specific systems/evolutions 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 K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' 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 a category 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.

G* Generic K/As

* These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.

** These systems/evolutions may be eliminated from the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan.

ES-401 PWR Examination Outline Form ES-401-2

Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO/SRO)

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
000007 (EPE 7; BW E02&E10; CE E02) Reactor Trip, Stabilization, Recovery / 1	X						007EK1.05; Knowledge of the operational implications of the following concepts as they apply to the reactor trip: Decay power as a function of time.	3.3	
000008 (APE 8) Pressurizer Vapor Space Accident / 3						X	008AG2.2.38; Knowledge of conditions and limitations in the facility license.	4.5	
000009 (EPE 9) Small Break LOCA / 3	X						009EK1.01; Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Natural circulation and cooling, including reflux boiling	4.2	
000011 (EPE 11) Large Break LOCA / 3						X	011EG2.2.44; Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	
000015 (APE 15) Reactor Coolant Pump Malfunctions / 4						X	015AG2.1.20; Ability to interpret and execute procedure steps.	4.6	
000022 (APE 22) Loss of Reactor Coolant Makeup / 2			X				022AK3.05; Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: Need to avoid plant transients.	3.2	
000025 (APE 25) Loss of Residual Heat Removal System / 4		X					025AK2.05; Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: Reactor building sump.	2.6	
000026 (APE 26) Loss of Component Cooling Water / 8				X			026AA1.02; Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: Loads on the CCWS in the control room.	3.2	
000027 (APE 27) Pressurizer Pressure Control System Malfunction / 3		X					027AK2.03; Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Controllers and positioners.	2.6	
000029 (EPE 29) Anticipated Transient Without Scram / 1				X			029EA1.15; Ability to operate and monitor the following as they apply to a ATWS: AFW System	4.1	
000038 (EPE 38) Steam Generator Tube Rupture / 3					X		038EA2.09; Ability to determine or interpret the following as they apply to a SGTR: Existence of natural circulation, using plant parameters.	4.2	
000040 (APE 40; BW E05; CE E05; W E12) Steam Line Rupture—Excessive Heat Transfer / 4					X		WE12EA2.2; Ability to determine and interpret the following as they apply to the (Uncontrolled Depressurization of all Steam Generators): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.4	
000054 (APE 54; CE E06) Loss of Main Feedwater /4	X						054AK1.01; Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): MFW line break depressurizes the S/G (similar to a steam line break).	4.1	
000055 (EPE 55) Station Blackout / 6						X	055AG2.4.20; Knowledge of the operational implications of EOP warnings, cautions, and notes.	4.3	
000056 (APE 56) Loss of Offsite Power / 6						X	056AG2.4.4; Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.5	
000057 (APE 57) Loss of Vital AC Instrument Bus / 6					X		057AA2.06; Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: AC instrument bus alarms for the inverter and alternate power source.	3.2	
000058 (APE 58) Loss of DC Power / 6						X	058AG2.4.30; Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.	4.1	

000062 (APE 62) Loss of Nuclear Service Water / 4					X		062AA2.03; Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The valve lineups necessary to restart the SWS while bypassing the portion of the system causing the abnormal condition	2.6	
000065 (APE 65) Loss of Instrument Air / 8			X				065AK3.04; Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Crossover to backup air supplies.	3.0	
000077 (APE 77) Generator Voltage and Electric Grid Disturbances / 6				X			077AA1.03; Ability to operate and/or monitor the following as they apply to Generator Voltage and Electric Grid Disturbances: Voltage regulator controls.	3.8	
(W E04) LOCA Outside Containment / 3					X		WE04EA2.1; Ability to determine and interpret the following as they apply to the (LOCA Outside Containment): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.4	
(W E11) Loss of Emergency Coolant Recirculation / 4			X				WE11EK3.4; Knowledge of the reasons for the following responses as they apply to the (Loss of Emergency Coolant Recirculation): RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.6	
(BW E04; W E05) Inadequate Heat Transfer—Loss of Secondary Heat Sink / 4		X					WE05EK2.2; Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following: 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.	3.9	
					X		WE05EA2.1; Ability to determine and interpret the following as they apply to the (Loss of Secondary Heat Sink): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.4	
K/A Category Totals:	3	3	3	3	3/3	3/3	Group Point Total:		18/6

ES-401	PWR Examination Outline							Form ES-401-2	
Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/SRO)									
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
000001 (APE 1) Continuous Rod Withdrawal / 1					X		001AA2.05; Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Uncontrolled rod withdrawal, from available indications.	4.6	
000003 (APE 3) Dropped Control Rod / 1									
000005 (APE 5) Inoperable/Stuck Control Rod / 1									
000024 (APE 24) Emergency Boration / 1						X	024G2.2.37; Ability to determine operability and/or availability of safety related equipment.	4.6	
000028 (APE 28) Pressurizer (PZR) Level Control Malfunction / 2			X				028AK3.03; Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: False indication of PZR level when PORV or spray valve is open and RCS saturated.	3.5	
000032 (APE 32) Loss of Source Range Nuclear Instrumentation / 7						X	032AG2.2.40; Ability to apply Technical Specifications for a system.	4.7	
000033 (APE 33) Loss of Intermediate Range Nuclear Instrumentation / 7									
000036 (APE 36; BW/A08) Fuel-Handling Incidents / 8				X			036AA1.02; Ability to operate and / or monitor the following as they apply to the Fuel Handling Incidents: ARM system.	3.1	
000037 (APE 37) Steam Generator Tube Leak / 3					X		037AA2.02; Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: Agreement / disagreement among redundant radiation monitors.	3.4	
000051 (APE 51) Loss of Condenser Vacuum / 4									
000059 (APE 59) Accidental Liquid Radwaste Release / 9	X						059AK1.02; Knowledge of the operational implications of the following concepts as they apply to Accidental Liquid Radwaste Release: Biological effects on humans of various types of radiation, exposure levels that are acceptable for nuclear power plant personnel, and the units used for radiation-intensity measurements and for radiation exposure levels.	2.6	
000060 (APE 60) Accidental Gaseous Radwaste Release / 9									
000061 (APE 61) Area Radiation Monitoring System Alarms / 7					X		061AA2.03; Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Setpoints for alert and high alarms.	3.3	
000067 (APE 67) Plant Fire On Site / 8									
000068 (APE 68; BW A06) Control Room Evacuation / 8									

000069 (APE 69; W E14) Loss of Containment Integrity / 5		X					WE14EK2.1; Knowledge of the interrelations between the (High Containment Pressure) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.4	
000074 (EPE 74; W E06 & E07) Inadequate Core Cooling / 4						X	WE07EG2.4.21; Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.0	
000076 (APE 76) High Reactor Coolant Activity / 9									
000078 (APE 78*) RCS Leak / 3									
(W E01 & E02) Rediagnosis & SI Termination / 3					X		WE02EA2.1; Ability to determine and interpret the following as they apply to the (SI Termination): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.3	
(W E13) Steam Generator Overpressure / 4				X			WE13EA1.2; Ability to operate and / or monitor the following as they apply to the: Operating behavior characteristics of the facility.	3.0	
(W E15) Containment Flooding / 5									
(W E16) High Containment Radiation /9									
(BW E08; W E03) LOCA Cooldown—Depressurization / 4			X				WE03EK3.4; Knowledge of the reasons for the following responses as they apply to the (LOCA Cooldown and Depressurization): RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.5	
(CE A11**; W E08) RCS Overcooling—Pressurized Thermal Shock / 4									
K/A Category Point Totals:	1	1	2	2	2/2	1/2	Group Point Total:		9/4

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems—Tier 2/Group 1 (RO/SRO)

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
003 (SF4P RCP) Reactor Coolant Pump					X							003K5.02; Knowledge of the operational implications of the following concepts as they apply to the RCPS: Effects of RCP coast down on RCS parameters.	2.8	
004 (SF1; SF2 CVCS) Chemical and Volume Control					X							004K5.11; Knowledge of the operational implications of the following concepts as they apply to the CVCS: Thermal stress, brittle fracture, pressurized thermal shock.	3.6	
005 (SF4P RHR) Residual Heat Removal		X			X							005K2.03; Knowledge of bus power supplies to the following: RCS pressure boundary motor-operated valves. 005K5.09; Knowledge of the operational implications of the following concepts as they apply the RHRS: Dilution and boration considerations	2.7 3.2	
006 (SF2; SF3 ECCS) Emergency Core Cooling								X	X			006A3.03; Ability to monitor automatic operation of the ECCS, including: ESFAS-operated valves 006A2.13: Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Inadvertent SIS actuation.	4.1 4.2	
007 (SF5 PRTS) Pressurizer Relief/Quench Tank				X								007K4.01; Knowledge of PRTS design feature(s) and/or interlock(s) which provide for the following: Quench tank cooling.	2.6	
008 (SF8 CCW) Component Cooling Water								X			X	008G2.1.7; Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. 008A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: PRMS alarm.	4.4 3.5	
010 (SF3 PZR PCS) Pressurizer Pressure Control		X										010K2.01; Knowledge of bus power supplies to the following: PZR heaters.	3.0	
012 (SF7 RPS) Reactor Protection								X				012A2.03; Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Incorrect channel bypassing.	3.4	
013 (SF2 ESFAS) Engineered Safety Features Actuation		X				X						013K2.01; Knowledge of bus power supplies to the following: ESFAS / safeguards equipment control. 013K6.01; Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: Sensors and detectors.	2.7 3.6	
022 (SF5 CCS) Containment Cooling							X					022A1.02; Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Containment pressure.	3.6	

026 (SF5 CSS) Containment Spray									X		026A4.01; Ability to manually operate and/or monitor in the control room: CSS controls.	4.5	
039 (SF4S MSS) Main and Reheat Steam							X				039A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Malfunctioning steam dump.	3.4	
			X								039K3.03; Knowledge of the effect that a loss or malfunction of the MRSS will have on the following: AFW pumps.	3.2	
059 (SF4S MFW) Main Feedwater										X	059G2.1.32; Ability to explain and apply system limits and precautions.	3.8	
										X	059G2.4.18; Knowledge of the specific bases for EOPs.	3.3	
061 (SF4S AFW) Auxiliary/Emergency Feedwater						X					061K6.02; Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps.	2.6	
										X	061G2.4.11; Knowledge of abnormal condition procedures.	4.2	
062 (SF6 ED AC) AC Electrical Distribution									X		062A4.02; Ability to manually operate and/or monitor in the control room: Remote racking in and out of breakers.	2.5	
	X										062K1.02; Knowledge of the physical connections and/or cause-effect relationships between the ac distribution system and the following systems: ED/G.	4.1	
063 (SF6 ED DC) DC Electrical Distribution	X										063K1.03; Knowledge of the physical connections and/or cause-effect relationships between the DC electrical system and the following systems: Battery charger and battery.	2.9	
								X			063A2.02; Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical systems; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of ventilation during battery charging.	3.1	
064 (SF6 EDG) Emergency Diesel Generator									X		064A4.06; Ability to manually operate and/or monitor in the control room: Manual start, loading, and stopping of the ED/G.	3.9	
										X	064G2.4.41; Knowledge of the emergency action level thresholds and classifications.	4.6	
073 (SF7 PRM) Process Radiation Monitoring							X				073A1.01; Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRM system controls including: Radiation levels.	3.2	
								X			073A2.02; Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Detector failure.	2.7	
076 (SF4S SW) Service Water			X								076K3.03; Knowledge of the effect that a loss or malfunction of the SWS will have on the following: Reactor building closed cooling water.	3.5	

078 (SF8 IAS) Instrument Air				X								078K4.01; Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: Manual/automatic transfers of control.	2.7	
103 (SF5 CNT) Containment			X									103K3.03; Knowledge of the effect that a loss or malfunction of the containment system will have on the following: Loss of containment integrity under refueling operations.	3.7	
				X								103K4.04; Knowledge of containment system design feature(s) and/or interlock(s), which provide for the following: Personnel access hatch and emergency access hatch.	2.5	
K/A Category Point Totals:	2	3	3	3	3	2	2	3/3	1	3	3/2	Group Point Total:		28/5

ES-401	PWR Examination Outline Plant Systems—Tier 2/Group 2 (RO/SRO)										Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
001 (SF1 CRDS) Control Rod Drive								X				001A2.15; Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Quadrant power tilt.	4.2	
002 (SF2; SF4P RCS) Reactor Coolant						X						002K6.06; Knowledge of the effect or a loss or malfunction on the following RCS components: Sensors and Detectors.	2.5	
011 (SF2 PZR LCS) Pressurizer Level Control		X										011K2.01; Knowledge of bus power supplies to the following: Charging pumps.	3.1	
014 (SF1 RPI) Rod Position Indication								X				014A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Misaligned rod.	3.9	
015 (SF7 NI) Nuclear Instrumentation				X								015K4.01; Knowledge of NIS design feature(s) and/or interlock(s) provide for the following: Source-range detector power shutoff at high powers.	3.1	
016 (SF7 NNI) Nonnuclear Instrumentation					X							016K5.01; Knowledge of the operational implication of the following concepts as they apply to the NNIS: Separation of control and protection circuits.	2.7	
017 (SF7 ITM) In-Core Temperature Monitor														
027 (SF5 CIRS) Containment Iodine Removal														
028 (SF5 HRPS) Hydrogen Recombiner and Purge Control														
029 (SF8 CPS) Containment Purge											X	029G2.4.31; Knowledge of annunciator alarms, indications, or response procedures.	4.1	
033 (SF8 SFPCS) Spent Fuel Pool Cooling														
034 (SF8 FHS) Fuel-Handling Equipment														
035 (SF 4P SG) Steam Generator										X		035A4.05; Ability to manually operate and/or monitor in the control room: Level Control to enhance natural circulation.	3.8	
041 (SF4S SDS) Steam Dump/Turbine Bypass Control			X									041K3.02; Knowledge of the effect that a loss or malfunction of the SDS will have on the following: RCS	3.8	
045 (SF 4S MTG) Main Turbine Generator							X					045A1.06; Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: Expected response of secondary plant parameters following T/G trip.	3.3	
055 (SF4S CARS) Condenser Air Removal														
056 (SF4S CDS) Condensate														
068 (SF9 LRS) Liquid Radwaste	X											068K1.02; Knowledge of the physical connections and/or cause effect relationships between the Liquid Radwaste System and the following systems: Waste gas vent header.	2.5	
071 (SF9 WGS) Waste Gas Disposal											X	071G2.1.19; Ability to use plant computers to evaluate system or component status.	3.9	
072 (SF7 ARM) Area Radiation Monitoring														
075 (SF8 CW) Circulating Water														
079 (SF8 SAS**) Station Air														

086 Fire Protection								X				086A2.02; Ability to (a) predict the impacts of the following malfunctions or operations on the Fire Protection System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Low FPS header pressure.	3.0	
050 (SF 9 CRV*) Control Room Ventilation														
K/A Category Point Totals:	1	1	1	1	1	1	1	1/2	0	1	1/1	Group Point Total:	10/3	10/3

ES-401 **Generic Knowledge and Abilities Outline (Tier 3)** **Form ES-401-3**

Facility: **Turkey Point** Date of Exam: **January, 2019**

Category	K/A #	Topic	RO		SRO-only	
			IR	#	IR	#
1. Conduct of Operations	2.1.15	Knowledge of administrative requirements for temporary management directives, such as standing orders, night orders, Operations memos, etc.	2.7			
	2.1.26	Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen).	3.4			
	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management.	4.3			
	2.1.1	Knowledge of conduct of operations requirements.			4.2	
	2.1.35	Knowledge of the fuel-handling responsibilities of SROs.			3.9	
	Subtotal		3		2	
2. Equipment Control	2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.0			
	2.2.43	Knowledge of the process used to track inoperable alarms.	3.0			
	2.2.13	Knowledge of tagging and clearance procedures.			4.3	
	2.2.40	Ability to apply Technical Specifications for a system.			4.7	
	Subtotal		2		2	
3. Radiation Control	2.3.11	Ability to control radiation releases.	3.8			
	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2			
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.			3.8	
	Subtotal		2		1	
4. Emergency Procedures/Plan	2.4.3	Ability to identify post-accident instrumentation.	3.7			
	2.4.4	Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.5			
	2.4.37	Knowledge of the lines of authority during implementation of the emergency plan.	3.0			
	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.			4.3	
	2.4.26	Knowledge of facility protection requirements, including fire brigade and portable firefighting equipment usage.			3.6	
	Subtotal		3		2	

Record of Rejected K/As **Form ES-401-4**

Tier/Group	Randomly Selected K/A	Reason for Rejection
1/1	026AA1.04	Not according to plant design. Changed to 026AA1.02.
1/1	055AG2.2.12	No surveillance procedures for SBO. Changed to 055AG2.4.20.
1/2	WE16EK3.4	Oversampled. Changed to 028AK3.03.
2/1	004K5.16	Not according to plant design. Changed to 004K5.11.
2/1	039A2.01	Not according to plant design. Changed to 039A2.04.
2/1	064A4.08	Not according to plant design. Changed to 064A4.06.
2/1	078K4.03	Not according to plant design. Changed to 078K4.01.
2/2	033A1.02	Oversampled. Changed to 045A1.06.
2/2	034A4.01	Oversampled. Changed to 035A4.05.
2/2	072K3.01	Oversampled. Changed to 033K3.01.
2/2	079A2.01	Overlap with 065 (Loss of Air). Changed to 014A2.04.
2/2	033K3.01	No relationship due to plant design. Changed to 041K3.02
1/1	029EA1.10	Overlap with operating test. Changed to 029EA1.15.
1/2	060AG2.4.46	Unable to write to SRO level. Changed to 024AG.2.2.27
3	2.1.27	Unable to write to Tier 3. Changed to 2.1.26.
3	2.1.28	Unable to write to Tier 3. Changed to G2.1.37.
2/2	001A2.06	Unable to write SRO question without entering minutia. Changed to 001A2.15.
3	2.4.9	Unable to write a Tier 3 SRO question. Changed to 2.4.26

Facility: Turkey Point Units 3 & 4 Date of Exam: 01/07/2019 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.				VM	ct	DL
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)				VM	ct	DL
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401				VM	ct	DL
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).				VM	ct	DL
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).				VM	ct	DL
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			
		18/2	11/8	46/15	VM	ct	DL
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				
		34/6	41/19		VM	ct	DL
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.				VM	ct	DL
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.				VM	ct	DL
10.	Question psychometric quality and format meet the guidelines in Appendix B.				VM	ct	DL
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.				VM	ct	DL

		Printed Name/Signature	Date
a.	Author	[signature] Mirkovich	12/12/18
b.	Facility Reviewer (*)	C. Trent / [signature]	12/13/18
c.	NRC Chief Examiner (#)	David R. Lanyi / [signature]	12/18/18
d.	NRC Regional Supervisor	Gerald J. McCoy / [signature]	1/3/2018

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.

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
1	H	2										X		M	E	007EK1.05 In order to ensure overall RO written exam balance of coverage, Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge (ML# 18117A079). How about we only give them 1 AFW pump and ask what value E-0 requires AFW flow to be set (340 gpm or 400 gpm) and then assuming no other operator actions, if S/G levels will be rising faster/slower in 10 minutes. Changed as requested. Question is SAT.
2	F	3												N	S	009EK1.01
3	F	3												M	S	011EG2.2.44
4	F	2				X			X					B	E	015G2.1.20 Could we change the second question to ask if the pump should be stopped before/after the reactor trip verification using the EOP network? Also are the ROs required to know vibration trip points by heart. Changed as requested. Question is SAT.
5	H	3				X								N	E	022AK3.05 Could we change B to "Avoid lowering RCS pressure below the DNBR TS" or words to that effect. Distactor B was chosen because of recent plant OE. However a fast rload reduction would not be cause of the event.

Refer to Section D of ES-401 and Appendix B for additional information regarding each of the following concepts:

1. Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.
2. Enter the level of difficulty (LOD) of each question a 1 (easy) to 5 (difficult); questions with a difficulty between 2 and 4 are acceptable.
3. Check the appropriate box if a psychometric flaw is identified:
   - "Stem Focus": The stem lacks sufficient focus to elicit the correct answer (e.g., unclear intent, more information is needed, or too much needless information).
   - "Cues": The stem or distractors contain cues (e.g., clues, specific determiners, phrasing, length).
   - "T/F": The answer choices are a collection of unrelated true/false statements.
   - "Cred. Dist.": The distractors are not credible; single implausible distractors should be repaired, and more than one is unacceptable.
   - "Partial": One or more distractors are partially correct (e.g., if the applicant can make unstated assumptions that are not contradicted by the stem).
4. Check the appropriate box if a job content flaw is identified:
   - "Job Link": The question is not linked to the job requirements (i.e., the question has a valid K/A but, as written, is not operational in content).

- "Minutia": The question requires the recall of knowledge that is too specific for the closed-reference test mode (i.e., it is not required to be known from memory).
- "#/Units": The question contains data with an unrealistic level of accuracy or inconsistent units (e.g., panel meter in percent with question in gallons).
- "Backward": The question requires reverse logic or application compared to the job requirements.

5. Check questions that are sampled for conformance with the approved K/A and those K/As that are designated "SRO-only." (K/A and license-level mismatches are unacceptable.)
6. Enter question's source: (B)ank, (M)odified, or (N)ew. Verify that (M)odified questions meet the criteria of Form ES-401, Section D.2.f.
7. Based on the reviewer's judgment, is the question, as written, (U)nsatisfactory (requiring repair or replacement), in need of (E)ditorial enhancement, or (S)atisfactory?
8. At a minimum, explain any "U" status ratings (e.g., how the Appendix B psychometric attributes are not being met).

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
6	H	3										X		N	E	025AK2.05 In order to ensure overall RO written exam balance of coverage, Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge (ML# 18117A079). How about something more like this: Unit is in Mode 5 on RHR Cooling 3A RHR Pump is in service Subsequently: ANN I7/6, RHR Pump Room A Sump Trouble alarms ANN H6/2, RHR HX Hi/Lo Flow alarms RHR Flow is erratic 3-ONOP-050, Loss of RHR should/should not benetered 3-ONOP-41.3, Excessive reactor Coolant Sysytem Leakage, should/should not be entered.. The licensee stated that they felt the revised wording would eliminate two choices. If one is entered the other wouldn't. Original question is OK.
7	F	3												N	S	026AA1.02

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
8	H	3										X		N	E	027AK2.03 In order to ensure overall RO written exam balance of coverage, Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge (ML# 18117A079). I think we need to go with a two part here. First ask what raising or lowering the controller does (or per the ONOP-41.5 attempt to raise/lower the controller) The second part should ask if use of the Master Controller fails, the procedure instructs you to close spray valves/ turn off heaters. Question has been rewritten. New question is SAT.
9	H	3												N	S	029EA1.15
10	H	3												N	S	E12EA2.2
11	H	2				X								N	U	054AK1.01 The second question needs work. If you have a sheared pipe, why would you consider putting any flow into it? Perhaps you could give all S/G parameters and ask if feeding is adequate or ask stabilization criteria. Depending on where the break is, the procedures may require them to isolate or feed. Therefore question is SAT.
12	3	H												N	S	056G2.4.4
13	3	H										X		N	E	062AA2.03 In order to ensure overall RO written exam balance of coverage, Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge (ML# 18117A079). I think we can get what we neeed from ONOP-019 Step 4 RNO to meet the K/A, either other question would work for the 2x2. Balance maintained by Q51 being procedurally related. Question is OK.
14	3	H												N	S	065AK3.04
15	3	H												B	S	077AA1.03
16	3	H												N	S	E04EA2.1

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
17	3	H												N	S	E11EK3.4
18	2	F				X								B	E	E05EK2.2 (2017 Exam) I'm not sure why someone would choose vents only. Could we make the second answer Both PORVs only and Both PORVS and All RCS Vent valves? Changed as requested. Question is SAT.
19	3	H												B	S	028AK3.03
20	2	F												B	S	036AA1.02
21	3	F										X		N	E	037AA2.02 In order to ensure overall RO written exam balance of coverage, Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge (ML# 18117A079). Simple rewording here can work. The ONOP requires the operator to check for a high alarm on R-15/R-19 first because it has a faster response to rising S/G tube leakage. If R-15/R-19 is in alarm \, the operator is required to verify proper automatic isolationof the process flowpath. Wording was changed to meet the intent of the comment. Question is SAT.
22	F	3										X		N	E	059AK1.02 How about for the first question we ask that per NOP-061.11C, Controlled Liquid Release from Waste Monitor Tank A, if R-18 exceeds it's alarm setpoint the release shall be terminated until the cause is corrected/ and Chemistry shall verify ODCM Limits NOT exceeded. Licensee pointed out that the change would make the question not meet the K/A. Original question is SAT.
23	H	2												M	S	E14EK2.1 (2017 Exam)
24	F	2	X											N	E	074EG2.4.21 Could we add the word valid in front of CET? Changed as requested. Question is SAT.
25	F	2												N	S	E02EA2.1

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
26	H	2	X											N	E	E13EA1.2 How about for the second question we ask "If the 3A S/G pressure is 1150 psig and NO safety valves have lifted, the crew is/is not required to mplement FR-H.2, Response to Steam Generator Overpressure" Changed as requested. Question is SAT.
27	H	2				X								N	E	E03EK3.4 Could we use 90° F/hr instead of Maximum Rate possible. This is the GOP-503 limit. We would need to ask what the maximum cooldown rate would be. Licensee stated that they believe that Max possible is better because those words are in their procedurs a lot. Consider question SAT.
28	F	2												B	S	003K5.02
29	H	2												N	S	004K5.11
30	F	2												B	S	005K2.03 (2016 exam)
31	H	3												N	E	005K5.09 I know that the second TS surveillance discusses voiding in the system, but this is not a very plausible distractor. I would rather see the second question look more like " … sufficient coolant circulation for decay heat removal _____." The answers would be "ONLY" or "and ensure adequate chemical mixing." Turkey Point procedures direct the operators to sweep RHR pumps after RHR ops are done. This makes the distractors plausible. Question is SAT.
32	F	2												N	S	006A3.03
33	F	2												B	S	007K4.01 (2013 Exam)
34	H	>1												N	S	008G2.1.7
35	F	2												N	S	010K2.01
36	H	2												N	S	012A2.03 (Picture)
37	H	2												M	E	013K2.01 (2017 Exam) Is it really true this is the normal line-up in the plants, or os It normal for the simulator? If the plant is

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
																preferentially lined-up with the 4D bus aligned to the 4B bus virtually all of the time, then this is OK. The question matches the plant. Question is SAT.
38	H	3												B	S	013K6.01
39	H	2												N	S	022A1.02
40	H	2		X		X						X		M	U	026A4.01 K/A is not really met with this one. I know it says "or monitor", but this is really looking at the applicants knowing the procedure. What it is missing is the how they do this. Manually initiate CS by starting the pumps and opening the valves. The correct answer also seems to be cued because you tell them that they are looking at CS Requirements. Why would they bite on the other 3 distratctors. I'd suggest toggling on starting spray and verifying Phase B. The other half could be manually starting equipment or pushing buttons. Question was rewritten. New question is SAT.
41	H	3												M	E	039A2.04 (2014 exam) How do we know that fuel burnup is less than 18,000 MWD/MTU? Perhaps we can tell them that the unit has been operating essentially at full power for the previous 6 months. You're kind of cueing that steam dumps might be the answer since you state one valve is open. If your SD system would only have one valve modulating to control temperature, than this would probably be ok. Is D wrong? It is a foldout page criteria and then can be done at any time (within the first hour). I like it as a distractor, but maybe that is because it could be correct. Maybe we should use the A pump as the distractor. That would be clearly wrong. Question was rewritten. New question is SAT.
42	H	2				X								N	E	039K3.03 I'm not sure why D is plausible. Does it make sense that loss if 1 S.G would cause a loss of 2 AFW pumps. It almost makes more sense to have the 3rd distractor a the B AFW pump. Turkey Point AFW steam supply is unique. Question is SAT..
43	F	2												N	E	059G2.1.32 Typo in distractor analysis: answer A should be "feed" pump not "fee" pump Corrected. Question is SAT.

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
44	H	2												B	S	059G2.4.18 (2013 Exam)
45	H	2												M	S	061K6.02 (2017 Exam)
46	F	2												N	S	062A4.02
47	H	2												N	S	062K1.02
48	H	2												N	S	063K1.03
49	F	2												N	S	064A4.06
50	F	2												N	S	073A1.01
51	H	2		X										B	E	073A2.02 (2017 Exam) The second question answers the first question. Why not ask if there is an auto isolation for this failure for the first question. Questions have been logically separated. Question is SAT.
52	H	2					X							M	E	076K3.03 (2017 Exam) (K/A is not listed on submittal) Sub-set issue: Need to say “for longer than a minimum of” Corrected as requested. Question is SAT.
53	F	2												N	S	078K4.01
54	H	2												B	S	103K3.03 (2013 Exam)
55	F	2												N	E	103K4.04 Change second set of answers to “inward” or “outward” Wording has been adjusted to make the most technical sense. Question is SAT.
56	H	2												B	S	002K6.06
57	F	2												N	S	011K2.01
58	H	2												N	E	086A2.02 How about just asking if the diesel fire pump is / is not expected to be running for the first question. Changed as requested. Question is SAT.

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
59	F	2												N	S	015K4.01
60	F	1												B	U	016K5.01 The fact that control and safety channels are separated is LOD 1. This is a good part of a two by two. The first part could just deal with whatever the control channel is designed to do and the second one will be that the safety channel is not affected because … Not true for Turkey Point. Several examples where this is not the case were pointed out. Question is SAT.
61	H	3												B	S	041K3.02
62	H	2												N	E	035A4.05 Can we change the second question to ask "The Main Feedwater Control Valves are / are not used to control feed to support natural circulation" Essentially changed as requested. Question is SAT.
63	H	2												M	S	045A1.06 (2015 Exam)
64	F	2												N	E	068K1.02 Why not test the vent path of the Recycle Monitor Tanks? If I didn't know, I'd guess the correct answer as this is written. This is a common misconception for the site. Question is SAT.
65	F	2				X								N	E/U	071G2.1.9 Is there anything monitored in the Control Room that cannot also be monitored on DCS? Is this one of those questions where if the applicant is not certain, he can't be wrong saying it can be monitored on DCS. Multiple readings cannot be read on DCS. Therefore the question is considered SAT.
66	F	2												M	S	G2.1.15 (2011 Exam)
67	F	2										X		N	E	G2.1.27 This is a Tier 2 question. I'm not sure we can write a Tier 3 question to this K/A. I'd recommend changing this to G 2.1.26, but if you think you can meet the Tier you don't have to change. Changed to G2.1.26. Unable to write a Tier 3 question. Question is now SAT.

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
68	F	2										X		N	E	G2.1.28 This is a Tier 2 question. I'm not sure we can write a Tier 3 question to this K/A. I'd recommend changing this to G 2.1.37, but if you think you can meet the Tier you don't have to change. Changed to G2.1.37. Unable to write a Tier 3 question. Question is now SAT.
69	F	2												B	S	G2.2.22 (2013 Exam)
70	F	3												B	S	G2.2.43
71	F	3										X		B	E/U	G2.3.11 (2011 Exam) This is a Tier 2 question. We need to keep Tier 3 questions at a higher level. Something out of the ODCM that is more generic should work. Information provided is from a generic EOP note. Therefore this is being considered SAT.
72	H	2										X		B	U	G2.3.12 (2015 Exam) This is a Tier 2 question. This one should deal with higher level activities. Rewritten. New question is SAT.
73	F	2												N	S	G2.4.3 (picture)
74	H	3						X						N	E	G2.4.4 This is awefully close to a tier 1 question. Are the ROs required to do this without the flowcharts? Answer. Yes. This is expected knowledge for ROs. Thisis a generic question on how to perform CSF checks. Question is SAT.
75	F	3	X			X								N	E	G2.4.37 Although you state the plausibility is based upon the ability to delegate, the question asks who is responsible. How about we ask "The SM is / is not responsible for E-Plan calls once the emergency response facilities are activated." "The EC is/ is not allowed to delegate e-plan calls to the Recovery Manager" Question as proposed could would have multiple correct answers. Considering the original question SAT.

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
76	H	2												N	S	008EG2.2.38
77	H	3												M	S	038EA2.09
78	H	3												N	S	055EG2.4.20
79	H	2												M	S	057AA2.06 (picture)
80	H	2												M	E	058G2.4.30 (2013 Bank) Isn't there a site reportability procedure that the operators would preferentially use? The question should ask what the requirement per LI-AA-1001 requires. Corrected as requested. Question is SAT.
81	H	3												M	S	E05EA2.1
82	H	3		X		X								M	E/U	001AA2.05 (Picture) (2017 Exam) Instead of the second distractor have an RPS trip designed to prevent exceeding a TS limit, wouldn't it make more sense to say it is there to prevent a safety analysis limit? Why would a significant AFD event occur due to an unplanned dilution event? The easiest fix for this is to ask instead "This is / is not a rod withdrawl event (or dilution event)" And then "The design RPS trip to potect against this event is / is not to terminate the transient before DNBR (AFD) exceeds safety analysis limits" Corrected as requested. Question is SAT.
83	H	2												N	S	032AG2.2.40
84	H	2												N	E	024AG2.2.37 Grammar, don't split the infinitive, "is /is not next required to" In first bullet after "subsequently" should read 'rise in source range …" Changed as requested.
85	H	2	X											M	E	061AA2.03 (2017 Exam) EAL Call I believe we may be oversampling their ability to perform an EAL call. Either this question or question 90 should be changed from an EAL call.

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
																Since #90 specifically asks for an eplan call, we should adjust this one. New question written. Question is SAT.
86	H	2												N	S	006A2.13
87	H	2												N	S	008A2.04
88	H	2											X	N	E/U	061G2.4.11 If use of the B SSGFP is preferred because A won't have power, than this is not an SRO question. ROs should know that you don't enter the ONOP when below 1000 psig. Not a power issue. STBY Feedpump is electricaly operated. Question is SAT.
89	H	2												M	S	063A2.02 (2015 Exam)
90	H	2	X											N	S	064EG2.4.41 EAL Call (See Question 85)
91	F	2				X								N	E	001A2.01 Changed to 001AA2.15 due to inability to write an SRO question without going into minutia. Since time is of the essence, a GOP shutdown doesn't make much sense. Why not toggle on Fast Load Reduction and Trip the reactor instead? Ask if the next step is to start the cooldown or de-energize the CRDM Coil Stacks. Changed as requested. Now SAT.
92	H	2												M	S	029G2.4.31 (2017 Exam)
93	F	2												N	S	014A2.04
94	F	2												N	E	G2.1.1 Could we use the PGM vice the OCC? It seems more plausible. Changed as requested. Now SAT.
95	F	2												N	S	G2.1.35
96	F	2											X	N	E/U	G2.2.13 Why is this SRO knowledge? I believe your ROs need to know what constitutes the tagging order Question rewritten. Now SAT.
97	H	2										X		B	U	G2.2.40

Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. Source (B/ M / N)	7. Status (U /E /S)	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist	Partial	Job-Link	Minutia	# / Units	Back ward	Q – K/A	SRO Only			
																This is a Tier 2 question. This should be brought back some. Cascading of TSs is usually a good fit for this Tier 3 K/A. This is testing TS 3.0.4 knowledge. Considered SAT for Tier 3.
98	H	2		X										M	U	G2.3.14 (2016 Exam) This is the second question that plays on when to start the clock for E-plan related stuff. Question totally rewritten. Now SAT.
99	H	2												B	S	G2.4.5
100	H	3										X		M	U	G2.4.9 This is written as a Tier 1 question. This should be looking at generic notes and cautions in EOPs concerning low power. It should not be looking at a specific accident. Changed to G2.4.26 due to inability to write to a SRO Tier 3 question. Now SAT