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

Facility: SSES Units 1 and 2	Date of Examination: August 11-22, 2014
Exam Level: RO ■ SRO □	Operating Test No.: LOC26

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, M	**Implement Reactor Coolant System Temperature Monitoring, HUR Exceeded (00.SO.1178.152)**
Conduct of Operations	S, D	**Implement On-Site Class 1E Operability Test for Inoperable Diesel Generator (24.SO.1475.001)**
Equipment Control	R, M	**Review and Verify Blocking Required per NDAP-QA-0322 (00.AD.3274.206)**
Radiation Control	S, N	**Perform Control Room Actions in Response to Fuel Handling Accident (81.ON.2356.001)**
Emergency Procedures/Plan		

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:

(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & 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

Facility:	SSES Units 1 and 2	Date of Examination:	August 11-22, 2014
Exam Level: RO ☐ SRO ■		Operating Test No.:	LOC26

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R, M	**Implement Reactor Coolant System Temperature Monitoring, HUR Exceeded (00.SO.1178.152)**
Conduct of Operations	S, D	**Implement On-Site Class 1E Operability Test for Inoperable Diesel Generator (24.SO.1475.001)**
Equipment Control	R, M	**Review and Verify Blocking Required per NDAP-QA-0322 (00.AD.3274.206)**
Radiation Control	R, D	**Respond to SGTS Exhaust High Radiation While Purging Primary Containment (00.AD.1018.101)**
Emergency Procedures/Plan	S, N	**Classify (scenario)**

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:

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

Facility: SSES Units 1 and 2	Date of Examination: August 11-22, 2014	
Exam Level: RO ■ SRO-I ☐ SRO-U ☐	Operating Test No.: LOC26	
Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. **Respond to Control Rod Drift In During Performance of Rod Exercise Test (55.ON.1998.151)**	**A,D,S**	**1**
b. **Shutdown RFP Primary Woodward Governor, RFP Speed Oscillates (45.OP.1671.151)**	**A,N,S**	**2**
c. **Start HPCI in Pressure Control Mode (52.OP.1950.101)**	**EN,M,S**	**4**
d. **Place Shell Warming in Service, Warming Demand Fails High (93.OP.2440.151)**	**A,N,L,S**	**3**
e. **Vent the Drywell (73.OP.2287.101)**	**D,P,S**	**5**
f. **Energize ESS Transformer 211, Re-Energize ESS Bus 2D after Transformer Lockout (04.OP.2529.151)**	**A,EN,N,S**	**6**
g. **Restore Bypassed Control Rod Position in RWM (31.OP.1552.101)**	**L,N,S**	**7**
h. **Perform RBCCW System Flush, RBCCW Pump Trips (14.ON.1335.151)**	**A,N,S**	**8**
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. **Manual Emergency Shutdown of Diesel Generator A from Panel 0C521A (24.OP.1443.051)**	**A,D,EN**	**6**
j. **Venting Suppression Chamber without Radiological Release Limitations (73.EO.2282.101)**	**D,E,EN,R**	**9**
k. **Perform Operator Actions Outside the Control Room in Accordance With ON-100-009 (00.ON.1153.102)**	**D,E**	**7**
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)ltemate 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 (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 Description

JPM A. The monthly control rod exercise is performed. The first 2 control rods are tested with no incident. The 3rd control rod drifts to an intermediate position when an insert signal is applied. The off-normal procedure for control rod problems is used to insert the control rod to the full-in position.

JPM B. RFP B has just been placed in-service as the second RFP in Flow Control Mode. Speed control is transferred to the Backup Woodward Governor due to concerns with the Primary. After control is transferred RFPT B speed begins oscillating, requiring the RFPT to be tripped to stop the oscillations.

JPM C. A manual startup of the HPCI system is performed for pressure control. HPCI system flow and discharge pressure are to be maximized to initiate a reactor cooldown with MSIVs closed.

JPM D. Unit startup is in progress. Shell warming is returned to service following a planned turbine trip. As HP turbine pressurization begins, the warming demand fails high. Shell warming must be secured or the turbine tripped before a reactor scram on Main Turbine TSV/TCV closure is generated as HP first stage pressure exceeds the RPS scram bypass setpoint.

JPM E. Drywell pressure is elevated with the plant operating at nominal rated power conditions. SGTS is started and a vent path created to lower Drywell pressure. Once Drywell pressure begins lowering, the vent path is secured.

JPM F. ESS Transformer 201 is to be returned to service following maintenance, with ESS Bus 2D returned to the normal supply. The transformer will be re-energized, but when ESS Bus 2D is transferred the transformer experiences a lockout. ESS Bus 2D is then re-energized from Diesel Generator D.

JPM G. A reactor startup is in progress at less than 5 percent power. A substitute control rod position has been entered for a partially withdrawn control rod with a bad position indication at a specific notch. The control rod has been withdrawn past the position with the bad indication and the substituted position is deleted.

JPM H. A flush of the RBCCW system per GO-100-014 for hot weather operation is to be performed. The in-service RBCCW pump trips when the flush is initiated. The standby pump fails to automatically start and must be manually started. The standby pump is air-bound and fails to develop flow, requiring the pump to be vented per the off-normal position.

JPM I. A local emergency stop of Diesel Generator A(B) is to be performed due to loss of cooling water. The emergency stop PB fails to trip the DG. The DG must be stopped by isolating the fuel oil supply.

JPM J. A Station Blackout and LOCA has occurred with Drywell pressure approaching design limits. A vent path from the Suppression Chamber to the Unit 1 Reactor Building is manually established by removal of a ductwork access panel to serve as a vent and manual opening of vent isolation dampers.

JPM K. The Control Room was evacuated due to a fire. Operators failed to scram the Unit 1 reactor before leaving the Control Room. Local actions to scram the reactor and ensure MSIVs remain closed are performed.

Facility: SSES Units 1 and 2	Date of Examination: August 11-22, 2014
Exam Level: RO ☐ SRO-I ■ SRO-U ☐	Operating Test No.: LOC26

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. **Respond to Control Rod Drift In During Performance of Rod Exercise Test (55.ON.1998.151)**	**A,D,S**	**1**
b. **Shutdown RFP Primary Woodward Governor, RFP Speed Oscillates (45.OP.1671.151)**	**A,N,S**	**2**
c. **Start HPCI in Pressure Control Mode (52.OP.1950.101)**	**EN,M,S**	**4**
d. **Place Shell Warming in Service, Warming Demand Fails High (93.OP.2440.151)**	**A,N,L,S**	**3**
e. **Vent the Drywell (73.OP.2287.101)**	**D,P,S**	**5**
f. **Energize ESS Transformer 211, Re-Energize ESS Bus 2D after Transformer Lockout (04.OP.2529.151)**	**A,EN,N,S**	**6**
g.		
h. **Perform RBCCW System Flush, RBCCW Pump Trips (14.ON.1335.151)**	**A,N,S**	**8**

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. **Manual Emergency Shutdown of Diesel Generator A from Panel 0C521A (24.OP.1443.051)**	**A,D,EN**	**6**
j. **Venting Suppression Chamber without Radiological Release Limitations (73.EO.2282.101)**	**D,E,EN,R**	**9**
k. **Perform Operator Actions Outside the Control Room in Accordance With ON-100-009 (00.ON.1153.102)**	**D,E**	**7**

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; 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 (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 Description

JPM A. The monthly control rod exercise is performed. The first 2 control rods are tested with no incident. The 3rd control rod drifts to an intermediate position when an insert signal is applied. The off-normal procedure for control rod problems is used to insert the control rod to the full-in position.

JPM B. RFP B has just been placed in-service as the second RFP in Flow Control Mode. Speed control is transferred to the Backup Woodward Governor due to concerns with the Primary. After control is transferred RFPT B speed begins oscillating, requiring the RFPT to be tripped to stop the oscillations.

JPM C. A manual startup of the HPCI system is performed for pressure control. HPCI system flow and discharge pressure are to be maximized to initiate a reactor cooldown with MSIVs closed.

JPM D. Unit startup is in progress. Shell warming is returned to service following a planned turbine trip. As HP turbine pressurization begins, the warming demand fails high. Shell warming must be secured or the turbine tripped before a reactor scram on Main Turbine TSV/TCV closure is generated as HP first stage pressure exceeds the RPS scram bypass setpoint.

JPM E. Drywell pressure is elevated with the plant operating at nominal rated power conditions. SGTS is started and a vent path created to lower Drywell pressure. Once Drywell pressure begins lowering, the vent path is secured.

JPM F. ESS Transformer 201 is to be returned to service following maintenance, with ESS Bus 2D returned to the normal supply. The transformer will be re-energized, but when ESS Bus 2D is transferred the transformer experiences a lockout. ESS Bus 2D is then re-energized from Diesel Generator D.

JPM G. A reactor startup is in progress at less than 5 percent power. A substitute control rod position has been entered for a partially withdrawn control rod with a bad position indication at a specific notch. The control rod has been withdrawn past the position with the bad indication and the substituted position is deleted.

JPM H. A flush of the RBCCW system per GO-100-014 for hot weather operation is to be performed. The in-service RBCCW pump trips when the flush is initiated. The standby pump fails to automatically start and must be manually started. The standby pump is air-bound and fails to develop flow, requiring the pump to be vented per the off-normal position.

JPM I. A local emergency stop of Diesel Generator A(B) is to be performed due to loss of cooling water. The emergency stop PB fails to trip the DG. The DG must be stopped by isolating the fuel oil supply.

JPM J. A Station Blackout and LOCA has occurred with Drywell pressure approaching design limits. A vent path from the Suppression Chamber to the Unit 1 Reactor Building is manually established by removal of a ductwork access panel to serve as a vent and manual opening of vent isolation dampers.

JPM K. The Control Room was evacuated due to a fire. Operators failed to scram the Unit 1 reactor before leaving the Control Room. Local actions to scram the reactor and ensure MSIVs remain closed are performed.

Facility: SSES Units 1 and 2	Date of Examination: August 11-22, 2014	
Exam Level: RO ☐ SRO-I ☐ SRO-U ■	Operating Test No.: LOC26	
Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a.		
b. **Shutdown RFP Primary Woodward Governor, RFP Speed Oscillates (45.OP.1671.151)**	**A,N,S**	**2**
c.		
d. **Place Shell Warming in Service, Warming Demand Fails High (93.OP.2440.151)**	**A,N,L,S**	**3**
e.		
f. **Energize ESS Transformer 211, Re-Energize ESS Bus 2D after Transformer Lockout (04.OP.2529.151)**	**A,EN,N,S**	**6**
g:		
h:		
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i:		
j. **Venting Suppression Chamber without Radiological Release Limitations (73.EO.2282.101)**	**D,E,EN,R**	**9**
k. **Perform Operator Actions Outside the Control Room in Accordance With ON-100-009 (00.ON.1153.102)**	**D,E**	**7**

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; 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 (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 Description

JPM A. The monthly control rod exercise is performed. The first 2 control rods are tested with no incident. The 3rd control rod drifts to an intermediate position when an insert signal is applied. The off-normal procedure for control rod problems is used to insert the control rod to the full-in position.

JPM B. RFP B has just been placed in-service as the second RFP in Flow Control Mode. Speed control is transferred to the Backup Woodward Governor due to concerns with the Primary. After control is transferred RFPT B speed begins oscillating, requiring the RFPT to be tripped to stop the oscillations.

JPM C. A manual startup of the HPCI system is performed for pressure control. HPCI system flow and discharge pressure are to be maximized to initiate a reactor cooldown with MSIVs closed.

JPM D. Unit startup is in progress. Shell warming is returned to service following a planned turbine trip. As HP turbine pressurization begins, the warming demand fails high. Shell warming must be secured or the turbine tripped before a reactor scram on Main Turbine TSV/TCV closure is generated as HP first stage pressure exceeds the RPS scram bypass setpoint.

JPM E. Drywell pressure is elevated with the plant operating at nominal rated power conditions. SGTS is started and a vent path created to lower Drywell pressure. Once Drywell pressure begins lowering, the vent path is secured.

JPM F. ESS Transformer 201 is to be returned to service following maintenance, with ESS Bus 2D returned to the normal supply. The transformer will be re-energized, but when ESS Bus 2D is transferred the transformer experiences a lockout. ESS Bus 2D is then re-energized from Diesel Generator D.

JPM G. A reactor startup is in progress at less than 5 percent power. A substitute control rod position has been entered for a partially withdrawn control rod with a bad position indication at a specific notch. The control rod has been withdrawn past the position with the bad indication and the substituted position is deleted.

JPM H. A flush of the RBCCW system per GO-100-014 for hot weather operation is to be performed. The in-service RBCCW pump trips when the flush is initiated. The standby pump fails to automatically start and must be manually started. The standby pump is air-bound and fails to develop flow, requiring the pump to be vented per the off-normal position.

JPM I. A local emergency stop of Diesel Generator A(B) is to be performed due to loss of cooling water. The emergency stop PB fails to trip the DG. The DG must be stopped by isolating the fuel oil supply.

JPM J. A Station Blackout and LOCA has occurred with Drywell pressure approaching design limits. A vent path from the Suppression Chamber to the Unit 1 Reactor Building is manually established by removal of a ductwork access panel to serve as a vent and manual opening of vent isolation dampers.

JPM K. The Control Room was evacuated due to a fire. Operators failed to scram the Unit 1 reactor before leaving the Control Room. Local actions to scram the reactor and ensure MSIVs remain closed are performed.

Facility: **SSES Units 1 and 2** Scenario No.: **1** Op-Test No.: **LOC26**

Examiners: _____ Operators: _____

Initial Conditions: **Unit 1 95 percent power for control rod pattern adjustment, EOL HPCI OOSVC, DG E substituted for DG A (IC-380)**

Turnover: **RFP lube oil conditioner swapped from A to B last shift; Control rods 42-15 and 46-19 declared slow last scram time test; Severe thunderstorm watch in effect**

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R SRO,ATC	Withdraw control rods to raise reactor power 3 percent (OP-AD-338, GO-100-012)
2	N/A	N SRO,BOP	Place CRD Pump B in-service, secure CRD Pump A (OP-155-001)
3	mfFW145 007B	C SRO,ATC	RFPT B vibration rises, reduce RFPT speed to lower vibration (AR-101-A16)
4	mfFW145 007B	C (ON) All	RFPT B trips on high vibration, Recirc LIM2 runback (ON-164-002)
5	cmfTR03_ FTB31 1N014C	I (TS) SRO,ATC	APRM 2 and 3 Recirc Loop A drive flows fail high during Recirc LIM2 runback (TS 3.3.1.1)
6	cmfAV04_ TV11028	C SRO,BOP	RBCCW TCV fails, ESW placed in-service to restore RBCCW cooling (ON-114-001), ESW loop declared inoperable when aligned to RBCCW (TS 3.7.2)
7	rfCU161001 rfCU161009 cmfMV06_ HV144F004	I SRO,ATC	RWCU fails to automatically isolate on high temperature, manual isolation successful (AR-101-A01)
8	mfRD155 017	M ALL	Hydraulic-block ATWS (EO-100-113, OP-145-005, ES-158-002)
9	cmfPM03_ 1P208A cmfPM03_ 1P208B	C SRO,BOP	SLC pump trips after start, standby SLC pump successfully injects boron (OP-153-001)
10	cmfTR01_ LT14201A	I SRO,ATC	Wide Range level instrument fails, RFP flow must be raised to maintain reactor level in ATWS band
11	mfFW148 002	C ALL	In-service RFPT trips after first scram, RCIC restored to maintain RPV level while standby RFPT placed in-service

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Scenario Events	Actual Attributes
1. Total malfunctions (5–8)	**3,6,7,9,10,11**	**6**
2. Malfunctions after EOP entry (1–2)	**9,10,11**	**3**
3. Abnormal events (2–4)	**4,6**	**2**
4. Major transients (1–2)	**8**	**1**
5. EOPs entered/requiring substantive actions (1–2)	**EO-100-102**	**1**
6. EOP contingencies requiring substantive actions (0–2)	**EO-100-113**	**1**
7. Critical tasks (2–3) **CT-1 Inject SLC** **CT-2 Lowers RPV level to < -60" but > -161"** **CT-3 Inserts control rods IAW EO-100-113 Sht. 2**		**3**

Facility: **SSES Units 1 and 2** Scenario No.: **2** Op-Test No.: **LOC26**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions **Unit 1 80 percent power starting up from forced outage, BOL**

HPCI OOSVC

Turnover **Swap RFP A main lube oil pumps**

RFP lube oil conditioner being swapped from A to B

Control rods 42-15 and 46-19 declared slow last scram time test

Severe thunderstorm watch in effect

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N SRO,BOP	Swap RFP A main lube oil pumps (OP-145-003)
2	rfDB105106	C All	1B227 feeder trips (AR-016-B04) and is inoperable (TS 3.8.7), re-energize RPS B from alternate (ON-158-001)
3	cmfPM02_ 1P124A(B)	C SRO,ATC	RFP A main lube oil pump trips due to FME (AR-120-A03), RFP A manually secured (OP-145-001)
4	N/A	R SRO,ATC	Reduce power to < 65 percent using recirc flow and control rods to secure RFP A (OP-AD-338)
5	cmfRL01_ B211K3B	I TS SRO	MSL flow transmitter fails high causing MSIV half-isolation (TS 3.6.1.3)
6	cmfRL02_ C721K6A-D cmfPM02_ 1P124C-D	I SRO,ATC	Insert manual scram on loss of Feedwater (only 1 RFP in-service), RPS low-level auto-scram is failed (OP-AD-004)
7	rfDS0010xx crfAB03_xx	M ALL	Loss of offsite power on reactor scram (ON-104-001)
8	mfDG024 001B	C SRO,BOP	Diesel Generator B fails to automatically start, manual start from Control Room successful (ON-104-001)
9	mfRR164 010 mfRR164 011A	M ALL	Drywell LOCA (EO-102, EO-103)
10	cmfRV02_ PSV141 F13G-N	I ALL	ADS auto-initiation fails, perform Rapid Depressurization (EO-112)

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

Event No.	Malf. No.	Event Type*	Event Description
11	cmfMV06_ HV152 F005A	I ALL	**Division 1 Core Spray injection valve fails to automatically open, can be manually opened from Control Room**
12	cmfRL01_ E111Kxxx cmfMV06_ HV151 F015B	I ALL	**Division 2 RHR LPCI initiation logic fails to initiate, manual alignment to LPCI required**

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Scenario Events	Actual Attributes
1. Total malfunctions (5–8)	**2,3,6,8,10,11, 12**	**7**
2. Malfunctions after EOP entry (1–2)	**8,10,11,12**	**4**
3. Abnormal events (2–4)	**2,6**	**2**
4. Major transients (1–2)	**7,9**	**2**
5. EOPs entered/requiring substantive actions (1–2)	**EO-100-102 EO-100-103**	**2**
6. EOP contingencies requiring substantive actions (0–2)	**EO-100-102 (ALC) EO-100-112**	**2**
7. Critical tasks (2–3) **CT-1 Rapid Depressurization at TAF** **CT-2 Manually align Division 1 Core Spray and Division 2 RHR for reactor vessel injection**	[redacted]	**2**

Facility: **SSES Units 1 and 2** Scenario No.: **3** Op-Test No.: **LOC26**

Examiners: _____ Operators: _____

Initial Conditions: **Unit 1 33 percent power shutting down for DW RCS leak, MOL**
HPCI OOSVC

Turnover: **Insert control rods, then test Turbine Bypass valve #3**
RFP lube oil conditioner being swapped from A to B
Control rods 42-15 and 46-19 declared slow last scram time test

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R SRO,ATC	Insert control rods (OP-156-001, OP-AD-338)
2	N/A	N SRO,BOP	Test turbine bypass valve #3 (SO-182-001)
3	cmfHX02_ 1E102C	C SRO,BOP	FW heater 2C tube leak (AR-120-C10,D10), isolate FW heater extraction steam (ON-147-002), TS MCPR limits not applicable (TS 3.2.2)
4	cmfPM04_ 0P504C	I SRO,BOP	Diesel Generator C spurious start without cooling, manual ESW initiation required
5	cmfEB01_ 1A203 mfRR164 010	I SRO, ATC	ESS Bus 1C lockout, DW leak severity rises, reactor scram required (ON-104-203, TS 3.8.7)
6	mfRP158 003	M ALL	Electrical ATWS (EO-100-113), ARI inserts control rods
7	mfRR179 003	C ALL	Fuel failure with high MSL radiation, MSIV isolation required (AR-103-D01, AR-104-D01)
8	cmfMV06_ HV149F013	I SRO,ATC	RCIC injection valve fails to open on initiation (OP-150-001)
9	mfRC150 004	M ALL	Unisolable RCS leak into Secondary Containment, 2 areas above Max Safe radiation (EO-100-104)
10	cmfMV01_ HV149F007 cmfMV09_ HV149F008	I SRO,BOP	RCIC steam isolation valves fail to automatically close (AR-108-F04,F05), manual isolation successful after reactor pressure reduced

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Scenario Events	Actual Attributes
1. Total malfunctions (5–8)	**3,4,5,7,8,10**	**6**
2. Malfunctions after EOP entry (1–2)	**7,8,10**	**3**
3. Abnormal events (2–4)	**3,5**	**2**
4. Major transients (1–2)	**6,9**	**2**
5. EOPs entered/requiring substantive actions (1–2)	**EO-100-102 EO-100-104**	**3**
6. EOP contingencies requiring substantive actions (0–2)	**EO-100-113 EO-100-112**	**2**
7. Critical tasks (2–3) **CT-1** **Manually initiate ARI.** **CT-2** **Rapidly depressurize the reactor when two Secondary Containment Areas exceed Max Safe Rad levels.**	[redacted]	**2**

Facility: **SSES Units 1 and 2** Scenario No.: **5** Op-Test No.: **LOC26**

Examiners: _____ Operators: _____

Initial Conditions: **Unit 1 Mode 2, 3 percent power, 500 psig**

Turnover: **Place RFP in-service in DPM in AUTO per OP-145-001**
Control rods 42-15 and 46-19 declared slow last scram time test
Severe thunderstorm watch in effect

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N SRO,BOP	Place RFP in-service in Discharge Pressure Mode (OP-145-001)
2	N/A	R SRO,ATC	Withdraw control rods to raise reactor power (OP-AD-338, GO-100-002)
3	mfLS155 0145435	I (TS) SRO,ATC	Inoperable control rod position indication (TS 3.1.3)
4	set fx10 SULC_B9. OUT=100	I SRO,ATC	Startup level control bypass valve HV-10640 controller fails to maximum demand, take manual control (ON-145-001)
5	IMF cmfRL02_ 86A1102	C SRO,BOP	Aux Bus 11B lockout, Start Condensate Pump C to maintain 2-pump Condensate alignment with RFP in-service (ON-103-003. OP 144-001)
6	cmfFU01_ 1C618FU21	I (TS) SRO	RCIC Division 2 initiation logic power loss (TS 3.3.5.1)
7	cmfRL01_ B211K7x	C ALL	Spurious MSIV closure, insert a manual scram due to loss of the normal heat sink (ON-100-101)
8	mfMS183 007	C ALL	Drywell LOCA, place Suppression Chamber spray in-service to cool Primary Containment (OP-149-004)
9	cmfMV01_ HV151 F028x	C SRO,BOP	RHR Suppression Chamber cooling isolation valve breaker trips, place other division of RHR in Suppression Chamber spray (OP-149-004)
10	mfRH149 004x	M ALL	Unisolable Suppression Pool leak (EO-100-103, 112)

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Scenario Events	Actual Attributes
1. Total malfunctions (5–8)	**4,5,7,8,9**	**5**
2. Malfunctions after EOP entry (1–2)	**8,9**	**2**
3. Abnormal events (2–4)	**4,5**	**2**
4. Major transients (1–2)	**10**	**1**
5. EOPs entered/requiring substantive actions (1–2)	**EO-100-102 EO-100-103**	**2**
6. EOP contingencies requiring substantive actions (0–2)	**EO-100-112**	**1**
7. Critical tasks (2–3) **CT-1** **Isolate HPCI when Suppression Pool level cannot be maintained above 17 feet.** **CT-2** **Rapidly Depressurize the reactor when Suppression Pool level cannot be maintained above 12 feet.**	[redacted]	**2**

Facility: **SSES Units 1 and 2** Date of Exam: **08/22/14 (LOC26)**

Tier	Group	RO K/A Category Points											SRO-Only Points					
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2		G*		Total
1. Emergency & Plant Evolutions	1	4	3	4				3	3			3	20	3		4		7
	2	1	1	1				1	2			1	7	2		1		3
	Tier Totals	5	4	5				4	5			4	27	5		5		10
2. Plant Systems	1	3	3	1	3	3	3	2	2	2	2	2	26	2		3		5
	2	1	1	1	1	1	1	1	1	1	1	2	12	0	1	2		3
	Tier Totals	4	4	2	4	4	4	3	3	3	3	4	38	3		5		8
3. Generic Knowledge & Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			2			3			2			1	2	2	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 outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to section D.1.b of ES-401, for guidance regarding 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 KAs 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/A's
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. If fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A Catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10CFR55.43

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1 (RO / SRO)

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	Q#
600000 Plant Fire On-site / 8					X		AA2.04 - Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: The fire's extent of potential operational damage to plant equipment	3.1	76
700000 Generator Voltage and Electric Grid Disturbances					X		AA2.01 - Ability to determine and/or interpret the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Operating point on the generator capability curve.	3.6	77
295005 Main Turbine Generator Trip / 3					X		AA2.02 - Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP : Turbine vibration	2.7	78
295030 Low Suppression Pool Water Level / 5						X	2.4.41 - Emergency Procedures / Plan: Knowledge of the emergency action level thresholds and classifications.	4.6	79
295037 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown / 1						X	2.4.35 - Emergency Procedures / Plan: Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects.	4.0	80
295021 Loss of Shutdown Cooling / 4						X	2.4.4 - Emergency Procedures / Plan: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.7	81
295019 Partial or Total Loss of Inst. Air / 8						X	2.1.19 - Conduct of Operations: Ability to use plant computers to evaluate system or component status.	3.8	82
295028 High Drywell Temperature / 5	X						EK1.01 - Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL TEMPERATURE : Reactor water level measurement	3.5	39
700000 Generator Voltage and Electric Grid Disturbances	X						AK1.01 - Knowledge of the operational implications of the following concepts as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES and the following: Definition of terms: volts, watts, amps, VARs, power factor.	3.3	40
295021 Loss of Shutdown Cooling / 4	X						AK1.04 - Knowledge of the operational implications of the following concepts as they apply to LOSS OF SHUTDOWN COOLING : Natural circulation	3.6	41
600000 Plant Fire On-site / 8		X					AK2.01 - Knowledge of the interrelations between PLANT FIRE ON SITE and the following: Sensors, detectors and valves	2.6	42
295005 Main Turbine Generator Trip / 3		X					AK2.02 - Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following: Feedwater temperature	2.9	43
295031 Reactor Low Water Level / 2		X					EK2.15 - Knowledge of the interrelations between REACTOR LOW WATER LEVEL and the following: A.C. distribution: Plant-Specific	3.2	44
295016 Control Room Abandonment / 7			X				AK3.03 - Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT : Disabling control room controls	3.5	45

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1 (RO / SRO)

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	Q#
295037 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown / 1			X				EK3.01 - Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Recirculation pump trip/runback	4.1	46
295038 High Off-site Release Rate / 9			X				EK3.03 - Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: Control room ventilation isolation	3.7	47
295026 Suppression Pool High Water Temp. / 5				X			EA1.03 - Ability to operate and/or monitor the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Temperature monitoring	3.9	48
295004 Partial or Total Loss of DC Pwr / 6				X			AA1.01 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : D.C. electrical distribution systems	3.3	49
295018 Partial or Total Loss of CCW / 8				X			AA1.01 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : Backup systems	3.3	50
295030 Low Suppression Pool Water Level / 5					X		EA2.03 - Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: Reactor pressure	3.9	51
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		AA2.05 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Jet pump operability: Not-BWR-1&2	3.1	52
295024 High Drywell Pressure / 5					X		EA2.06 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL PRESSURE: Suppression pool temperature	4.1	53
295023 Refueling Accidents / 8						X	2.4.18 Knowledge of the specific bases for EOPs.	3.3	54
295003 Partial or Complete Loss of AC / 6						X	2.4.49 - Emergency Procedures / Plan: Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.6	55
295019 Partial or Total Loss of Inst. Air / 8						X	2.4.9 - Emergency Procedures / Plan: Knowledge of low power / shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	3.8	56
295025 High Reactor Pressure / 3	X						EK1.04 - Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE : Decay heat generation	3.9	57
295006 SCRAM / 1			X				AK3.06 - Knowledge of the reasons for the following responses as they apply to SCRAM : Recirculation pump speed reduction: Plant-Specific	3.2	58
K/A Category Totals:	4	3	4	3	3/3	3/4	Group Point Total:		20/7

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2 (RO / SRO)

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	Q#
295020 Inadvertent Cont. Isolation / 5 & 7					X		AA2.03 - Ability to determine and/or interpret the following as they apply to INADVERTENT CONTAINMENT ISOLATION : Reactor power	3.7	83
295002 Loss of Main Condenser Vac / 3						X	2.4.21 - Emergency Procedures / Plan: 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.	4.6	84
295022 Loss of CRD Pumps / 1					X		AA2.03 - Ability to determine and/or interpret the following as they apply to LOSS OF CRD PUMPS : CRD mechanism temperatures	3.2	85
295002 Loss of Main Condenser Vacuum	X						AK1.04 - Knowledge of the operational implications of the following concepts as they apply to LOSS OF MAIN CONDENSER VACUUM : Increased offgas flow.	3.0	59
295017 High Off-site Release Rate / 9		X					AK2.14 - Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: PCIS/NSSSS	4.0	60
500000 High CTMT Hydrogen Conc. / 5			X				EK3.07 - Knowledge of the reasons for the following responses as they apply to HIGH PRIMARY CONTAINMENT HYDROGEN CONCENTRATIONS: Operation of drywell vent	3.1	61
295008 High Reactor Water Level / 2				X			AA1.07 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR WATER LEVEL : Main turbine: Plant-Specific	3.4	62
295022 Loss of CRD Pumps / 1					X		AA2.02 - Ability to determine and/or interpret the following as they apply to LOSS OF CRD PUMPS : CRD system status	3.3	63
295007 High Reactor Pressure / 3						X	2.4.6 - Emergency Procedures / Plan: Knowledge of EOP mitigation strategies.	3.7	64
295029 High Suppression Pool Water Level / 5					X		EA2.03 - Ability to determine and/or interpret the following as they apply to HIGH SUPPRESSION POOL WATER LEVEL : Drywell/containment water level	3.4	65
K/A Category Totals:	1	1	1	1	2/2	1/1	Group Point Total:		7/3

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 2 Group 1 (RO / SRO)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
263000 DC Electrical Distribution								X				A2.02 - Ability to (a) predict the impacts of the following on the D.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of ventilation during charging	2.9	86
209001 LPCS								X				A2.01 - Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Pump trips	3.4	87
262001 AC Electrical Distribution											X	2.1.32 - Conduct of Operations: Ability to explain and apply all system limits and precautions.	4.0	88
223002 PCIS/Nuclear Steam Supply Shutoff											X	2.2.40 - Equipment Control: Ability to apply technical specifications for a system.	4.7	89
400000 Component Cooling Water											X	2.1.20 - Ability to interpret and execute procedure steps.	4.6	90
215004 Source Range Monitor	X											K1.02 - Knowledge of the physical connections and/or cause- effect relationships between SOURCE RANGE MONITOR (SRM) SYSTEM and the following: Reactor manual control	3.4	1
205000 Shutdown Cooling	X											K1.08 - Knowledge of the physical connections and/or cause- effect relationships between SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) and the following: LPCI	3.9	2
212000 RPS		X										K2.02 - Knowledge of electrical power supplies to the following: Analog trip system logic cabinets	2.7	3
239002 SRVs		X										K2.01 - Knowledge of electrical power supplies to the following: SRV solenoids	2.8	4
259002 Reactor Water Level Control						X						K6.05 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR WATER LEVEL CONTROL SYSTEM : Reactor water level input	3.5	5
211000 SLC			X									K3.01 - Knowledge of the effect that a loss or malfunction of the STANDBY LIQUID CONTROL SYSTEM will have on following: Ability to shutdown the reactor in certain conditions	4.3	6

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 2 Group 1 (RO / SRO)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
263000 DC Electrical Distribution				X								K4.02 - Knowledge of D.C. ELECTRICAL DISTRIBUTION design feature(s) and/or interlocks which provide for the following: Breaker interlocks, permissives, bypasses and cross ties: Plant-Specific	3.1	7
218000 ADS				X								K4.02 - Knowledge of AUTOMATIC DEPRESSURIZATION SYSTEM design feature(s) and/or interlocks which provide for the following: Allows manual initiation of ADS logic	3.8	8
215003 IRM					X							K5.01 - Knowledge of the operational implications of the following concepts as they apply to INTERMEDIATE RANGE MONITOR (IRM) SYSTEM : Detector operation	2.6	9
206000 HPCI					X							K5.02 - Knowledge of the operational implications of the following concepts as they apply to HIGH PRESSURE COOLANT INJECTION SYSTEM : Turbine shaft sealing: BWR-2,3,4	2.8	10
262002 UPS (AC/DC)						X						K6.02 - Knowledge of the effect that a loss or malfunction of the following will have on the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) : D.C. electrical power	2.8	11
217000 RCIC						X						K6.04 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC): Condensate storage and transfer system	3.5	12
400000 Component Cooling Water							X					A1.01 - Ability to predict and / or monitor changes in parameters associated with operating the CCWS controls including: CCW flow rate	2.8	13
203000 RHR/LPCI: Injection Mode							X					A1.09 - Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC) controls including: Component cooling water systems	2.9	14
223002 PCIS/Nuclear Steam Supply Shutoff								X				A2.05 - Ability to (a) predict the impacts of the following on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abn cond or ops. Nuclear boiler instrumentation failures	3.3	15

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 2 Group 1 (RO / SRO)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
215005 APRM / LPRM								X				A2.02 - Ability to (a) predict the impacts of the following on the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions : Upscale or downscale trips	3.6	16
264000 EDGs									X			A3.04 - Ability to monitor automatic operations of the EMERGENCY GENERATORS (DIESEL/JET) including: Operation of the governor control system on frequency and voltage control	3.1	17
262001 AC Electrical Distribution									X			A3.02 - Ability to monitor automatic operations of the A.C. ELECTRICAL DISTRIBUTION including: Automatic bus transfer	3.2	18
300000 Instrument Air										X		A4.01 - Ability to manually operate and/or monitor in the control room: Pressure gauges	2.6	19
261000 SGTS										X		A4.04 - Ability to manually operate and/or monitor in the control room: Primary containment pressure	3.3	20
209001 LPCS											X	2.4.46 - Emergency Procedures / Plan: Ability to verify that the alarms are consistent with the plant conditions.	4.2	21
217000 RCIC											X	2.4.2 - Emergency Procedures / Plan: Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	4.5	22
206000 HPCI		X										K2.02 - Knowledge of electrical power supplies to the following: System pumps: BWR-2,3,4	2.8	23
262001 AC Electrical Distribution					X							K5.02 - Knowledge of the operational implications of the following concepts as they apply to A.C. ELECTRICAL DISTRIBUTION: Breaker control	2.6	24
261000 SGTS	X											K1.01 - Knowledge of the physical connections and/or cause- effect relationships between STANDBY GAS TREATMENT SYSTEM and the following: Reactor building ventilation system	3.4	25
400000 Component Cooling Water				X								K4.01 - Knowledge of CCWS design feature(s) and or interlocks which provide for the following: Automatic start of standby pump	3.4	26
K/A Category Totals:	3	3	2	3	3	2	2	2/2	2	2	2/3	Group Point Total:	26/5	

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 2 Group 2 (RO / SRO)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
226001 RHR/LPCI: Containment Spray System Mode								X				A2.11 - Ability to (a) predict the impacts of the following on the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Motor operated valve failures	3.0	91
241000 Reactor/Turbine Pressure Regulator											X	2.4.34 - Emergency Procedures / Plan: Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.	4.1	92
234000 Fuel Handling Equipment											X	2.2.12 - Equipment Control: Knowledge of surveillance procedures.	4.1	93
215002 RBM	X											K1.05 - Knowledge of the physical connections and/or cause- effect relationships between ROD BLOCK MONITOR SYSTEM and the following: Four rod display: BWR-3,4,5	3.0	27
201001 CRD Hydraulic		X										K2.01 - Knowledge of electrical power supplies to the following: Pumps	2.9	28
239001 Main and Reheat Steam			X									K3.15 - Knowledge of the effect that a loss or malfunction of the MAIN AND REHEAT STEAM SYSTEM will have on following: Reactor water level control	3.5	29
286000 Fire Protection				X								K4.03 - Knowledge of FIRE PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Maintenance of fire header pressure	3.3	30
201003 Control Rod and Drive Mechanism					X							K5.05 - Knowledge of the operational implications of the following concepts as they apply to CONTROL ROD AND DRIVE MECHANISM : Reverse power effect	3.0	31
204000 RWCU						X						K6.05 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR WATER CLEANUP SYSTEM : A. C. power	2.6	32
230000 RHR/LPCI: Torus/Pool Spray Mode							X					A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE controls including: Suppression chamber pressure	3.8	33

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 2 Group 2 (RO / SRO)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	Q#
226001 RHR/LPCI: CTMT Spray Mode								X				A2.06 - Ability to (a) predict the impacts of the following on the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: D.C. electrical failures	2.8	34
271000 Off-gas									X			A3.01 - Ability to monitor automatic operations of the OFFGAS SYSTEM including: Automatic system isolations	3.3	35
241000 Reactor/Turbine Pressure Regulator										X		A4.07 - Ability to manually operate and/or monitor in the control room: Main stop/throttle valves (operation)	3.5	36
201006 RWM											X	2.2.42 - Equipment Control:: Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	3.9	37
290002 Reactor Vessel Internals											X	2.2.40 - Equipment Control: Ability to apply technical specifications for a system.	3.4	38
K/A Category Totals:	1	1	1	1	1	1	1	1/1	1	1	2/2	Group Point Total:		12/3

Facility: **SSES Units 1 and 2**			Date of Exam: **08/22/14 (LOC26)**			
Category	K/A #	Topic	RO		SRO-Only	
			IR	Q#	IR	Q#
1. Conduct of Operations	2.1.34	Knowledge of primary and secondary plant chemistry limits.			3.5	94
	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management.	4.3	66		
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	67		
	2.1.28	Knowledge of the purpose and function of major system components and controls.	4.1	75		
	Subtotal			3		1
2. Equipment Control	2.2.23	Ability to track Technical Specification limiting conditions for operations.			4.6	95
	2.2.19	Knowledge of maintenance work order requirements.			3.4	98
	2.2.39	Knowledge of less than one hour technical specification action statements for systems.	3.9	68		
	2.2.15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.	3.9	69		
	Subtotal			2		2
3. Radiation Control	2.3.14	Knowledge of radiation or containment hazards that may arise during normal, abnormal, or emergency conditions or activities.			3.8	96
	2.3.6	Ability to approve release permits.			3.8	100
	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.	3.4	70		
	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	71		
	2.3.11	Ability to control radiation releases.	3.8	74		
	Subtotal			3		2
4. Emergency Procedures / Plan	2.4.23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.			4.4	97
	2.4.32	Knowledge of operator response to loss of all annunciators.			4.0	99
	2.4.47	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	72		
	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	3.6	73		
	Subtotal			2		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
SRO 2 / 2	215001 A2.07 Traversing In-core Probe	Question 91 Originally selected K/A Ability to (a) predict the impacts of the following on the TRAVERSING IN-CORE PROBE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Failure to retract during accident conditions: Mark-I&II (Not-BWR1) Unable to write a discriminating question at the SRO level for this K/A. Randomly re-sampled system due to low discriminatory potential for TIPs and randomly sampled A2 K/A. 226001 RHR/LPCI: Containment Spray System Mode A2.11 - Ability to (a) predict the impacts of the following on the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Motor operated valve failures (3.0)
SRO 1 / 1	600000 AA2.07 Plant Fire on Site	Question 76 Originally selected K/A Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: Whether malfunction is due to common-mode electrical failures Unable to write a psychometrically sound question related to the K/A at the SRO level. Replaced with randomly sampled K/A within original E/APE. AA2.04 - Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: The fire's extent of potential operational damage to plant equipment (3.1)
SRO 2 / 1	400000 2.4.12 Component Cooling Water	Question 90 Originally selected K/A Emergency Procedures / Plan: Knowledge of the specific bases for EOPs Lack of information related to the CCW systems precluded writing a psychometrically sound question on this K/A. Replaced with randomly sampled K/A within original system. 2.1.20 - Ability to interpret and execute procedure steps. (4.6)

Tier / Group	Randomly Selected K/A	Reason for Rejection
SRO 3	2.3 Radiation Control 2.3.6	Question 100 Originally selected K/A Ability to approve release permits. Rejected due to overlap with already administered audit examination operating test item. Replaced with randomly sampled K/A within Section 2.3. 2.3.6 – Knowledge of radiation exposure limits under normal or emergency conditions.
RO 1 / 1	295025 EK1.01 High Reactor Pressure	Question 57 Originally selected K/A Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE : Pressure effects on reactor power Rejected due to K/A sampled on 2013 LOC25 NRC exam, unable to develop a significantly modified question. Replaced with randomly sample K/A within EK1. EK1.03 - Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE : Decay heat generation
RO 2 / 1	211000 K3.03 SLC	Question 6 Originally selected K/A Knowledge of the effect that a loss or malfunction of the STANDBY LIQUID CONTROL SYSTEM will have on following: Core plate differential pressure indication Rejected due to overlap on 2013 LOC25 NRC exam, unable to develop a significantly modified question. Replaced with randomly sample K/A within K3. K3.01 - Knowledge of the effect that a loss or malfunction of the STANDBY LIQUID CONTROL SYSTEM will have on following: Ability to shutdown the reactor in certain conditions

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 2 / 1	215005 A2.07 APRM / LPRM	**Question 16** **Originally selected K/A** **Ability to (a) predict the impacts of the following on the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions: Recirculation flow channels flow mismatch** **Rejected due to overlap with operating test scenario LOC26-NRC-1, Event 5. Replaced with randomly sample K/A within A2.** **A2.02 - Ability to (a) predict the impacts of the following on the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions: Upscale or downscale trips**
RO 1 / 1	295030 EA2.02 Low Suppression Pool Water Level	**Question 51** **Originally selected K/A** **Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL : Suppression pool temperature** **Rejected due to overlap with Question 48. Replaced with randomly sample K/A within EA2.** **EA2.03 - Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL: Reactor pressure**
RO 1 / 1	295023 2.4.41 Refueling Accidents	**Question 54** **Originally selected K/A** **Emergency Procedures / Plan: Knowledge of the emergency action level thresholds and classifications.** **Rejected due to SRO-level knowledge and abilities required for this K/A. Replaced with randomly-sampled generic K/A.** **2.4.18 Knowledge of the specific bases for EOPs.**

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 1 / 2	295013 AK1.01 High Suppression Pool Temperature	**Question 59** **Originally selected K/A** **Knowledge of the operational implications of the following concepts as they apply to HIGH SUPPRESSION POOL TEMPERATURE : Pool stratification.** **Rejected due to overlap with RO questions 48 and 53, and SRO question 82. Randomly sampled Tier 1 Group 2 APE 295002, Loss of Main Condenser Vacuum, to replace 295013. Randomly sampled AK1 under 295013 to obtain new K/A.** **AK1.04 - Knowledge of the operational implications of the following concepts as they apply to LOSS OF MAIN CONDENSER VACUUM : Increased offgas flow.**
RO 2 / 1	205000 K1.05 Shutdown Cooling	**Question 2** **Originally selected K/A** **Knowledge of the physical connections and/or cause-effect relationships between SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) and the following: Component cooling water systems** **Rejected due to overlap with RO question 13, 14, and SRO question 90. Replaced with randomly sample K/A within K1.** **K1.08 - Knowledge of the physical connections and/or cause- effect relationships between SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) and the following: LPCI**
RO 2 / 1	300000 K5.01 Instrument Air	**Question 24** **Originally selected K/A** **Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM: Air compressors** **Rejected due to overlap on 2013 LOC25 NRC exam. Due to small number of K5 topics in 300000, randomly resampled for new Tier 2 Group 1 system and obtained 262001 A.C. Electrical Distribution. Randomly sampled K5 and obtained K/A** **K5.02 - Knowledge of the operational implications of the following concepts as they apply to A.C. ELECTRICAL DISTRIBUTION: Breaker control**

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 1 / 1	295038 EK3.01 High Off-site Release Rate	Question 47 Originally selected K/A Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: Implementation of site emergency plan Rejected due to SRO-level knowledge and abilities required for this K/A. Replaced with randomly-sampled K/A from EK3: EK3.03 - Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: Control room ventilation isolation
RO 2 / 2	286000 K4.07 Fire Protection	Question 30 Originally selected K/A K4.07 - Knowledge of FIRE PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Diesel engine protection Rejected due to could not develop a question with reliable discrimination validity. Replaced with randomly-sampled K/A from K4: K4.03 - Knowledge of FIRE PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Maintenance of fire header pressure
RO 2 / 1	206000 K5.06 HPCI	Question 9 Originally selected K/A K5.06 - Knowledge of the operational implications of the following concepts as they apply to HIGH PRESSURE COOLANT INJECTION SYSTEM : Turbine speed measurement Rejected due to could not develop a question with reliable discrimination validity. Replaced with randomly-sampled K/A from K5: K5.02 - Knowledge of FIRE PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Turbine shaft sealing

Tier / Group	Randomly Selected K/A	Reason for Rejection
RO 2 / 2	**201001 CRD Hydraulic**	**Question 28** **Originally selected K/A** **K2.02 - Knowledge of electrical power supplies to the following: Scram valve solenoids** **Rejected due to question due to overlap with written and operating exam topics. Replaced with randomly-sampled K/A from K2:** **K2.01 - Knowledge of electrical power supplies to the following: Pumps**
RO 2 / 1	**259002 Reactor Water Level Control System**	**Question 5** **Originally selected K/A** **K3.07 - Knowledge of the effect that a loss or malfunction of the REACTOR WATER LEVEL CONTROL SYSTEM will have on following: Reactor water level indication** **Question did not match originally selected K/A; on Chief Examiner direction selected K/A to match question due to high level of discriminatory and operational validity of question. Replaced with appropriate K/A within 259002:** **K6.05 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR WATER LEVEL CONTROL SYSTEM : Reactor water level input**

U.S. Nuclear Regulatory Commission

Site-Specific SRO Written Examination

Applicant Information	
Name:	
Date: **August 22, 2014**	Facility/Unit: **SSES Units 1 and 2**
Region: I ■ II ☐ III ☐ IV ☐	Reactor Type: W ☐ CE ☐ BW ☐ GE ■
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

_____
Applicant's Signature

Results		
RO/SRO-Only/Total Examination Values	_____ / _____ / _____	Points
Applicant's Scores	_____ / _____ / _____	Points
Applicant's Grade	_____ / _____ / _____	Percent