

**Susquehanna Learning Center**

769 Salem Boulevard  
Berwick, PA 18603-0467  
570-542-3353



November 1, 2007

Mr. John Caruso  
USNRC Chief Examiner  
USNRC Region 1  
475 Allendale Road  
King of Prussia, PA 19406-1415

Susquehanna Learning Center  
**Examination Outline**  
PLA 006303                      File A14-13D

Dear Mr. Caruso:

Enclosed for your review and approval are Proposed Examination Materials for the PPL Susquehanna, LLC Initial Licensed Operator Examination scheduled to begin 12/07/07 followed by the Operating Exam beginning on 12/10/07. These materials are submitted in accordance with NUREG 1021, "Operator Licensing Examination Standards for Power Reactors", Revision 9. The following materials are enclosed:

- Form ES-201-3, Examination Security Agreement (Up to Date Copy)
- Form ES-301-1, Administrative Topics Outline RO - Rev. 1
- Form ES-301-1, Administrative Topics Outline SRO - Rev. 1
- Form ES-301-2, Control Room/In-Plant Systems Outline RO - Rev. 1
- Form ES-301-2, Control Room/In-Plant Systems Outline SRO-I - Rev. 1
- Form ES-301-2, Control Room/In-Plant Systems Outline SRO-U - Rev. 1
- Form ES-301-3, Operating Test Quality Checklist - Rev. 1
- Form ES-301-4, Simulator Scenario Quality Checklist - Rev. 1 (Signed)
- Form ES-301-5, Transient and Event Checklist - Rev. 1 (Signed)
- Form ES-301-6, Competencies Checklist - Rev. 1 (Signed)
- **RO Written Outline – Previously Submitted 10/29/07**
  - Form ES-401-1, BWR Examination Outline - RO - Rev. 0
  - Form ES-401-3, Generic Knowledge and Abilities Outline Tier 3-RO - Rev. 0
- **SRO Written Outline – Previously submitted on 10/29/07**
  - Form ES-401-1, BWR Examination Outline - SRO - Rev. 0
  - Form ES-401-3, Generic Knowledge and Abilities Outline Tier 3-SRO - Rev. 0
- Form ES-401-4, Record of Rejected K/As - Rev. 0 - Previously submitted
- Form ES-401-6, Written Examination Quality Checklist - Rev. 0 (Signed) – Previously submitted
- Form ES-D-1, Scenario Outline
- 9 Administrative Topics JPMs
- 11 Control Room/In-Plant Systems JPMs
- 5 Simulator Scenarios
- 100 Written Examination Questions and Answers - Previously submitted

- References
  - Full color set of EOPs and Bases
  - Emergency Plan Classification Procedure and Bases
  - Reference pages for each written question's correct answer
  - References provided to the Candidates for the Written Examination
  - Applicable procedures for each JPM

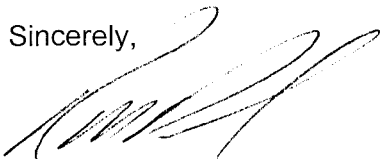
Modifications to the previously submitted outlines were made as a result of feedback received during the validation process. These modifications to the outlines are identified with bold italics.

All proposed Examination Materials have been validated by Licensed Operator personnel in accordance with the guidance provided within NUREG 1021, Operator Licensing Examination Standards for Power Reactors, Revision 9.

We request that these materials be withheld from public disclosure until after the completion of the examination. If you have any questions, please feel free to contact me at 570-542-3126 or Chris Michaels at 570-542-1891.

The above materials have been reviewed for "Safeguards Material" content. None of these materials are deemed to be "Safeguards Material."

Sincerely,



Robert M. Peal  
Manager-Nuclear Training

Response: No

Enclosures: Listed

cc: R. R. Boesch  
R. R. Sgarro  
Ops Letter File  
Nuc Records-Site

cm 45 day cover letter 11-01-07

CM/RMP/vah

Facility:		Susquehanna		Date of Exam:		December 2007		NRC													
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 Evolution	1	4	3	3				3	4			3	20	4	3	7					
	2	1	1	2				1	1			1	7	2	1	3					
	Tier Totals	5	4	5				4	5			4	27	6	4	10					
2. Plant Systems	1	3	2	2	3	3	2	2	3	2	2	2	26	2	3	5					
	2	1	0	1	2	0	2	1	1	1	2	1	12	0	2	3					
	Tier Totals	4	2	3	5	3	4	3	4	3	4	3	38	4	4	8					
3. Generic Knowledge & Abilities Categories				1		2		3		4		10	1		2		3		4		7
				3		3		2		2			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 $\pm 1$ 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 ES-401, Attachment 2, 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.																			
		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. 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																			

Susquehanna NRC  
BWR Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		AA2.02 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : Neutron monitoring	3.2	76
295003 Partial or Complete Loss of AC / 6						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.	4.3	77
295006 SCRAM / 1					X		AA2.03 - Ability to determine and/or interpret the following as they apply to SCRAM : Reactor Water level	4.0	78
295024 High Drywell Pressure / 5						X	2.4.6 - Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.	4.0	79
295025 High Reactor Pressure / 3					X		EA2.04 - Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: Suppression pool level.....	3.9	80
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1					X		EA2.04 - Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Suppression pool temperature	4.1	81
600000 Plant Fire On-site / 8						X	2.1.23 - Conduct of Operations Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.0	82
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4		X					AK2.01 - Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION and the following: Recirculation system.....	3.6	39
295003 Partial or Complete Loss of AC / 6					X		AA2.03 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : Battery status: Plant-Specific	3.2	40
295004 Partial or Total Loss of DC Pwr / 6	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : Electrical bus divisional separation	2.9	41
295005 Main Turbine Generator Trip / 3				X			AA1.05 - Ability to operate and/or monitor the following as they apply to MAIN TURBINE GENERATOR TRIP : Reactor /turbine pressure regulating system.	3.6	42
295006 SCRAM / 1						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.	4.0	43
295016 Control Room Abandonment / 7						X	2.4.50 - Emergency Procedures / Plan Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	44
295018 Partial or Total Loss of CCW / 8						X	2.4.31 - Emergency Procedures / Plan Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	45

Susquehanna NRC  
BWR Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295019 Partial or Total Loss of Inst. Air / 8					X		AA2.02 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Status of safety-related instrument air system loads (see AK2.1 - AK2.19)	3.6	46
295021 Loss of Shutdown Cooling / 4	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to LOSS OF SHUTDOWN COOLING : Adequate core cooling	3.9	47
295023 Refueling Acc Cooling Mode / 8				X			AA1.01 - Ability to operate and/or monitor the following as they apply to REFUELING ACCIDENTS : Secondary containment ventilation	3.3	48
295023 Refueling Acc Cooling Mode / 8	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to REFUELING ACCIDENTS : Inadvertent criticality	3.7	49
295024 High Drywell Pressure / 5			X				EK3.07 - Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL PRESSURE : Drywell venting	3.5	50
295025 High Reactor Pressure / 3				X			EA1.07 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: ARI/RPT/ATWS: Plant-Specific	4.1	51
295026 Suppression Pool High Water Temp. / 5			X				EK3.02 - Knowledge of the reasons for the following responses as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Suppression pool cooling	3.9	52
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	53
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	3.7	54
295031 Reactor Low Water Level / 2		X					EK2.14 - Knowledge of the interrelations between REACTOR LOW WATER LEVEL and the following: Emergency generators	3.9	55
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1					X		EA2.01 - Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Reactor power	4.2	56
295038 High Off-site Release Rate / 9		X					EK2.04 - Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: Stack-gas monitoring system: Plant-Specific	3.9	57
600000 Plant Fire On-site / 8			X				AK3.04 - Knowledge of the reasons for the following responses as they apply to PLANT FIRE ON SITE: Actions contained in the abnormal procedure for plant fire on site	2.8	58
K/A Category Totals:	4	3	3	3	4/4	3/3	Group Point Total:	20/7	

Susquehanna NRC  
BWR Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
295013 High Suppression Pool Temp / 5						X	2.1.12 – Conduct of operations - Ability to apply tech specs for a system	4.0	83
295015 Incomplete SCRAM / 1					X		AA2.02 - Ability to determine and/or interpret the following as they apply to INCOMPLETE SCRAM : Reactor Power	4.3	84
295017 High Off-site Release Rate / 9						X	2.4.29 – Emergency Procedures/Plan: Knowledge of the emergency plan	4.0	85
295008 High Reactor Water Level / 2					X		AA2.02 - Ability to determine and/or interpret the following as they apply to HIGH REACTOR WATER LEVEL : Steam flow/feedflow mismatch	3.4	59
295009 Low Reactor Water Level / 2						X	2.1.20 - Conduct of Operations Ability to execute procedure steps.	4.3	60
295020 Inadvertent Cont. Isolation / 5 & 7				X			AA1.02 - Ability to operate and/or monitor the following as they apply to INADVERTENT CONT. ISOLATION: Drywell Ventilation/Cooling system	3.2	61
295022 Loss of CRD Pumps / 1		X					AK2.07 - Knowledge of the interrelations between LOSS OF CRD PUMPS and the following: Reactor pressure (SCRAM assist): Plant-Specific	3.4	62
295032 High Secondary Containment Area Temperature / 5			X				EK3.02 - Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE : Reactor SCRAM	3.6	63
295035 Secondary Containment High Differential Pressure / 5			X				EK3.02 - Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE : Secondary containment ventilation response	3.3	64
500000 High CTMT Hydrogen Conc. / 5	X						EK1.01 - Knowledge of the operational implications of the following concepts as they apply to HIGH CONTAINMENT HYDROGEN CONCENTRATIONS: Containment integrity	3.3	65
295002 Loss of Main Condenser Vac / 3							Available but not selected		
295007 High Reactor Pressure / 3							Available but not selected		
295010 High Drywell Pressure / 5							Available but not selected		
295012 High Drywell Temperature / 5							Available but not selected		
295013 High Suppression Pool Temperature / 5							Available but not selected		
295014 Inadvertent Reactivity Addition / 1							Available but not selected		
295017 High Off-site Release Rate / 9							Available but not selected		
295020 Inadvertent Cont. Isolation / 5 & 7							Available but not selected		
295029 High Suppression Pool Water Level / 5							Available but not selected		
295033 High Secondary Containment Area Radiation Levels / 9							Available but not selected		
295034 Secondary Containment Ventilation High Radiation / 9							Available but not selected		
295036 Secondary Containment High Sump/Area Water Level / 5							Available but not selected		

Susquehanna NRC  
BWR Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

EAPE # / Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
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K/A Category Totals:	1	1	2	1	1/1	2/2	Group Point Total:		7/3
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Susquehanna NRC  
BWR Written Examination Outline  
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Imp.	Q #
203000 RHR/LPCI: Injection Mode											X	3.6	86
223002 PCIS/Nuclear Steam Supply Shutoff											X	4.0	87
239002 SRVs								X				3.2	88
264000 EDGs								X				3.4	89
400000 Component Cooling Water											X	4.0	90
203000 RHR/LPCI: Injection Mode						X						2.7	1
205000 Shutdown Cooling		X										2.5	2
206000 HPCI		X										2.8	3
209001 LPCS				X								3.0	4
211000 SLC	X											3.7	5
212000 RPS					X							2.7	6



Susquehanna NRC  
BWR Written Examination Outline  
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G		Imp.	Q #
215003 IRM						X							3.1	7
215003 IRM					X								2.6	8
215004 Source Range Monitor							X						3.6	9
215005 APRM / LPRM							X						4.1	10
217000 RCIC								X					3.0	11
217000 RCIC	X												2.6	12
218000 ADS										X			2.5	13
223002 PCIS/Nuclear Steam Supply Shutoff								X					3.9	14
223002 PCIS/Nuclear Steam Supply Shutoff						X							2.9	15

Susquehanna NRC  
BWR Written Examination Outline  
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G		Imp.	Q #
239002 SRVs			X									K3.03 - Knowledge of the effect that a loss or malfunction of the RELIEF/SAFETY VALVES will have on following: Ability to rapidly depressurize the reactor	4.3	16
259002 Reactor Water Level Control								X				A2.01 - Ability to (a) predict the impacts of the following on the REACTOR WATER LEVEL CONTROL SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of any number of main steam flow inputs	3.3	17
261000 SGTS	X											K1.09 - Knowledge of the physical connections and/or cause- effect relationships between STANDBY GAS TREATMENT SYSTEM and the following: Primary Containment Isolation System	3.2	18
261000 SGTS											X	2.4.2 - Emergency Procedures / Plan Knowledge of system set points / interlocks and automatic actions associated with EOP entry conditions.	3.9	19
262001 AC Electrical Distribution				X								K4.02 - Knowledge of A.C. ELECTRICAL DISTRIBUTION design feature(s) and/or interlocks which provide for the following: Circuit breaker automatic trips	2.9	20
215002 RBM										X		A4.06 - Ability to manually operate and/or monitor in the control room: Surveillance Testing	2.7	21
263000 DC Electrical Distribution			X									K3.03 - Knowledge of the effect that a loss or malfunction of the D.C. ELECTRICAL DISTRIBUTION will have on following: Systems with D.C. components (i.e. valves, motors, solenoids, etc.)	3.4	22
263000 DC Electrical Distribution									X			A3.01 - Ability to monitor automatic operations of the D.C. ELECTRICAL DISTRIBUTION including: Meters, dials, recorders, alarms, and indicating lights	3.2	23
264000 EDGs										X		A4.02 - Ability to manually operate and/or monitor in the control room: Synchroscope	3.4	24
300000 Instrument Air				X								K4.02 - Knowledge of INSTRUMENT AIR SYSTEM design feature(s) and or interlocks which provide for the following: Cross-over to other air systems	3.0	25
400000 Component Cooling Water									X			A3.01 - Ability to monitor automatic operations of the CCWS including: Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS	3.0	26
K/A Category Totals:	3	2	2	3	3	2	2	3/2	2	2	2/3	Group Point Total:	26/5	

Susquehanna NRC  
BWR Written Examination Outline  
Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q #
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286000 Fire Protection											X	2.1.14 - Conduct of Operations Knowledge of Conduct of Operations requirements.	3.8	91
259001 Reactor Feedwater								X				A2.03 - Ability to (a) predict the impacts of the following on the REACTOR FEEDWATER SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of condensate pump(s)	3.6	92
271000 Off-gas								X				A2.04 - Ability to (a) predict the impacts of the following on the OFFGAS SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Offgas system high radiation	4.1	93
201001 CRD Hydraulic			X									K3.03 - Knowledge of the effect that a loss or malfunction of the CONTROL ROD DRIVE HYDRAULIC SYSTEM will have on following: Control rod drive mechanisms	3.1	27
201004 RSCS						X						K6.04 - Knowledge of the effect that a loss or malfunction of the following will have on the ROD SEQUENCE CONTROL SYSTEM (PLANT SPECIFIC) : Turbine generator (1st stage shell pressure): BWR-4,5	3.3	28
201006 RWM						X						K6.05 - Knowledge of the effect that a loss or malfunction of the following will have on the ROD WORTH MINIMIZER SYSTEM (RWM) (PLANT SPECIFIC) : Steam flow input: P-Spec(Not-BWR6)	2.7	29
202001 Recirculation							X					A1.04 - Ability to predict and/or monitor changes in parameters associated with operating the RECIRCULATION SYSTEM controls including: Reactor water level	3.3	30
219000 RHR/LPCI: Torus/Pool Cooling Mode				X								K4.08 - Knowledge of RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE design feature(s) and/or interlocks which provide for the following: Adequate pump net positive suction head	2.9	31
226001 RHR/LPCI: CTMT Spray Mode									X			A3.03 - Ability to monitor automatic operations of the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE including: System flow	2.8	32

Susquehanna NRC  
BWR Written Examination Outline  
Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q #
245000 Main Turbine Gen. / Aux.	X											K1.08 - Knowledge of the physical connections and/or cause- effect relationships between MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS and the following: Reactor/turbine pressure control system: Plant-Specific	3.4	33
256000 Reactor Condensate										X		A4.02 – Ability to manually operate and/or monitor in the control room: System motor operated valves	2.8	34
259001 Reactor Feedwater								X				A2.02 - Ability to (a) predict the impacts of the following on the REACTOR FEEDWATER SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Feedwater heater isolation	3.1	35
271000 Off-gas											X	2.1.2 - Conduct of Operations Knowledge of operator responsibilities during all modes of plant operation.	3.0	36
272000 Radiation Monitoring										X		A4.02 - Ability to manually operate and/or monitor in the control room: Meter indications	3.0	37
286000 Fire Protection				X								K4.02 - Knowledge of FIRE PROTECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Automatic system initiation	3.3	38
201002 RMCS												Available but not selected		
201003 Control Rod and Drive Mechanism												Available but not selected		
202002 Recirculation Flow Control												Available but not selected		
204000 RWCU												Available but not selected		
214000 RPIS												Available but not selected		
215001 Traversing In-core Probe												Available but not selected		
215002 RBM												Available but not selected		
216000 Nuclear Boiler Inst.												Available but not selected		
223001 Primary CTMT and Aux.												Available but not selected		
230000 RHR/LPCI: Torus/Pool Spray Mode												Available but not selected		
233000 Fuel Pool Cooling/Cleanup												Available but not selected		
234000 Fuel Handling Equipment												Available but not selected		
239001 Main and Reheat Steam												Available but not selected		
241000 Reactor/Turbine Pressure Regulator												Available but not selected		
268000 Radwaste												Available but not selected		

Susquehanna NRC  
BWR Written Examination Outline  
Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q #
288000 Plant Ventilation													Available but not selected	
290001 Secondary CTMT													Available but not selected	
290002 Reactor Vessel Internals													Available but not selected	
290003 Control Room HVAC													Available but not selected	
K/A Category Totals:	1	0	1	2	0	2	1	1/2	1	2	1/1	Group Point Total:	12/3	

Facility: Susquehanna NRC		Date: 12/10/07				
Category	K/A #	Topic	RO		SRO-Only	
			IR	Q#	IR	Q#
1. Conduct of Operations	2.1.14	Knowledge of system status criteria which require the notification of plant personnel.			3.3	94
	2.1.11	Knowledge of less than one hour technical specification action statements for systems.			3.8	95
	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component STATUS	3.0	66		
	2.1.30	Ability to locate and operate components, including local controls.	3.9	67		
	2.1.1	Knowledge of conduct of operations requirements.	3.7	68		
Subtotal				3		2
2. Equipment Control	2.2.5	Knowledge of the process for making changes in the facility as described in the safety analysis report.			2.7	96
	2.2.25	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	2.5	69		
	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	3.7	70		
	2.2.27	Knowledge of the refueling process	2.8	71		
Subtotal				3		1
3. Radiation Control	2.3.3	Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems).			2.9	97
	2.3.9	Knowledge of the process for performing a containment purge.			3.4	98
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	72		
	2.3.11	Ability to control radiation releases.	2.7	73		
Subtotal				2		2
4. Emergency Procedures /	2.4.9	Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.			3.9	99

Plan	2.4.10	Knowledge of annunciator response procedures.			3.1	100
	2.4.3	Ability to identify post-accident instrumentation.	3.5	74		
	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.	2.9	75		
	Subtotal			2		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
2 / 2	201004 / K6.03	(Q.28) The K&A deals with the loss of rod movement information to the RSCS system. The system does not serve this purpose at SSES. Randomly selected 201004 K6.04
2 / 1	206000 / K2.01	(Q.3) The topic (electrical power supplies) was oversampled (#22, #2). Randomly selected K2.03
2 / 1	261000 / K1.04	(Q.18) The topic for this system does not exist at SSES. Randomly selected K1.09
2 / 1	261000 / 2.4.49	(Q.19) No procedurally directed immediate actions are associated with this system. Randomly selected 2.4.2
2 / 1	300000 / A3.02	(Q.25) No operationally valid objectives exist to write a discriminating question at a higher level of difficulty for the topic (monitoring instrument air temperature). Randomly selected K4.02
2 / 1	262002 / A4.01	(Q.21) The topic does not apply to SSES because the system is not monitored in the control room. Randomly selected 215002 K4.05
2 / 2	202001 / A1.12	(Q.30) No documented technical reference or plant procedure is available to generate a question on this topic. Randomly selected A1.04
2 / 2	286000 / K2.03	(Q. 38) This topic, electrical power supplies, was oversampled. Randomly selected K4.02
1 / 1	295005 / AA1.03	(Q. 42) Not applicable at SSES. Randomly selected AA1.05
1 / 1	295026 / EK3.03	(Q.52) Not applicable at SSES. Randomly selected EK3.02
1 / 2	295015 / AA1.07	(Q.61) Double jeopardy with #56. Randomly selected 295020 AA1.02
1 / 2	295009 / 2.1.32	(Q.60) Same area sampled in other level related questions. Randomly selected 2.1.20
1 / 1	295008 / AA2.02	(Q.83) Same safety function & topic chosen for RO exam. Randomly selected 295012 G2.1.12
3	2.2.34	(Q.71) A discriminating question at the SRO level could not be written for this topic. Randomly selected 2.2.27
1 / 1	295021 / 2.4.6	(Q.79) Oversampled (see #47, #99). Randomly selected 295024 2.4.6
1 / 1	295006 / AA2.02	(Q.78) Double jeopardy with #84. Randomly selected AA2.03
2 / 1	223002 / 2.4.49	(Q.87) No immediate actions associated with this system. Randomly selected 2.1.9
2 / 2	256000 / 2.2.10	(Q.91) System was not in TS and therefore was not related to generic topic. Randomly re-selected 286000 / 2.1.1. (originally re-selected 2.1.14 which was the same as Q# 94)
1 / 2	295017 / 2.4.29	(Q.85) System and topic similar to Q.93 for Offgas system. Randomly selected 2.4.29
2 / 1	215002 / A4.05	(Q.21) Original analog system is being replaced by the GE NUMAC system by modification at SSES. Randomly selected A4.06
2 / 2	256000 / K5.03	(Q.34) Topic is minutia. Controls are not in the control room. Randomly selected A4.02.



1 / 2	295015 / AA2.02	(Q.84) Too simplistic for a discriminating SRO question. Randomly selected AA2.01

Facility: SSESDate of Examination: 12/10/07

Examination Level

RO ☒Operating Test Number: LOC-22 NRC

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, R, P	00.AD.038.001      2.1.20      4.3 Complete Aborted Evolution Log <i>Classroom</i>
Conduct of Operations	N, R	55.SO.3467.201      2.1.12      2.9 Complete SO-255-002, Quarterly SDV Vent and Drain Valves Operability <i>Classroom</i>
Equipment Control	D, S	00.SO.003.151      2.2.12      3.0 Compute Average Drywell Air Temperature IAW SO-100-007 <del>(Alternate Path)</del> <i>Simulator</i>
Radiation Control		N/A
Emergency Plan	D, S	13.ON.003.001      2.4.27      3.0 Activate the Fire Brigade <i>Simulator</i>
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 ( $\leq 3$ for ROs; $\leq 4$ for SROs & RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected)		

Facility: <b>SSES</b>		Date of Examination: <b>12/10/07</b>	
Examination Level		Operating Test Number: <b>LOC-22 NRC</b>	
Control Room Systems <sup>®</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title		Type Code*	Safety Function
34.EO.003.151	288000 K4.02 3.7/3.8 Re-establish RB HVAC in Accordance With ES-134-003 (Alternate Path)	A, D, S, L	9
64.OP.004.153	202002 A2.05 3.8/4.0 Reset Recirculation Pump Limiter #2 Runback IAW ON-164-002 (Alternate Path)	A, D, S	1
51.OP.002.152	209001 A4.01 3.8/3.6 Perform Manual Startup Component by Component of Core Spray IAW OP-151-001 (Alternate Path)	A, D, S, L	2
83.ON.001.102	239002 A2.03 4.1/4.2 Respond to a Stuck Open SRV in Accordance With ON-183-001	D, S	3
49.OP.004.153	226001 A4.01 3.5/3.4 <b>Spray the Drywell (Alternate Path)</b>	A, D, S, L	5
49.OP.017.101	295016 AA1.06 4.0/4.1 Place Shutdown Cooling in Service Using RHR Loop "B" at RSDP	D, S, L	4
24.SO.002.151	264000 A2.01 3.5/3.6 Perform the Monthly Diesel Generator Operability Test for 'D' D/G in Accordance With SO-024-001	A, D, S	6
78.OP.3678.101	215005 A4.04 3.2/3.2 Bypass a Failed LPRM detector	N, S	7
In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
00.ON.015.153	295016 AA1.08 4.0/4.0 Perform Manual Operation of the ADS Valves from the Remote Shutdown Panels or Relay Rooms as Required by ON-100-009, Control Room Evacuation (Alternate Path)	A, D, E, R	3
58.EO.001.101	223001 EK3.07 4.2/4.3 Performing De-energizing of Scram Pilot Solenoids IAW ES-158-001	D, E	7
24.OP.009.003	264000 K4.07 3.3/3.4 Perform a Manual Start of D/G 'E' from Local Panel 0C521E IAW OP-024-001	D	6
<p>@ All RO and SRO 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.</p>			
*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		$\leq 9 / \leq 8 / \leq 4$	
(E)mergency or abnormal in-plant		$\geq 1 / \geq 1 / \geq 1$	
(L)ow-power / Shutdown		$\geq 1 / \geq 1 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)		$\geq 2 / \geq 2 / \geq 1$	
(P)revious 2 exams		$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(R)CA		$\geq 1 / \geq 1 / \geq 1$	
(S)imulator			

Facility: <b>SSES</b>	Date of Examination: <b>12/10/07</b>	
Examination Level	<b>SRO-I <input checked="" type="checkbox"/></b>	Operating Test Number: <b>LOC-22 NRC</b>
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
34.EO.003.151      288000 K4.02      3.7/3.8 Re-establish RB HVAC in Accordance With ES-134-003 (Alternate Path)	A, D, S, L	9
64.OP.004.153      202002 A2.05      3.8/4.0 Reset Recirculation Pump Limiter #2 Runback IAW ON-164-002 (Alternate Path)	A, D, S	1
51.OP.002.152      209001 A4.01      3.8/3.6 Perform Manual Startup Component by Component of Core Spray IAW OP-151-001 (Alternate Path)	A, D, S, L	2
83.ON.001.102      239002 A2.03      4.1/4.2 Respond to a Stuck Open SRV in Accordance With ON-183-001	D, S	3
<b>49.OP.004.153      226001 A4.01      3.5/3.4</b> <b>Spray the Drywell (Alternate Path)</b>	A, D, S, L	5
24.SO.002.151      264000 A2.01      3.5/3.6 Perform the Monthly Diesel Generator Operability Test for 'D' D/G in Accordance With SO-024-001	A, D, S	6
78.OP.3678.101      215005 A4.04      3.2/3.2 Bypass a Failed LPRM detector	N, S	7
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
00.ON.015.153      295016 AA1.08      4.0/4.0 Perform Manual Operation of the ADS Valves from the Remote Shutdown Panels or Relay Rooms as Required by ON-100-009, Control Room Evacuation (Alternate Path)	A, D, E, R	3
58.EO.001.101      223001 EK3.07      4.2/4.3 Performing De-energizing of Scram Pilot Solenoids IAW ES-158-001	D, E	7
24.OP.009.003      264000 K4.07      3.3/3.4 Perform a Manual Start of D/G 'E' from Local Panel 0C521E IAW OP-024-001	D	6
<b>@</b> All RO and SRO 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	$\leq 9 / \leq 8 / \leq 4$	
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$	
(L)ow-power / Shutdown	$\geq 1 / \geq 1 / \geq 1$	
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$	
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)	
(R)CA	$\geq 1 / \geq 1 / \geq 1$	
(S)imulator		

Facility: <b>SSES</b>	Date of Examination: <b>12/10/07</b>
Examination Level <b>SRO-U</b> <input checked="" type="checkbox"/>	Operating Test Number: <b>LOC-22 NRC</b>
Control Room Systems <sup>®</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)	
System / JPM Title	Type Code*      Safety Function
34.EO.003.151      288000 K4.02      3.7/3.8 Re-establish RB HVAC in Accordance With ES-134-003 (Alternate Path)	A, D, S, L      9
<b>49.OP.004.153      226001 A4.01      3.5/3.4</b> <b>Spray the Drywell (Alternate Path)</b>	A, D, S, L      5
51.OP.002.152      209001 A4.01      3.8/3.6 <i>ESF</i> Perform Manual Startup Component by Component of Core Spray IAW OP-151-001 (Alternate Path)	A, D, S, L      2
In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)	
00.ON.015.153      295016 AA1.08      4.0/4.0 Perform Manual Operation of the ADS Valves from the Remote Shutdown Panels or Relay Rooms as Required by ON-100-009, Control Room Evacuation (Alternate Path)	A, D, E, R      3
58.EO.001.101      223001 EK3.07      4.2/4.3 Performing De-energizing of Scram Pilot Solenoids IAW ES-158-001	D, E      7
@ All RO and SRO 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	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(L)ow-power / Shutdown	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

Facility: **SSES**Scenario No.: **ILO-604**Op-Test No.: **1**Examiners: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Initial Conditions: Unit 1 is at 100% EOL, Unit 2 is at 100% power.Turnover: Perform a swap of the CRD pumps to allow maintenance to record vibration data on the 1B CRD pump. A Minimum Generation Alert has been issued for the PJM network. Chemistry/ RE investigating an Offgas system spike observed during the last control rod exercising surveillance.

Event No.	Malf. No.	Event Type*	Event Description
1	Keys 1,2,3	C (SRO)	Scenario begins with a trip of 250V DC 1D274 breaker to the HPCI Aux Oil Pump. The crew responds to the failure and addresses Tech Specs. (TS)
2	Keys 4,5	N (BOP)	From the turnover, the crew swaps in-service CRD Pumps as part of a normal evolution.
3		R (RO)	GCC/TCC calls with a Min Generation Emergency which directs a 100 MWe controlled power reduction with reactor recirculation.
4	Key 6	C (RO)	A mechanical failure results in the trip of the "A" RFPT "A" and a Recirculation runback. The crew stabilizes the plant and the PCO resets the runback.
5	Key 7	C (BOP)	A loss of the running CRD pump results in a loss of CRD. The PCO starts the standby pump IAW the off-normal procedure. However, the pump subsequently trips and the complete loss of CRD results in Inoperable Accumulators (TS). The crew will assess conditions and perform a manual scram.
6	SCN_ILO-604	M (ALL)	A high power failure to scram condition (ATWS) is recognized and the crew performs the Level/Power Control EOP strategy. Actions include lowering level, bypassing isolations and overriding ECCS.
7	SCN_ILO-604		Failure of SLC with the concurrent loss of CRD results in further plant degradation during the ATWS. The crew will direct alternate boron injection.
8	Key 8	C (ALL)	Once RPV level is intentionally lowered, the Main Turbine trips and a concurrent loss of the Auxiliary Busses results in a loss of Condensate and Feedwater, Service Water and the Condenser. ESW will be started and cooling water will be transferred to ESW. Level and pressure control will transition to RCIC and SRVs.
9	Keys 9,19	I (BOP)	A controller failure requires RCIC in manual and initially can control level. RCIC trips a few minutes later due speed control failure and the crew recognizes that RPV cannot be maintained above TAF.
10	Keys 10,11,12	M (ALL)	When level reaches TAF, the crew performs a Rapid Depressurization to inject and control level with LPCI in the ATWS. CRD is restored and the crew will be successful in inserting control rods. The crew will address containment and place Supp Pool Cooling in service.

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

Facility: SSESScenario No.: ILO-503AOp-Test No.: LOC-22 NRCExaminers: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Initial Conditions: Unit 1 startup at 70 percent power. Rod Sequence is A2/SU step 566. Unit 2 is at 100%.Turnover: Power ascension on hold while Reactor Engineering evaluates thermal limits. 1B Instrument Air compressor is OOS for rebuild. 'E' and 'R' SRV tailpipe temperatures are elevated.

Event No.	Malf. No.	Event Type*	Event Description
1	Key 1	C (SRO) C (RO) C (BOP)	The scenario begins with a loss of 1A RPS Bus. The crew responds to the RPS power loss. The BOP performs the off-normal procedure including restoring cooling water to the RRP. The RO resets the scram and the crew recognizes the failure of RWCU to isolate. The RO will manually shutdown and isolate the system. The SRO addresses the Tech Specs associated with the isolation failure. (TS)
2	Keys 2,3,4	C (SRO) C (RO)	Control rod 30-47 drifts out and the crew responds to the reactivity event and inserts the control rod to full-in using off-normal procedure. The SRO addresses the Tech Specs and directs the HCU hydraulically disarmed. (TS)
3	Key 5		The lower seal on the "B" Reactor Recirc pump (RRP) fails and the crew responds to the alarms and seal indications.
4	Keys 6,7	C (ALL) R (RO)	A short time later, the upper seal on the "B" RRP fails which requires the crew to enter the off-normal for Dual Seal Failure. The RO reduces power with control rods, then the crew (RO/BOP) will shutdown and isolate the RRP. The SRO addresses Tech Specs and single loop operation. (TS)
5	Keys 7, 10	M (ALL)	A small leak initially develops requiring crew to address rising drywell pressure and subsequent manual scram. The leak continues to worsen into a small LOCA inside Drywell.
6	SCN_ ILO- 503A	C (BOP)	Following the scram, high pressure injection is required to control RPV level. A HPCI auto start failure is recognized by the BOP operator and HPCI is manually started to control level. HPCI subsequently trips and level lowers. RCIC and CRD are also available for injection.
7	SCN_ ILO- 503A	C (BOP)	On the high drywell pressure, the 'C' Diesel Generator fails to start and is manually started from the Control Room to restore a 4KV ESS Bus.
8	Key 8	M (ALL)	When RPV level is controlled above, a Loss of Offsite Power and a Plant Aux Load Shed results in a loss of Condensate and Feedwater.
9	Key 9		1A and 1C ESS 4KV Bus Lockouts prevent the diesels from loading onto the buses and reduced low pressure ECCS capability. This complicates level restoration and level lowers.

10	SCN_ ILO- 503A	C (BOP) M (ALL)	As level lowers, the crew recognizes ADS logic failed and the BOP will manually initiate ADS. The crew must perform a Rapid Depressurization when RPV level reaches TAF.
11	SCN_ ILO- 503A	M (ALL)	Following the depressurization, level will become indeterminate and the crew must perform RPV Flooding. The crew will address containment concerns once ACC is assured.

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



Facility: **SSES**Scenario No.: **ILO-502A**Op-Test No.: **LOC-22 NRC**Examiners: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Initial Conditions: Unit 1 is at 48% power and Startup Bus 10 is currently supplied from Startup Bus 20 through the Tie Breaker. Unit 2 is at 100% power.

Turnover: Restore electric plant lineup to normal by transferring Startup Bus 10 to Startup Transformer 10. Do not transfer 4KV Buses back to normal lineup until Maintenance verifies T-10 operation.

Event No.	Malf. No.	Event Type*	Event Description
1	Key 9	I (SRO) I(RO)	The scenario begins with an APRM instrument failure. The RO determines that a critical self-test fault caused an INOP trip. The SRO addresses the Tech Specs and the RO bypasses the failed APRM. (TS)
2	Key 10	C (BOP)	As the crew prepares for the electric plant lineup, a trip of the running EHC pump occurs. The crew must recognize the standby pump failed to start and the BOP must manually start the standby EHC pump.
3		N (ALL)	IAW turnover, the crew continues with a normal post-maintenance restoration of Startup Bus 10 back to the Startup Transformer T-10.
4		R (RO)	With the plant now stabilized, the crew continues power ascension and raises reactor power by withdrawing control rods.
5	Keys 1,2	C (SRO) C (ALL)	A failure of the Inverter to 1D125 (supplies Instrument Bus 1Y125) is recognized by the loss of post-accident monitoring instrumentation. The crew responds to the loss of instruments using the off-normal procedures. The SRO determines affected instruments and Tech Specs. The BOP will transfer the instruments to alternate power using the off-normal procedure. (TS)
6	Key 3	I (SRO)	A Steam Leak Detection instrument failure results in a HPCI Isolation. The crew will respond to the alarms and verify the instrument malfunction and not a steam leak. The SRO determines the Tech Specs and HPCI is unavailable, a setup for the major transient to follow. (TS)
7	Keys 4,5	C (ALL)	An unisolable leak on the Instrument Air header requires the crew to enter and perform off-normal procedure actions. This malfunction will require the crew to perform scram imminent actions and the crew will manually scram the reactor. The loss of instrument air will result in a loss of feedwater and MSIV closure. The crew will start ESW and closed cooling water to ESW. The crew will transition level and pressure control to HPCI, RCIC and SRVs.
8	Keys 6,7	M (ALL)	After the scram, a small break LOCA on a recirc line will require the crew to control RPV level and degraded containment conditions will require containment sprays. Once the BOP sprays the Supp Chamber, the leak worsens and RPV level lowers. Crew aligns remaining high pressure injection to maintain level.
9	SCN_ ILO- 502A	I (ALL)	As level lowers, the crew recognizes that ADS logic has failed. When level lowers to TAF, the crew will perform a Rapid Depressurization and the BOP will manually open ADS valves.

10	SCN_ ILO- 502A	C (ALL)	As pressure lowers with the rapid depressurization, the crew will align low pressure injection sources. The "B" LPCI Injection Valve HV-F015B will fail to open and must be manually aligned for injection. The crew will control RPV level with low pressure ECCS.
11	Key 8	M (ALL)	The high drywell temperature with the lowering reactor pressure will result in violating the Saturation Limit curve and RPV level will become indeterminate. The crew will enter RPV Flooding and raise injection to flood to the Main Steam Lines.

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

Facility: SSESScenario No.: ILO-402Op-Test No.: LOC-22 NRCExaminers: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Initial Conditions: Unit 1 is at 50% EOL, A2 Startup Sequence Step 483. Unit 2 is at 100% power.Turnover: Reactor startup in progress. Power ascension is suspended while BOP equipment is placed in service. Place the 1C RFP in service IAW GO-100-002 step 5.78. Continue with rod withdrawal to 75% power.

Event No.	Malf. No.	Event Type*	Event Description
1	Key 10	C (BOP)	Scenario begins with a trip of the 1B Service Water (SW) pump. At this power level, the crew recognizes that two SW pumps are required and the BOP must manually start the 1C SW pump. A circuit failure will prevent the autostart on low pressure so if the crew waits, a low header pressure condition will result.
2	Key 7	<del>I (SRO)</del>	A few minutes later, a power failure to the Seismic Monitoring Panel occurs. The crew responds to the alarms and breaker trip and the SRO addresses the Tech Specs. (TS)
3		N (ALL)	In support of power ascension, the crew starts the 1C Reactor Feedpump.
4		N (ALL) R (RO)	Once in a three feedpump alignment, the crew will raise power by withdrawing control rods.
5	SCN_ ILO-402	C (SRO) C (RO)	RO will recognize and report control rod 42-35 fails to move and the crew enters the off-normal procedure for stuck control rod. The RO will perform ON actions and after drive pressure is raised, the control rod will move. The SRO will address Tech Specs for the control rod. (TS)
6	Key 2	I (SRO) I (BOP)	A transmitter failure will result in a loss of extraction steam to 3B Feedwater Heater. The crew will take actions in the off-normal procedure and manually isolate the feedwater heaters. The crew will stabilize the plant and the SRO will address the Tech Specs, thermal limits and isolating the FW string within 2 hrs.
7	Key 3	C (SRO) C (RO)	Both Reactor Recirc pumps will trip. The RO will recognize and report the condition and immediately place the Mode Switch to Shutdown.
8	SCN_ ILO-402	C (ALL)	The crew will respond to the manual scram. On the scram, all Condensate pumps will trip due to a Plant Aux Bus Load Shed circuit failure. The resulting loss of feedwater will require the BOP to take level control and start RCIC and maximize CRD.
9	Key 4	M (ALL)	An instrument line break inside the drywell results in rising drywell pressure and temperature. Degrading primary containment conditions will require EO-103 entry and the crew will perform containment sprays.

10	SCN_ ILO-402	C (BOP)	HPCI will fail to start on 1.72 psig and the BOP operator must start HPCI component by component to maintain reactor level.
11	Keys 5,6	M (ALL) C (ALL)	Primary containment conditions degrade and the crew will spray the containment. When sprays are initiated, the RHR suction line from the suppression pool breaks resulting in Reactor Building flooding and EOP entry. The crew will manually isolate the RHR loop and then lineup and spray the Drywell with the other RHR loop.

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

Facility: **SSES**Scenario No.: **ILO-302A**Op-Test No.: **LOC-22 NRC**Examiners: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Initial Conditions: Unit 1 is at 74 percent power EOL. Unit 2 is in Mode 4.

Turnover: No Surveillance activities are planned or due during the shift. 1B CRD Pump is OOS for breaker maintenance this shift. The Suppression Chamber is being vented using the 'A' SGTS Train. The 1B Condensate Pump has a possible ground and will be shutdown for inspection after shift turnover.

Event No.	Malf. No.	Event Type*	Event Description
1	Key 1	C (SRO) C (BOP)	The scenario begins with the Suppression Chamber vented using the "A" SGTS fan which will trip once the crew has the shift. The crew will recognize and report the alarms and assess the condition. The BOP must secure the Vent lineup using OP-173-001. The SRO will address Tech Specs for the SGTS fan failure. (TS)
2		N (ALL)	Per the turnover, the crew will perform a normal shutdown of the "1B" Condensate Pump for maintenance.
3	SCN_ ILO- 302A	I (BOP)	When the pump is stopped, the crew will recognize and report abnormal condensate pump motor amps and system operating pressures. The crew will discover the Condensate Min Flow Recirc Valve is failed partially open. The BOP will be able to take the controller to manual and close the valve.
4	Key 2	I (SRO) I (RO)	The "A" NR Level instrument fails upscale and causes a level transient. The crew will respond to the failure using the Off Normal procedure. The RO will take manual FWLC and raise level (affects reactivity). When level is above 30 inches, the RO will select the alternate level instrument and restore system to auto. This instrument is a turbine trip logic input and the SRO will address Tech Specs. (TS)
5	Key 3	C(ALL) R (RO)	Turbine Building radiation alarms will indicate the start of fuel clad failure. The crew will recognize and report rising MSL and Offgas radiation levels. The crew will perform a controlled power reduction to stabilize rad levels. Radiation levels will rise and the crew will perform a manual scram.
6	SCN_ ILO- 302A	I (BOP) C (RO)	When the reactor is scrammed, rods will fail to insert (ATWS) due to a RPS "A" failure and the crew will operate manual pushbuttons and ARI. This will be successful and all control rods will insert. The crew will stabilize the plant. The Startup Level Control Valve (LV-10641) will fail closed and the RO must control level with the (LV-10640).
7	Key 4	C (ALL)	MSL radiation levels will continue to rise and the SRO will direct the MSIVs manually closed. The "D" MSL will failure to isolate and the crew will recognize and report the condition. The crew will continue to perform EOP actions to control level and pressure. The fuel failure will also cause high radiation conditions in the Reactor Building, requiring Secondary Containment Control actions.

8	SCN_ ILO- 302A	M (ALL)	With the unisolated MSL, a steam leak develops in the Turbine Building resulting in a rad release. The crew will determine that an unmonitored release is in-progress and continue RPV Control actions. The radioactivity release will exceed the ALERT level and the crew must take actions per EO-105 to include dose assessment and a cooldown.
9	SCN_ ILO- 302A	M (ALL)	The release will continue and the dose assessment report will reach the GE level. The SRO will determine that a Rapid Depressurization is required to stop the release. The crew performs a Rapid Depressurization and continues to control RPV level and address primary containment. The crew will initiate suppression pool cooling.

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