Facility:	GINNA	Date of Examination:	8/27/2018
Examination Level: RO ☒ SRO ☐		Operating Test Number:	2018

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations K/A - 2.1.5 (2.9*) 45.12	D, R	Ability to use procedures related to shift staffing, such a minimum crew complement, overtime limitations, etc. Determine the allowable hours an Operator can work.
Conduct of Operations K/A – 2.1.25 (3.9) 45.12	M, S	Ability to interpret reference materials, such as graphs, curves, tables, etc. Manually Calculate QPTR.
Equipment Control K/A – 2.2.41 (3.5) 45.13	M, R	Ability to obtain and interpret station electrical and mechanical drawings. Determine proper tagging boundary for work.
Radiation Control K/A – 2.3.7 (3.5) 45.10	D, R	Ability to comply with radiation work permit requirements during normal or abnormal conditions. Determine stay time and exit requirements for working in a High Radiation Area.
Emergency Plan		

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)

Facility: GINNA	Date of Examination: 8/27/2018
Examination Level: RO ☐ SRO ☒	Operating Test Number: 2018

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations K/A - 2.1.5 (3.9) 45.12	D, R	Ability to use procedures related to shift staffing, such a minimum crew complement, overtime limitations, etc. Determine the allowable hours an Operator can work. (Modified for SRO level)
Conduct of Operations K/A – 2.1.25 (4.2) 45.12	M, R	Ability to interpret reference materials, such as graphs, curves, tables, etc. Review a manual QPTR calculation.
Equipment Control K/A – 2.2.41 (3.9) 45.13	M, R	Ability to obtain and interpret station electrical and mechanical drawings. Review a clearance and tagging boundary for work.
Radiation Control K/A – 2.3.7 (3.6) 45.10	D R	Ability to comply with radiation work permit requirements during normal or abnormal conditions. Determine stay time and exit requirements for working in a High Radiation Area and Determine Notification Requirements for Contaminated Injured Person
Emergency Plan K/A – 2.4.41 (4.6) 45.11	D, R	Knowledge of the emergency action level thresholds and classification. Classify event, complete notification paperwork, and provide direction to communicator.

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)

Facility: Ginna	Date of Examination: 8/27/2018
Exam Level: RO ☒ SRO-I ☐ SRO-U ☐	Operating Test Number: 2018

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. 004 Chemical and Volume Control System [004 A4.07 (3.9/3.7)] Borate for one rod not fully inserted following trip per ES-0.1	S, D, A, E	1
b. 012 Reactor Protection System [012 A4.05 (3.6/3.6)] Remove a Power Range Channel from Service	S, D	7
c. 005 Residual Heat Removal System [005 A2.03 (2.9/3.1)] Restore RHR Cooling	S, D, L	4P
d. 076 Service Water System [076 A2.01 (3.5*/3.7*)] Respond to a Total Loss of SW	S, D, A, E	4S
e. 006 Emergency Core Cooling System [006 A4.05 (3.9/3.8)] Transfer to Cold Leg Recirculation	S, D, A, E	2
f. 010 Pressurizer Pressure Control System [010 A2.02 (3.9/3.9)] Respond to Controlling Pressurizer Pressure Channel Failing High with stuck open Spray Valve	S, M, E, A	3
g. 026 Containment Spray System [026 A4.01 (4.5/4.3)] Verify/Initiate Containment Spray Actuation IAW E-0. (Verify NaOH flow)	S, M, E, EN	5
h. 008 Component Cooling Water System [008 A4.01 (3.3/3.1)] Component Cooling Water Leak Isolation	S, N, E	8

In-Plant Systems:* **3 for RO**, 3 for SRO-I, and 3 or 2 for SRO-U

System/JPM Title	Type Code*	Safety Function
i. APE 067 Plant Fire on Site [APE 067 AA2.17 (3.5/4.3)] Align SW to Suction of the TDAFW Pump IAW ER-FIRE.2	D, E	4S
j. 071 Waste Gas Disposal System [071 A3.03 (3.6/3.8)] Release "D" Gas Decay Tank	R, D, A	9
k. 064 Emergency Diesel Generator System [064 A4.01 (4.0/4.3)] Start "A" EDG Locally per ER-FIRE.1	D	6

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

* Type Codes	Criteria for **R** /SRO-I/SRO-U
(A)lternate path	**4–6**/4–6 /2–3
(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	

Facility: Ginna	Date of Examination: 8/27/2018
Exam Level: RO ☐ SRO-I ☒ SRO-U ☐	Operating Test Number: 2018

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. 004 Chemical and Volume Control System [004 A4.07 (3.9/3.7)] Borate for one rod not fully inserted following trip per ES-0.1	S, D, A, E	1
b. N/A		
c. 005 Residual Heat Removal System [005 A2.03 (2.9/3.1)] Restore RHR Cooling	S, D, L	4P
d. 076 Service Water System [076 A2.01 (3.5*/3.7*)] Respond to a Total Loss of SW	S, D, A, E	4S
e. 006 Emergency Core Cooling System [006 A4.05 (3.9/3.8)] Transfer to Cold Leg Recirculation	S, D, A, E	2
f. 010 Pressurizer Pressure Control System [010 A2.02 (3.9/3.9)] Respond to Controlling Pressurizer Pressure Channel Failing High with stuck open Spray Valve	S, M, E, A	3
g. 026 Containment Spray System [026 A4.01 (4.5/4.3)] Verify/Initiate Containment Spray Actuation IAW E-0. (Verify NaOH flow)	S, M, E, EN	5
h. 008 Component Cooling Water System [008 A4.01 (3.3/3.1)] Component Cooling Water Leak Isolation	S, N, E	8

In-Plant Systems:* 3 for RO, **3 for SRO-I**, and 3 or 2 for SRO-U

System/JPM Title	Type Code*	Safety Function
i. APE 067 Plant Fire on Site [APE 067 AA2.17 (3.5/4.3)] Align SW to Suction of the TDAFW Pump IAW ER-FIRE.2	D, E	4S
j. 071 Waste Gas Disposal System [071 A3.03 (3.6/3.8)] Release "D" Gas Decay Tank	R, D, A	9
k. 064 Emergency Diesel Generator System [064 A4.01 (4.0/4.3)] Start "A" EDG Locally per ER-FIRE.1	D	6

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.	
* Type Codes	Criteria for R /**SRO-I**/SRO-U
(A)lternate path	4–6/**4–6** /2–3
(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	

Facility: Ginna	Date of Examination: 8/27/2018
Exam Level: RO ☐ SRO-I ☐ SRO-U ☒	Operating Test Number: 2018

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. N/A		
b. N/A		
c. 005 Residual Heat Removal System [005 A2.03 (2.9/3.1)] Restore RHR Cooling	S, D, L	4P
d. N/A		
e. N/A		
f. 010 Pressurizer Pressure Control System [010 A2.02 (3.9/3.9)] Respond to Controlling Pressurizer Pressure Channel Failing High with stuck open Spray Valve	S, M, E, A	3
g. 026 Containment Spray System [026 A4.01 (4.5/4.3)] Verify/Initiate Containment Spray Actuation IAW E-0. (Verify NaOH flow)	S, M, E, EN	5
h. N/A		

In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or **2 for SRO-U**

System/JPM Title	Type Code*	Safety Function
i. APE 067 Plant Fire on Site [APE 067 AA2.17 (3.5/4.3)] Align SW to Suction of the TDAFW Pump IAW ER-FIRE.2	D, E	4S
j. 071 Waste Gas Disposal System [071 A3.03 (3.6/3.8)] Release "D" Gas Decay Tank	R, D, A	9
k. N/A		

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

* Type Codes	Criteria for R /SRO-I/**SRO-U**
(A)lternate path	4–6/4–6 /**2–3**
(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	

Facility: Ginna   Scenario No.: 1   Op-Test No.: 2018

Examiners: ______   Operators: ______

Initial Conditions: $1X10^{-8}$ amps following a forced maintenance outage. The crew will be directed to pull rods to the POAH and start the A MFW Pump in accordance with O-1.2, Plant Startup from Hot Shutdown to Full Power Load.

Turnover: 1C SI Pump C/T for lube oil cooler replacement. (If allowed, expected return in 2 hours – if not, then make a fail to start malfunction)

Critical Tasks: CT #1:E-0 – D: Manually actuate at least one train of Safety Injection before exiting E-0.

CT #2: Manually start at least one RHR pump to provide a low-head injection source prior to initiating SG depressurization in FR-C.2.

CT #3: Depressurize SGs to atmospheric pressure (at < 100°F/hr) to inject ECCS accumulators and establish low-head injection flow before a Core Cooling Red Path develops.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R(ATC) N(CRS, BOP)	Raise power to the POAH
2	OVR MIS06A OVR MIS06B OVR MIS06C OVR MIS06D OVR MIS06E	C(BOP) TS (CRS)	Containment Recirculation Fan Cooler A Trips
3	EDS04B	C(ALL) TS (CRS)	Fault / Loss of Emergency Bus: 480V Bus 16
4	RCS02D	M(ALL)	Small Break Loss of Coolant Accident (SBLOCA) (Ramp In)
5	SIS02A SIS02B	C(CRS, ATC)	Failure of AUTO Safety Injection
6	SIS03A	C(CRS, ATC)	1A SI Pump Trip
7	RPS07E	C(BOP)	1A RHR Pump Fails to AUTO Start
8	P-MIS07 RCS05A RCS15A	(ALL)	FR-C.2 - Degraded Core Cooling

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Ginna 2018 NRC Scenario #1

The plant is at 1×10^{-8} amps power (BOL). The area has experienced overcast conditions for the past 4 hours, with light wind from the West at 10-15 mph, and this is expected to continue throughout the shift. The crew will raise reactor power to the POAH and stabilize plant power between 0.5 - 1%; and then raise and stabilize reactor power to 2-3 % and start 'A' MFW Pump for a confidence run. Do NOT exceed 5% reactor power until maintenance on the 'C' SI Pump is complete.

The following equipment is Out-Of-Service: The 'C' SI Pump is OOS for lube oil cooler replacement and is expected to be back in 2 hours.

Shortly after taking the watch, the crew will withdraw control rods to raise and stabilize power at 0.5-1% in accordance with O-1.2, PLANT STARTUP FROM HOT SHUTDOWN TO FULL LOAD.

Subsequently, the 'A' Containment Recirc Fan will trip. The operator will respond in accordance with AR-C-1, CONTAINMENT RECIRC SYSTEM LO AIR FLOW; AR-J-9, SAFEGUARD BREAKER TRIP; and manually start a second Containment Recirc Fan in accordance with A-503.1, Emergency and Abnormal Operating Procedures Users Guide; and P-17, Operations Control Room Operating Instructions. The operator will address Technical Specification LCO 3.6.6, Containment Spray (CS), Containment Recirculation Fan Cooler (CRFC), and NaOH Systems.

Next, a fault on 480V Bus 16 will occur, resulting in Bus 16 de-energizing. The operator will enter AP-ELEC.14/16, Loss of Safeguards Bus 14/16. The operator may leave 'B' EDG running or secure it within AP-ELEC.14/16. The operator will address Technical Specification LCO 3.8.1, AC Sources – MODES 1, 2, 3, and 4; and LCO 3.8.9, Distribution Systems – MODES 1, 2, 3, and 4.

Afterwards, a Small Break LOCA occurs over five minutes. The operator will enter AP-RCS.1, Reactor Coolant Leak; however, ultimately the reactor will be tripped, Safety Injection will be manually actuated, and the operator will enter E-0, Reactor Trip or Safety Injection. When the SI occurs, the 'A' SI Pump will trip and the 'A' RHR Pump will fail to start automatically and will be manually started in accordance with ATT-27.0, Attachment Automatic Action Verification.

The operator will transition from E-0 to E-1, Loss of Reactor or Secondary Coolant. Ultimately, an ORANGE path on the Core Cooling Safety Function will occur and the operator will transition to FR-C.2, Response to Degraded Core Cooling.

Shortly after entry into FR-C.2, 'A' RCP will trip on high vibrations. The scenario will terminate at Step 13 (or beyond) of FR-C.2 after S/G depressurization has begun and ECCS Accumulators begin to inject.

Critical Tasks:

Manually actuate at least one train of Safety Injection before exiting E-0 (EOP-Based)

Safety Significance: Failure to actuate Safety Injection when it is required to be actuated, and can be actuated, violates the assumptions of the Safety Analysis and constitutes incorrect performance that could lead to misdiagnosis of the event, implementation of an incorrect mitigation strategy and ultimately degradation of the RCS and/or fuel cladding fission product barriers.

Manually start at least one RHR Pump to provide a low-head injection source prior to initiating S/G depressurization in FR-C.2 (EOP-Based)

Safety Significance: Failure to depressurize the S/Gs results in the needless deterioration of core cooling to an inadequate status. Inventory losses continue while no makeup can be injected into the RCS because of the system pressure. Depressurizing the S/Gs would provide some immediate benefit by condensing steam on the primary side of the S/G U-tubes. Eventually, continued depressurization of the S/Gs will lead to ECCS accumulator injection and to low-head ECCS injection. Accumulator injection and low-head injection would restore the core cooling CSF to an adequate status. Thus, failure to depressurize the S/Gs when it is possible to do so (as it is in the postulated plant conditions) causes an extreme (red-path) challenge to the core cooling CSF that could be avoided by secondary depressurization. Failure to perform the critical task causes a "significant reduction of safety margin beyond that irreparably introduced by the scenario." Additionally, it represents a "demonstrated inability by the crew to take an action or combination of actions that would prevent a challenge to plane safety."

Depressurize S/Gs to atmospheric pressure (at < 100°F/hr) to inject ECCS accumulators and establish low-head injection flow before a Core Cooling Red Path develops (EOP-Based)

Safety Significance: Failure to depressurize the S/Gs results in the needless deterioration of core cooling to an inadequate status. Inventory losses continue while no makeup can be injected into the RCS because of the system pressure. Depressurizing the S/Gs would provide some immediate benefit by condensing steam on the primary side of the S/G U-tubes. Eventually, continued depressurization of the S/Gs will lead to ECCS accumulator injection and to low-head ECCS injection. Accumulator injection and low-head injection would restore the core cooling CSF to an adequate status. Thus, failure to depressurize the S/Gs when it is possible to do so (as it is in the postulated plant conditions) causes an extreme (red-path) challenge to the core cooling CSF that could be avoided by secondary depressurization. Failure to perform the critical task causes a "significant reduction of safety margin beyond that irreparably introduced by the scenario." Additionally, it represents a "demonstrated inability by the crew to take an action or combination of actions that would prevent a challenge to plane safety."

Facility: Ginna Scenario No.: 3 Op-Test No.: 2018

Examiners: ______________ Operators: ______________

Initial Conditions: 90% Power

Turnover: Maintaining 90% power following the return of 1A Heater Drain Pump following maintenance, maintenance and engineering monitoring pump seal performance

Critical Tasks: CT #1 - E-3 – A: Isolate feedwater flow into and steam flow from the ruptured SG before a transition to ECA-3.1 occurs.

CT #2 – E-3 – B: Establish/maintain an RCS temperature so that transition from E-3 does not occur because the temperature is either too high to maintain required subcooling or too low causing a challenge to the subcriticality or integrity CSF.

Event No.	Malf. No.	Event Type*	Event Description
1	CVC09	C(ATC)	VCT Divert Control Valve Failure (LCV-112A) – Fails to full divert position, requires taking valve to manual VCT.
2	SGN03B	I(BOP) TS(US)	S/G PRESSURE CHANNEL FAILURE: PT-469 (II) – fails low to zero.
3	SGN05B	R(ATC) N(BOP) TS(US)	Steam Generator 'B' Tube Leak (SGTL) – 10 gpm, downpower required IAW AP-SG.1.
4	EDS01A GEN08	C(ALL) TS(US)	Loss of 7T Line/'A' EDG fails to start in AUTO – AP-ELEC.1
5	SGN05B	M(ALL)	'B' SG SGTR / Rx Trip / SI (Ramp to 640 gpm tube rupture over 300 seconds)
6	EDS01B	C(ALL)	Loss of Off-Site Power (Prior to transition to E-3) (At step 9, following AFW verification)
7	PZR05A	C(ATC)	During RCS Depressurization with a PORV, the selected PORV and its associated Block Valve will not close. Causes transition to ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT – SUBCOOLED RECOVERY DESIRED. (Or force the use of PORV 430, by causing PORV 431-C to not open)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Ginna 2018 NRC Scenario #3

The plant is at 90% power (MOL). Corrective Maintenance was performed on 'A' HDT Pump four days ago and Engineering is monitoring Pump seal performance. It is intended to observe the 'A' HDT Pump operation for one more day at this power level and then raise power to 100%. The area has experienced overcast conditions for the past 4 hours, with wind from the West at 20 - 30 mph, and this is expected to continue throughout the shift.

There is no equipment is Out-Of-Service.

Shortly after taking the watch, VCT or Holdup Tank Divert Valve, LCV-112A, will fail to the FULL DIVERT position. The operator will respond in accordance with A-503.1, Emergency and Abnormal Operating Procedures Users Guide, and place the control switch for LCV-112A to the VCT position.

Following this, S/G Pressure Transmitter PT-469 will fail Low. The operator will respond in accordance with AR-G-27, STM LINE A LO-LO PRESS CHANNEL ALERT 514 PSI; AR-G-22, ADFCS SYSTEM TROUBLE, and enter ER-INST.1, Reactor Protection Bistable Defeat After Instrumentation Loop Failure. The operator will address Technical Specification LCO 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, and LCO 3.3.3, Post Accident Monitoring (PAM) Instrumentation.

Subsequently, a 10 gpm Steam Generator Tube Leak (SGTL) will develop on the 'B' Steam Generator. The operator will respond in accordance with AR-PPCS-R47AR, SGTL INDICATED, and enter AP-SG.1, Steam Generator Tube Leak, and commence a load reduction. The operator will address Technical Specification LCO 3.4.13, RCS Operational Leakage, and LCO 3.7.14, Secondary Specific Activity.

During the load reduction, the 7T Line will de-energize, and the 'A' EDG will fail to start automatically. The operator will respond in accordance with AP-ELEC.1, Loss of 12A and/or 12B Busses, and manually start the 'A' EDG. When the 'A' EDG is manually started, power will be restored to all Safeguards Buses, and the operator will restore plant equipment as required. The operator will address Technical Specification LCO 3.3.4, Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation, LCO 3.8.1, AC Sources – MODES 1, 2, 3, and 4, and LCO 3.8.9, Distribution Systems – Modes 1, 2, 3, and 4; as well as Technical Requirements Manual, TR-3.8.1, Offsite Power Sources.

After this, the S/G Tube Leak in the 'B' S/G will degrade to a S/G Tube Rupture (640 gpm) over five minutes. This will result in an automatic reactor trip and Safety Injection actuation. The crew will enter E-0, Reactor Trip or Safety Injection, and transition to E-3, Steam Generator Tube Rupture. Following the verification of AFW step in E-0, the remaining Offsite Power Circuit 767 will be lost resulting in loss of all Offsite Power. ECCS loads that were lost will automatically sequence onto 'B' EDG.

While depressurizing the RCS using a PORV at Step 19 of E-3, the PORV and its associated block valve will fail to CLOSE. The crew will transition to ECA-3.1, SGTR With Loss of Reactor Coolant – Subcooled Recovery Desired.

The scenario will terminate at Step 15 of ECA-3.1, after the crew has established a 100°F/hr RCS cooldown rate; or any time after entry into ECA-3.1 and an entry into FR-P.1 is required because of an Orange Path on the RCS Integrity Critical Safety Function Status Tree.

Critical Tasks:

Isolate feedwater flow into and steam flow from the ruptured SG (B) so that minimum ΔP between the B SG and A SG is not less than 250 psid once target temperature is reached (Entry into ECA-3.1 at Step 16 RNO). (EOP-Based)

Safety Significance: Failure to isolate the ruptured SG causes a loss of ΔP between the ruptured SG and the intact SG. Upon a loss of ΔP, the crew must transition to a contingency procedure that constitutes an incorrect performance that "necessitates the crew taking compensating action which complicates the event mitigation strategy." If the crew fails to isolate steam from the SG, or feed flow into the SG, the ruptured SG pressure will tend to decrease to the same pressures as the intact SG, requiring a transition to a contingency procedure, and delaying the stopping of RCS leakage into the SG.

While in EOP-E-3, establish/maintain an RCS temperature so that transition from E-3 does not occur because the RCS temperature is in either (1) Too high to maintain 20°F of RCS Subcooling OR (2) below 284°F (RCS Integrity Red Path Limit) (EOP-Based)

Safety Significance: Failure to establish and maintain the correct RCS temperature during a SGTR leads to a transition from E-3 to a contingency procedure. This failure constitutes an incorrect performance that necessitates the operator taking compensating action that would unnecessarily complicate the event mitigation strategy.

Facility: Ginna Scenario No.: 4 Op-Test No.: 2018

Examiners: Operators:

Initial Conditions: 100%

Turnover: The "A" AFW Pump is OOS for Bearing Replacement.

Critical Tasks: CT# 1 – E-0 – Q: Manually trip the turbine before a severe challenge to subcriticality or integrity CSF.

CT #2 – FR-H.1 – A: Establish feedwater to at least one SG before RCS bleed and feed is required.

CT #3 – E-2 – A: Isolate the faulted SG before transition out of E-2.

Event No.	Malf. No.	Event Type*	Event Description
1	PZR03B	I(ATC) TS(US)	Pressurizer Level Channel 427 (Channel II) fails low, resulting in letdown isolation. (AR-F-11 & ER-INST.1 & S-3.2E) Defeats failed channel and restores letdown.
2	TUR16A	I(ATC/ BOP)	Turbine 1st Stage Pressure (PI-485) fails low AP-RCC.1, Continuous Control Rod Withdrawal / Insertion. ER-INST.1
3	HTR02A	R(ATC) N(BOP) N(US)	HEATER DRAIN TANK PUMP 1A TRIP – AP-FW.1, Abnormal MFW Pump Flow or NPSH. Load reduction to less than 70% IAW AP-TURB.5, Rapid Load Reduction.
4	CND03A	C(BOP)	Hotwell Level Transmitter fails high.
5	STM01A	I(BOP) TS(US)	STEAM FLOW CHANNEL FAILURE: FT-464 (1A-1) fails high - ER-INST.1
6	STM02A TUR02	M(ALL)	STMLN BRK OUTSDE CNMT UPSTRM MSIV'S: S/G 1A / Turbine fails to Auto Trip
7	RPS07L FDW11B FDW12?	C(ALL)	The 'B' AFW Pump will fail to Auto start, then trip after it is manually started. The TDAFW Pump will trip on Overspeed.
8	STM09A	(ALL)	FR-H.1 Transition, recovery available with either SAFW pump. Return to procedure in effect E-0 and then transition to E-2 and isolate faulted SG 'A'.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Ginna 2018 NRC Scenario #4

The plant is at 100% power (MOL). The area has experienced overcast conditions for the past 4 hours, with wind from the West at 20-30 mph, and this is expected to continue throughout the shift.

The following equipment is Out-Of-Service: The 'A' MDAFW Pump is OOS for bearing replacement.

Shortly after taking the watch, Pressurizer Level Channel 427 will fail LOW, resulting in letdown isolation and de-energizing the Pressurizer heaters. The crew will respond per AR-F-11, PRESSURIZER LO LEVEL 13%, and enter ER-INST.1, Reactor Protection Bistable Defeat After Instrumentation Loop Failure. They will defeat the failed channel, reset PZR heaters, reduce charging to a single charging pump, and re-establish letdown in accordance with S-3.2E, Placing In or Removing From Service Normal Letdown/Excess Letdown. The crew will start a second charging pump and slowly restore PRZR level to program (56%). The operator will address Technical Specification LCO 3.3.1, Reactor Trip System (RTS) Instrumentation; LCO 3.3.3, Post Accident Monitoring (PAM) Instrumentation; and LCO 3.4.9, Pressurizer.

Following this, Main Turbine 1st Stage Pressure Instrument PT-485 will fail LOW. This will result in an automatic control rod insertion requiring the operator to place control rods in MANUAL. The operator will respond in accordance with AR-F-16, AVERAGE TAVG – TREF DEVIATION ± 5°F; AP-RCC.1, Continuous Control Rod Withdrawal/Insertion; and enter ER-INST.1, Reactor Protection Bistable Defeat After Instrumentation Loop Failure.

Subsequently, 'A' Heater Drain Tank (HDT) Pump will trip resulting in the Standby Condensate Pump starting and the Condensate Bypass Valve to OPEN. The operator will respond in accordance with AR-G-25, MOTOR OFF CTR SECT PMPS EXCEPT MAIN & AUX FEED PMPS, and enter AP-FW.1, Abnormal MFW Pump Flow or NPSH, and commence a load reduction to 70% reactor power in accordance with AP-TURB.5, Rapid Load Reduction.

During the load reduction Hotwell Level transmitter LT-2006 will fail HIGH resulting in the Condenser Reject Valve opening. The operator will respond in accordance with AP-FW.1, Abnormal MFW Pump Flow or NPSH, and take manual control of the Hotwell Level Controller.

Following this, Steam Flow Transmitter FT-464 will fail HIGH. The operator will respond in accordance with AR-G-22, ADFCS SYSTEM TROUBLE, and enter ER-INST.1, Reactor Protection Bistable Defeat After Instrumentation Loop Failure. The operator will address Technical Specification LCO 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation.

After this, a steam line break will occur upstream of the MSIVs outside Containment. The Reactor will automatically trip, and Safety Injection is expected to actuate; however, the Main Turbine will fail to automatically trip, and the operator will need to manually trip the Turbine. When the operator manually actuates the SLI signal, only the B MSIV will close. The 'B' MDAFW Pump will fail to automatically start and the TDAFW Pump will trip on overspeed. Additionally, 'B' MDAFW Pump will trip when manually started by the operator.

The crew will enter E-0, Reactor Trip or Safety Injection, and transition to FR-H.1, Response to Loss of Secondary Heat Sink. The operators will restore 'B' S/G water level utilizing 'D' Standby Auxiliary Feedwater (SAFW) Pump and transition back to E-0. Upon re-entry into E-0, the crew will transition to E-2, Faulted Steam Generator Isolation.

The scenario will terminate at Step 9 of E-2, after the crew has transitioned to E-1, Loss of Reactor or Secondary Coolant.

Critical Tasks:

Manually trip the main turbine or shut both MSIVs before a severe (orange-path) challenge develops to either the subcriticality or the integrity CSF or [before transition to ECA-2.1], whichever happens first (EOP Based)

Safety Significance: Failure to trip the main turbine under the postulated plant conditions causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Additionally, such an omission constitutes a demonstrated inability by the crew to "take an action that would prevent a challenge to plant safety."

Establish feedwater flow into at least one SG before RCS bleed and feed is required (EOP Based)

Safety Significance: Failure to establish feedwater flow to any SG results in the crew's having to rely upon the lower priority action of establishing RCS bleed and feed to minimize core uncover. This constitutes incorrect performance that "leads to degradation of any barrier to fission product release."

Isolate the Faulted Steam Generator Before Transition out of E-2 (EOP Based)

Safety Significance: Failure to isolate a faulted SG that can be isolated causes challenges to the Integrity and/or Subcriticality CSFs beyond those irreparably introduced by the postulated conditions. Also, depending upon plant conditions, it could constitute a demonstrated inability by the crew to recognize a failure of the automatic actuation of an ESF system or component.

Facility: **R.E.Ginna Nuclear Power Plant** Date of Exam: **08/27/2018**

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**	**3**	**2**				**1**	**1**			**1**	9	**3**	**1**	4
	Tier Totals	**4**	**6**	**5**				**4**	**4**			**4**	27	**6**	**4**	10
2. Plant Systems	1	**2**	**3**	**3**	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**3**	28	**3**	**2**	5
	2	**1**	**1**	**2**	**1**	**0**	**0**	**1**	**0**	**1**	**1**	**2**	10	**2**	**1**	3
	Tier Totals	**3**	**4**	**5**	**4**	**2**	**2**	**3**	**3**	**3**	**4**	**5**	38	**5**	**3**	8

3. Generic Knowledge and Abilities Categories	1	2	3	4	Total	SRO 1	SRO 2	SRO 3	SRO 4	SRO Total
	2	**2**	**3**	**3**	10	**2**	**2**	**1**	**2**	7

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 Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO/SRO)						Form ES-401-2		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	Q#
000007 (EPE 7; BW E02&E10; CE E02) Reactor Trip, Stabilization, Recovery / 1	X						EK1.05, 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	1
000008 (APE 8) Pressurizer Vapor Space Accident / 3					**X**		**AA2.18, Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Computer indications for RCS temperature and pressure**	**3.0**	**76**
000009 (EPE 9) Small Break LOCA / 3		X					EK2.03, Knowledge of the interrelations between the small break LOCA and the following: S/Gs	3.0	2
000011 (EPE 11) Large Break LOCA / 3					**X**		**EA2.11, Ability to determine or interpret the following as they apply to a Large Break LOCA: Conditions for throttling or stopping HPI**	**4.3**	**77**
000015 (APE 15) Reactor Coolant Pump Malfunctions / 4						X	G2.1.7, Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation	4.4	3
000022 (APE 22) Loss of Reactor Coolant Makeup / 2					**X**		**AA2.04, Ability to determine and interpret the following as they apply to | the Loss of Reactor Coolant Makeup: How long PZR level can be maintained within limits**	**3.8**	**78**
000025 (APE 25) Loss of Residual Heat Removal System / 4					X		AA2.04, Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Location and isolability of leaks	3.3	4
000026 (APE 26) Loss of Component Cooling Water / 8				X			AA1.02, 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	5
000027 (APE 27) Pressurizer Pressure Control System Malfunction / 3						X	G2.1.7, Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	6
000029 (EPE 29) Anticipated Transient Without Scram / 1						**X**	**G2.1.28, Knowledge of the purpose and function of major system components and controls**	**4.1**	**79**
000038 (EPE 38) Steam Generator Tube Rupture / 3				X			EA1.34, Ability to operate and monitor the following as they apply to a SGTR: Obtaining shutdown with natural circulation	4.2	7
000040 (APE 40; BW E05; CE E05; W E12) Steam Line Rupture—Excessive Heat Transfer / 4						**X**	**G.2.4.47, Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material**	**4.2**	**80**
000054 (APE 54; CE E06) Loss of Main Feedwater /4	X						AK1.02, Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): Effects of feedwater introduction on dry S/G	3.6	8
000055 (EPE 55) Station Blackout / 6	X						EK1.02, Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Natural circulation cooling	4.1	9
000056 (APE 56) Loss of Offsite Power / 6						X	2.4.20, Knowledge of the operational implications of EOP warnings, cautions, and notes	3.8	10

000057 (APE 57) Loss of Vital AC Instrument Bus / 6			X				AK3.01, Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital ac electrical instrument bus	4.1	11
						X	**G2.2.42, Ability to recognize system parameters that are entry-level conditions for Technical Specifications**	**4.6**	**81**
000058 (APE 58) Loss of DC Power / 6					X		AA2.01, Ability to determine and interpret the following as they apply to the Loss of DC Power: That a loss of dc power has occurred; verification that substitute power sources have come on line	3.7	12
000062 (APE 62) Loss of Nuclear Service Water / 4					X		AA2.03, 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	13
000065 (APE 65) Loss of Instrument Air / 8			X				AK3.04, Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Cross-over to backup air supplies	3.0	14
000077 (APE 77) Generator Voltage and Electric Grid Disturbances / 6				X			AA1.01, Ability to operate and/or monitor the following as they apply to Generator Voltage and Electric Grid Disturbances: Grid frequency and voltage	3.6	15
(W E04) LOCA Outside Containment / 3		X					EK2.2, Knowledge of the interrelations between the (LOCA Outside Containment) 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	3.8	16
(W E11) Loss of Emergency Coolant Recirculation / 4			X				EK3.4, 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	17
(BW E04; W E05) Inadequate Heat Transfer—Loss of Secondary Heat Sink / 4		X					EK2.2, 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	18
K/A Category Totals:	3	3	3	3	3/3	3/3	Group Point Total:		18/6

ES-401							PWR Examination Outline Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/SRO)		Form ES-401-2
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	Q#
000001 (APE 1) Continuous Rod Withdrawal / 1						X	G2.2.37, Ability to determine operability and/or availability of safety related equipment	3.6	19
000003 (APE 3) Dropped Control Rod / 1									
000005 (APE 5) Inoperable/Stuck Control Rod / 1									
000024 (APE 24) Emergency Boration / 1									
000028 (APE 28) Pressurizer (PZR) Level Control Malfunction / 2						**X**	**G2.1.28, Knowledge of the purpose and function of major system components and controls**	**4.1**	**82**
000032 (APE 32) Loss of Source Range Nuclear Instrumentation / 7									
000033 (APE 33) Loss of Intermediate Range Nuclear Instrumentation / 7									
000036 (APE 36; BW/A08) Fuel-Handling Incidents / 8		X					AK2.01, Knowledge of the interrelations between the Fuel Handling Incidents and the following: Fuel handling equipment	2.9	20
000037 (APE 37) Steam Generator Tube Leak / 3	X						AK1.02, Knowledge of the operational implications of the following concepts as they apply to Steam Generator Tube Leak: Leak rate vs. pressure drop	3.5	21
000051 (APE 51) Loss of Condenser Vacuum / 4				X			AA1.04, Ability to operate and / or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position	2.5	22
000059 (APE 59) Accidental Liquid Radwaste Release / 9					**X**		**AA2.05, Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: The occurrence of automatic safety actions as a result of a high PRM system signal**	**3.9**	**83**
000060 (APE 60) Accidental Gaseous Radwaste Release / 9									
000061 (APE 61) Area Radiation Monitoring System Alarms / 7					**X**		**AA2.06, Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Required actions if alarm channel is out of service**	**4.1**	**84**
000067 (APE 67) Plant Fire On Site / 8					**X**		**AA2.05, Ability to determine and interpret the following as they apply to the Plant Fire on Site: Ventilation alignment necessary to secure affected area**	**3.6**	**85**
000068 (APE 68; BW A06) Control Room Evacuation / 8		X					AK2.03, Knowledge of the interrelations between the Control Room Evacuation and the following: Controllers and positioners	2.9	23
000069 (APE 69; W E14) Loss of Containment Integrity / 5									
000074 (EPE 74; W E06 & E07) Inadequate Core Cooling / 4			X				EK3.05, Knowledge of the reasons for the following responses as they apply to the Inadequate Core Cooling: Activating the HPI system	4.2	24

000076 (APE 76) High Reactor Coolant Activity / 9									
000078 (APE 78*) RCS Leak / 3							Not applicable to Rev 2 K/As.		
(W E01 & E02) Rediagnosis & SI Termination / 3									
(W E13) Steam Generator Overpressure / 4									
(W E15) Containment Flooding / 5			X				EK3.2, Knowledge of the reasons for the following responses as they apply to the (Containment Flooding): Normal, abnormal and emergency operating procedures associated with (Containment Flooding).	2.8	25
(W E16) High Containment Radiation /9									
(BW A01) Plant Runback / 1							Not applicable to plant design.		
(BW A02 & A03) Loss of NNI-X/Y/7							Not applicable to plant design.		
(BW A04) Turbine Trip / 4							Not applicable to plant design.		
(BW A05) Emergency Diesel Actuation / 6							Not applicable to plant design.		
(BW A07) Flooding / 8							Not applicable to plant design.		
(BW E03) Inadequate Subcooling Margin / 4							Not applicable to plant design.		
(BW E08; W E03) LOCA Cooldown—Depressurization / 4		X					EK2.2, Knowledge of the interrelations between the (LOCA Cooldown and Depressurization) 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.	3.7	26
(BW E09; CE A13**; W E09 & E10) Natural Circulation/4									
(BW E13 & E14) EOP Rules and Enclosures							Not applicable to plant design.		
(CE A11**; W E08) RCS Overcooling—Pressurized Thermal Shock / 4					X		EA2.2, Ability to determine and interpret the following as they apply to the (Pressurized Thermal Shock): Adherence to appropriate procedures and operation within the limitations in the facility*s license and amendments	3.5	27
(CE A16) Excess RCS Leakage / 2							Not applicable to plant design.		
(CE E09) Functional Recovery							Not applicable to plant design.		
(CE E13*) Loss of Forced Circulation/LOOP/Blackout / 4							Not applicable to Rev 2 K/As.		
K/A Category Point Totals:	1	3	2	1	1/3	1/1	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	Q#
003 (SF4P RCP) Reactor Coolant Pump									X			A3.01, Ability to monitor automatic operation of the RCPS, including: Seal injection flow	3.3	28
004 (SF1; SF2 CVCS) Chemical and Volume Control				X								K4.08, Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following: Hydrogen control in RCS	2.8	29
									X			A3.02, Ability to monitor automatic operation of the CVCS, including: Letdown isolation	3.6	30
005 (SF4P RHR) Residual Heat Removal						X						K6.03, Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger	2.5	31
006 (SF2; SF3 ECCS) Emergency Core Cooling							X					A1.14, Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: Reactor vessel level	3.6	32
								X				**A2.06, 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: water hammer**	**3.5**	**86**
007 (SF5 PRTS) Pressurizer Relief/Quench Tank					X							K5.02, Knowledge of the operational implications of the following concepts as the apply to PRTS: Method of forming a steam bubble in the PZR	3.1	33
							X					A1.02, Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank pressure	2.7	34
008 (SF8 CCW) Component Cooling Water				X								K4.01, Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Automatic start of standby pump	3.1	35
010 (SF3 PZR PCS) Pressurizer Pressure Control						X						K6.04, Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: PRT	2.9	36
											X	G2.2.38, Knowledge of conditions and limitations in the facility license.	3.6	37
012 (SF7 RPS) Reactor Protection										X		A4.01, Ability to manually operate and/or monitor in the control room: Manual trip button	4.5	38
								X				**A2.03, 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**	**3.7**	**87**
013 (SF2 ESFAS) Engineered Safety Features Actuation					X							K5.02, Knowledge of the operational implications of the following concepts as they apply to the ESFAS: Safety system logic and reliability	2.9	39

022 (SF5 CCS) Containment Cooling										X		A4.01, Ability to manually operate and/or monitor in the control room: CCS fans	3.6	40
								X				**A2.04, Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of service water**	**3.2**	**88**
025 (SF5 ICE) Ice Condenser												Not applicable to plant design.		
026 (SF5 CSS) Containment Spray			X									K3.01, Knowledge of the effect that a loss or malfunction of the CSS will have on the following: CCS	3.9	41
								X				A2.08, Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Safe securing of containment spray when it can be done)	3.2	42
039 (SF4S MSS) Main and Reheat Steam										X		A4.04, Ability to manually operate and/or monitor in the control room: Emergency feedwater pump turbines	3.8	43
											X	G2.4.45, Ability to prioritize and interpret the significance of each annunciator or alarm	4.1	44
059 (SF4S MFW) Main Feedwater				X								K4.08, Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Feedwater regulatory valve operation (on basis of steam flow, feed flow mismatch)	2.5	45
											X	**G2.4.35, Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects**	**4.0**	**89**
061 (SF4S AFW) Auxiliary/Emergency Feedwater		X										K2.02, Knowledge of bus power supplies to the following: AFW electric drive pumps	3.7	46
			X									K3.02, Knowledge of the effect that a loss or malfunction of the AFW will have on the following: S/G	4.2	47
062 (SF6 ED AC) AC Electrical Distribution		X										K2.01, Knowledge of bus power supplies to the following: Major system loads	3.3	48
063 (SF6 ED DC) DC Electrical Distribution		X										K2.01, Knowledge of bus power supplies to the following: Major DC loads	2.9	49
								X				A2.01, 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: Grounds	2.5	50

064 (SF6 EDG) Emergency Diesel Generator								X				A2.02, Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Load, VARS, pressure on air compressor, speed droop, frequency, voltage, fuel oil level, temperatures	2.7	51
											X	**G2.2.38, Knowledge of conditions and limitations in the facility license**	**4.5**	**90**
073 (SF7 PRM) Process Radiation Monitoring											X	G.2.1.20, Ability to interpret and execute procedure steps	4.6	52
076 (SF4S SW) Service Water	X											K1.19, Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: SWS emergency heat loads	3.6	53
078 (SF8 IAS) Instrument Air			X									K3.02, Knowledge of the effect that a loss or malfunction of the IAS will have on the following: Systems having pneumatic valves and controls	3.4	54
103 (SF5 CNT) Containment	X											K1.08, Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: SIS, including action of safety injection reset	3.6	55
053 (SF1; SF4P ICS*) Integrated Control												Not applicable to Rev 2 K/As.		
K/A Category Point Totals:	2	3	3	3	2	2	2	3/ **3**	2	3	3/ **2**	Group Point Total:		28/**5**

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

Plant Systems—Tier 2/Group 2 (RO/SRO)

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	Q#
001 (SF1 CRDS) Control Rod Drive			X									K3.02, Knowledge of the effect that a loss or malfunction of the CRDS will have on the following: RCS	3.4	56
002 (SF2; SF4P RCS) Reactor Coolant														
011 (SF2 PZR LCS) Pressurizer Level Control											**X**	**G2.4.21, Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control 2. Core cooling and heat removal 3. Reactor coolant system integrity 4. Containment conditions 5. Radioactivity release control.**	**4.3**	**93**
014 (SF1 RPI) Rod Position Indication								**X**				**A2.04, 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**	**91**

015 (SF7 NI) Nuclear Instrumentation											X	G2.2.42, Ability to recognize system parameters that are entry-level conditions for Technical Specifications	3.9	57
016 (SF7 NNI) Nonnuclear Instrumentation	X											K1.06, Knowledge of the physical connections and/or cause-effect relationships between the NNIS and the following systems: AFW system	3.6	58
017 (SF7 ITM) In-Core Temperature Monitor														
027 (SF5 CIRS) Containment Iodine Removal														
028 (SF5 HRPS) Hydrogen Recombiner and Purge Control											X	G2.1.28, Malfunctions or operations on the HRPS; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Hydrogen recombiner power setting, determined by using plant data book	3.4	59
029 (SF8 CPS) Containment Purge														
033 (SF8 SFPCS) Spent Fuel Pool Cooling														
034 (SF8 FHS) Fuel-Handling Equipment									X			A3.02, Ability to monitor automatic operation of the Fuel Handling System, including: Load limits	2.5	60
035 (SF 4P SG) Steam Generator								**X**				**A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the GS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Faulted or ruptured S/Gs**	**4.6**	**92**
041 (SF4S SDS) Steam Dump/Turbine Bypass Control				X								K4.11, Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following: T-ave/T-ref program	2.8	61
045 (SF 4S MTG) Main Turbine Generator														
055 (SF4S CARS) Condenser Air Removal														
056 (SF4S CDS) Condensate														
068 (SF9 LRS) Liquid Radwaste														
071 (SF9 WGS) Waste Gas Disposal							X					A1.06, Ability to predict and/or monitor changes in parameters(to prevent exceeding design limits) associated with Waste Gas Disposal System operating the controls including: Ventilation system	2.5	62
072 (SF7 ARM) Area Radiation Monitoring			X									K3.02, Knowledge of the effect that a loss or malfunction of the ARM system will have on the following: Fuel handling operations	3.1	63
075 (SF8 CW) Circulating Water		X										K2.03, Knowledge of bus power supplies to the following: Emergency/essential SWS pumps	2.6	64
079 (SF8 SAS**) Station Air														
086 Fire Protection										X		A4.06, Ability to manually operate and/or monitor in the control room: Halon system	3.2	65
050 (SF 9 CRV*) Control Room Ventilation												Not applicable to Rev. 2 K/As.		
K/A Category Point Totals:	1	1	2	1	0	0	1	0/ **2**	1	1	2/ **1**	Group Point Total:		10/**3**

Facility: **R.E.Ginna Nuclear Power Plant** Date of Exam: **08/27/2018**

Category	K/A #	Topic	RO IR	RO Q#	SRO-only IR	SRO-only Q#
	2.1.21	Ability to verify the controlled procedure copy	3.5	66		
	2.1.30	**Ability to locate and operate components, including local controls**			**4.0**	**94**
	2.1.36	Knowledge of procedures and limitations involved in core alterations	3.0	67		
	2.1.42	**Knowledge of new and spent fuel movement procedures**			**3.4**	**95**
2. Equipment Control	2.2.13	Knowledge of tagging and clearance procedures	4.1	68		
	2.2.18	**Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.**			**3.9**	**96**
	2.2.35	Ability to Determine Technical Specification Mode of Operation	3.6	72		
	2.2.38	**Knowledge of conditions and limitations in the facility license**			**4.5**	**97**
	2.2.43	Knowledge of the process used to track inoperable alarms	3.0	69		
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	70		
	2.3.6	**Ability to approve release permits**			**3.8**	**98**
	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	71		
4. Emergency Procedures/Plan	2.4.29	Knowledge of the Emergency Plan	3.1	73		
	2.4.25	Knowledge of fire protection procedures	3.3	74		
	2.4.31	Knowledge of annunciator alarms, indications, or response procedures	4.2	75		
	2.4.43	**Knowledge of emergency communications systems and techniques**			**3.8**	**99**
	2.4.40	**Knowledge of SRO responsibilities in emergency plan implementation**			**4.5**	**100**
Tier 3 Point Total				10		**7**

Tier / Group	Randomly Selected K/A	Reason for Rejection
T2/G2	001K3.02	Q56, 001K3.01 rejected because it is a suppressed K/A with no interface between the Control Rod Drive System and CVCS System
T1/G1	011EA2.11	Q77, 011EA2.09 rejected because natural circ does not apply to LBLOCA
T2/G1	026K3.01	Q41, 026K3.02 rejected because Ginna does not have recirculation spray system.
T2/G2	055G2.4.34	Q93, 055G2.4.34 rejected because could not write appropriate SRO level Q for the KA.
T1/G1	027G2.1.7	Q6, APE027G2.4.30 oversamples safety limits, could not write another RO level Q for the KA.
T3	G2.4.29	Q73, Not able to write adequate LOD question for G2.4.11. Reselected KA.
T2/G2	072K3.02	Q63, Unable to write adequate question for KA 072K5.02.
T3	2.2.35	Q72, Overlapped with Q62. Reselected KA.
T1/G2	036AK2.01	Q20, Could not write a reasonable RO level question for KAAPE 036 AA2.03
T2/G2	034A3.02	Q60, 034K6.02 rejected because could not write appropriate RO Q for the KA.
T3	G2.1.21	Q66, G2.1.7 rejected because could not write a Tier 3 plantwide question to this KA.
T3	G2.4.43	Q99, G2.4.18 rejected because could not write a Tier 3 plantwide question to this KA.
T1G1	G2.1.7	Q3, G2.4.47 rejected because unable to write plausible distractors.
T2/G2	G2.1.28	Q59, A2.01 rejected because could not write appropriate RO Q for the KA