

Facility: South Texas Project - Rev 1

Printed: 10/24/2007

Date Of Exam: 11/02/2007

Tier	Group	RO K/A Category Points											SRO-Only Points					
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18	0	0	0	
	2	1	2	2	N/A			2	2	N/A			0	9	0	0	0	
	Tier Totals	4	5	5	N/A			5	5	N/A			3	27	0	0	0	
2. Plant Systems	1	3	2	3	3	3	2	2	3	2	3	2	28	0	0	0		
	2	1	1	1	1	1	1	1	1	1	0	1	10	0	0	0		
	Tier Totals	4	3	4	4	4	3	3	4	3	3	3	38	0	0	0		
3. Generic Knowledge And Abilities Categories				1		2		3		4		10		1	2	3	4	0
				3		2		2		3				0	0	0	0	

Note:

1. Ensure that at least two topics from every 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 ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
- 7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

PWR RO Examination Outline

Printed: 10/24/2007

Facility: South Texas Project - Rev 1

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000007 Reactor Trip - Stabilization - Recovery / 1		X					EK2.02 - Breakers, relays and disconnects	2.6	1
000008 Pressurizer Vapor Space Accident / 3						X	2.4.24 - Knowledge of loss of cooling water procedures.	3.3	1
000009 Small Break LOCA / 3	X						EK1.02 - Use of steam tables	3.5	1
000011 Large Break LOCA / 3			X				EK3.14 - RCP tripping requirement	4.1	1
000015/000017 RCP Malfunctions / 4					X		AA2.09 - When to secure RCPs on high stator temperatures	3.4	1
000022 Loss of Rx Coolant Makeup / 2				X			AA1.06 - CVCS charging pump ammeters and running indicators	2.9	1
000025 Loss of RHR System / 4					X		AA2.01 - Proper amperage of running LPI/decay heat removal/RHR pump(s)	2.7	1
000026 Loss of Component Cooling Water / 8						X	2.4.10 - Knowledge of annunciator response procedures.	3.0	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 - Controllers and positioners	2.6	1
000029 ATWS / 1					X		EA2.07 - Reactor trip breaker indicating lights	4.2	1
000038 Steam Gen. Tube Rupture / 3	X						EK1.04 - Reflux boiling	3.1*	1
000040 Steam Line Rupture - Excessive Heat Transfer / 4		X					AK2.01 - Valves	2.6*	1
000054 Loss of Main Feedwater / 4			X				AK3.02 - Matching of feedwater and steam flows	3.4*	1
000055 Station Blackout / 6						X	2.4.48 - Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.5	1
000058 Loss of DC Power / 6			X				AK3.01 - Use of dc control power by ED/Gs	3.4*	1
000062 Loss of Nuclear Svc Water / 4				X			AA1.06 - Control of flow rates to components cooled by the SWS	2.9	1
000065 Loss of Instrument Air / 8				X			AA1.02 - Components served by instrument air to minimize drain on system	2.6	1
W/E04 LOCA Outside Containment / 3	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with LOCA Outside Containment	3.5	1
K/A Category Totals:	3	3	3	3	3	3		Group Point Total:	18

PWR RO Examination Outline

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Facility: South Texas Project - Rev 1

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1	X						AK1.05 - Calculation of minimum shutdown margin	3.3	1
000051 Loss of Condenser Vacuum / 4					X		AA2.02 - Conditions requiring reactor and/or turbine trip	3.9	1
000059 Accidental Liquid RadWaste Rel. / 9				X			AA1.01 - Radioactive-liquid monitor	3.5	1
000068 Control Room Evac. / 8					X		AA2.11 - Indications of natural circulation	4.3	1
000076 High Reactor Coolant Activity / 9			X				AK3.06 - Actions contained in EOP for high reactor coolant activity	3.2	1
W/E03 LOCA Cooldown - Depress. / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.6	1
W/E06 Inad. Core Cooling / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.6	1
W/E08 RCS Overcooling - PTS / 4			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with Pressurized Thermal Shock	3.6	1
W/E13 Steam Generator Over-pressure / 4				X			EA1.3 - Desired operating results during abnormal and emergency situations	3.1	1
K/A Category Totals:	1	2	2	2	2	0	Group Point Total:	9	

PWR RO Examination Outline

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Facility: South Texas Project - Rev 1

ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
003 Reactor Coolant Pump							X					A1.07 - RCS temperature and pressure	3.4*	1
004 Chemical and Volume Control						X						K6.27 - Purpose of RHR relief and isolation valves	3.4	1
004 Chemical and Volume Control								X				A2.11 - Loss of IAS	3.6	1
005 Residual Heat Removal	X											K1.08 - SWS	2.7	1
006 Emergency Core Cooling	X											K1.13 - CSS	3.3*	1
006 Emergency Core Cooling					X							K5.04 - Brittle fracture, including causes and preventative actions	2.9	1
007 Pressurizer Relief/Quench Tank								X				A2.05 - Exceeding PRT high-pressure limits	3.2	1
007 Pressurizer Relief/Quench Tank										X		A4.01 - PRT spray supply valve	2.7*	1
008 Component Cooling Water				X								K4.02 - Operation of the surge tank, including the associated valves and controls	2.9	1
008 Component Cooling Water										X		A4.08 - CCW pump control switch	3.1*	1
010 Pressurizer Pressure Control								X				A2.02 - Spray valve failures	3.9	1
012 Reactor Protection			X									K3.01 - CRDS	3.9	1
013 Engineered Safety Features Actuation		X										K2.01 - ESFAS/safeguards equipment control	3.6*	1
022 Containment Cooling							X					A1.02 - Containment pressure	3.6	1
026 Containment Spray			X									K3.01 - CCS	3.9	1
039 Main and Reheat Steam					X							K5.05 - Bases for RCS cooldown limits	2.7	1
059 Main Feedwater				X								K4.19 - Automatic feedwater isolation of MFW	3.2	1
061 Auxiliary/Emergency Feedwater		X										K2.01 - AFW system MOVs	3.2*	1
062 AC Electrical Distribution											X	2.1.20 - Ability to execute procedure steps.	4.3	1
063 DC Electrical Distribution	X											K1.02 - AC electrical system	2.7	1
064 Emergency Diesel Generator						X						K6.08 - Fuel oil storage tanks	3.2	1
064 Emergency Diesel Generator										X		A4.01 - Local and remote operation of the ED/G	4.0	1
073 Process Radiation Monitoring					X							K5.03 - Relationship between radiation intensity and exposure limits	2.9*	1
076 Service Water											X	2.1.30 - Ability to locate and operate components, including local controls.	3.9	1

PWR RO Examination Outline

Printed: 10/24/2007

Facility: South Texas Project - Rev 1

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
076 Service Water				X								K4.06 - Service water train separation	2.8	1
078 Instrument Air									X			A3.01 - Air pressure	3.1	1
103 Containment									X			A3.01 - Containment isolation	3.9	1
103 Containment			X									K3.03 - Loss of containment integrity under refueling operations	3.7	1
K/A Category Totals:	3	2	3	3	3	2	2	3	2	3	2	Group Point Total: 28		

PWR RO Examination Outline

Printed: 10/24/2007

Facility: South Texas Project - Rev 1

ES - 401

Plant Systems - Tier 2 / Group 2

Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
001 Control Rod Drive								X				A2.06 - Effects of transient xenon on reactivity	3.4	1
011 Pressurizer Level Control						X						K6.04 - Operation of PZR level controllers	3.1	1
015 Nuclear Instrumentation									X			A3.03 - Verification of proper functioning/operability	3.9	1
017 In-core Temperature Monitor					X							K5.02 - Saturation and subcooling of water	3.7	1
028 Hydrogen Recombiner and Purge Control		X										K2.01 - Hydrogen recombiners	2.5*	1
033 Spent Fuel Pool Cooling											X	2.4.10 - Knowledge of annunciator response procedures.	3.0	1
035 Steam Generator							X					A1.02 - S/G pressure	3.5	1
045 Main Turbine Generator			X									K3.01 - Remainder of the plant	2.9	1
068 Liquid Radwaste	X											K1.02 - Waste gas vent header	2.5	1
079 Station Air				X								K4.01 - Cross-connect with IAS	2.9	1
K/A Category Totals:	1	0	1	Group Point Total: 10										

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

Printed: 10/24/2007

Facility: South Texas Project - Rev 1

Form ES-401-3

<u>Generic Category</u>	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
Conduct of Operations	2.1.3	Knowledge of shift turnover practices.	3.0	1
	2.1.14	Knowledge of system status criteria which require the notification of plant personnel.	2.5	1
	2.1.20	Ability to execute procedure steps.	4.3	1
	Category Total:			3
Equipment Control	2.2.4	(multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.	2.8	1
	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1
	Category Total:			2
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6	1
	2.3.2	Knowledge of facility ALARA program.	2.5	1
	Category Total:			2
Emergency Procedures/Plan	2.4.18	Knowledge of the specific bases for EOPs.	2.7	1
	2.4.25	Knowledge of fire protection procedures.	2.9	1
	2.4.35	Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.3	1
	Category Total:			3

Generic Total: 10

Facility: South Texas Project

Printed: 05/03/2007

Date Of Exam: 11/02/2007

Tier	Group	RO K/A Category Points											SRO-Only Points					
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total		
1. Emergency & Abnormal Plant Evolutions	1	0	0	0	N/A			0	0	N/A			0	0	4	2	6	
	2	0	0	0				0	0				0	0	3	1	4	
	Tier Totals	0	0	0				0	0				0	0	0	7	3	10
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	3	2	5		
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	6	2	8		
3. Generic Knowledge And Abilities Categories				1		2		3		4		0		1	2	3	4	7
				0		0		0		0				2	2	1	2	

Note:

1. Ensure that at least two topics from every 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 ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
- 7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

PWR SRO Examination Outline

Printed: 05/03/2007

Facility: South Texas Project

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000025 Loss of RHR System / 4					X		AA2.02 - Leakage of reactor coolant from RHR into closed cooling water system or into reactor building atmosphere	3.8	1
000027 Pressurizer Pressure Control System Malfunction / 3						X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	3.7	1
000038 Steam Gen. Tube Rupture / 3					X		EA2.05 - Causes and consequences of shrink and swell in S/Gs	2.9	1
000054 Loss of Main Feedwater / 4					X		AA2.07 - Reactor trip first-out panel indicator	3.9	1
000065 Loss of Instrument Air / 8						X	2.4.48 - Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.8	1
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4					X		EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.0	1
K/A Category Totals:	0	0	0	0	4	2	Group Point Total:	6	

PWR SRO Examination Outline

Printed: 05/03/2007

Facility: South Texas Project

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
000001 Continuous Rod Withdrawal / 1					X		AA2.03 - Proper actions to be taken if automatic safety functions have not taken place	4.8	1
000033 Loss of Intermediate Range NI / 7						X	2.2.23 - Ability to track limiting conditions for operations.	3.8	1
000068 Control Room Evac. / 8					X		AA2.03 - T-hot, T-cold, and in-core temperatures	4.2	1
W/E03 LOCA Cooldown - Depress. / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.1	1
K/A Category Totals:	0	0	0	0	3	1	Group Point Total:	4	

PWR SRO Examination Outline

Printed: 05/03/2007

Facility: South Texas Project

ES - 401 Plant Systems - Tier 2 / Group 1 Form ES-401-2

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
005 Residual Heat Removal											X	2.4.11 - Knowledge of abnormal condition procedures.	3.6	1
010 Pressurizer Pressure Control								X				A2.01 - Heater failures	3.6	1
061 Auxiliary/Emergency Feedwater								X				A2.04 - pump failure or improper operation	3.8	1
076 Service Water								X				A2.01 - Loss of SWS	3.7*	1
103 Containment											X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
K/A Category Totals:	0	3	0	0	2	Group Point Total:		5						

PWR SRO Examination Outline

Printed: 05/03/2007

Facility: South Texas Project

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
014 Rod Position Indication								X				A2.04 - Misaligned rod	3.9	1
017 In-core Temperature Monitor								X				A2.02 - Core damage	4.1	1
041 Steam Dump/Turbine Bypass Control								X				A2.03 - Loss of IAS	3.1	1
K/A Category Totals:	0	3	0	0	0	Group Point Total:	3							

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Printed: 05/03/2007

Facility: South Texas Project

Form ES-401-3

<u>Generic Category</u>	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
Conduct of Operations	2.1.4	Knowledge of shift staffing requirements.	3.4	1
	2.1.12	Ability to apply technical specifications for a system.	4.0	1
	Category Total:			2
Equipment Control	2.2.6	Knowledge of the process for making changes in procedures as described in the safety analysis report.	3.3	1
	2.2.27	Knowledge of the refueling process.	3.5	1
	Category Total:			2
Radiation Control	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
	Category Total:			1
Emergency Procedures/Plan	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
	2.4.44	Knowledge of emergency plan protective action recommendations.	4.0	1
	Category Total:			2
Generic Total:				7

ES-401

Record of Rejected K/As

Form ES-401-4

Tier/ Group	Randomly Selected K/A	Reason For Rejection
RO		
1/1	APE 026 AK3.01	STP does not have automatic valves for this function
1/1	EPE W/E04 EK1.1	After spending considerable time while drafting the outline, we were unable to formulate a question representative of the RO level that would be psychometrically valid and fulfill the requirements of the KA.
1/1	EPE W/E05 2.4.46	There are no annunciators indicative of a Loss of Secondary Heat Sink event.
1/2	APE 003 AK3.03	STP does not have an auto turbine runback
1/2	EPE W/E09 EK3.2	Oversampling of natural circulation topic
1/2	APE 067 AK1.02	Fire classifications are part of General Employee Training and are not indicative of the RO level of knowledge (question would not be discriminatory).
2/1	022 K4.02	STP does not have variable speed fans
2/1	022 K4.01	STP does not use penetration cooling
2/2	041 K2.02	STP does not have an Integrated Control System
3	G2.1.11	Could not formulate an RO level question - RO's are only required to be knowledgeable of Tech Spec entry conditions
SRO		
1/1	APE 008 AA2.09	STP does not have PZR spray block valves
1/2	EPE W/E09 EA2.2	Oversampling of natural circulation topic
1/2	APE 032 AA2.07	Taking logs and interpreting data to ensure compliance with channel check requirements is an RO function at STP.
3	2.3.2	Unable to formulate SRO level question - non specific SRO duties/responsibilities

STP November '07 Written Exam Outline Generation

- The South Texas Project used a software product called “PWR KA Catalog” (version 9.1.2) to generate the Reactor Operator and Senior Reactor Operator written exam outlines. This software was developed by WD Associates and is distributed through the PWR Owners Group.
- In discussion with Paul Hippley, the PWR Owners Group representative for this software, he confirmed the software does fulfill the criteria for randomly and systematically selecting KAs for the written exam outline in accordance with NUREG 1021, ES-401. For example, the program will:
 - Ensure all systems are selected for use on the outline before selecting a system again.
 - Generate a replacement KA (if a KA is rejected) using the same systematic and random sampling process, thus ensuring all systems are selected at least once before a system is selected again.

Refer to Form ES-401-4 for a summary of rejected KAs.

KAs pre-screened prior to outline generation consisted of:

- All KAs associated with system 025, Ice Condenser System (STP's containment does not have an ice condenser)
- All KAs with an importance less than 2.5

Facility: South Texas Project

Date of Examination: 11/5/2007

Examination Level (circle one): **RO** SRO

Operating Test Number: 1 (NRC)

Administrative Topic (see Note)	Type Code*	Describe activity to be performed:
(A1) Conduct of Operations	D, R	VERIFY FAULTED RCS INVENTORY K/A 2.1.18 (2.9) Ability to make accurate, clear and concise logs, records, status boards, and reports
(A2) Conduct of Operations	N, R	DETERMINE DILUTION REQUIRED FOR POWER INCREASE K/A 2.1.7 (3.7) Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation
(A3) Equipment Control	D, R	WRITE ECO FOR A CL-ACW PUMP K/A 2.2.13 (3.6) Knowledge of tagging and clearance procedures
(A4) Radiation Control	N, R	CALCULATE MAXIMUM STAY TIME K/A 2.3.1 (2.6) Knowledge of 10CFR20 and related facility radiation control requirements
Emergency Plan	NA	NA

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

***Type Codes and Criteria:** (C)ontrol Room; (S)imulator; 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: <u>South Texas Project</u>		Date of Examination: 11/5/2007
Examination Level (circle one): RO / SRO		Operating Test Number: 1 (NRC)
Administrative Topic (see Note)	Type Code*	Describe activity to be performed:
(A5) Conduct of Operations	D, R	DETERMINE TS ACTION FOR ABNORMAL RCS ACTIVITY K/A 2.1.12 (4.0) Ability to apply technical specifications for a system
(A6) Conduct of Operations	D, R	REVIEW OPERATOR LOGS K/A 2.1.3 (3.4) Knowledge of shift turnover practices
(A7) Equipment Control	D, R	REVIEW A SUSPENDED SURVEILLANCE K/A 2.2.12 (3.4) Knowledge of surveillance procedures
(A4) Radiation Control	N, R	CALCULATE MAXIMUM STAY TIME K/A 2.3.1 (3.0) Knowledge of 10CFR20 and related facility radiation control requirements
(A8) Emergency Plan	N, R	APPROVE OFFSITE NOTIFICATION K/A 2.4.38 (4.0) Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.		
*Type Codes and Criteria: (C)ontrol Room; (S)imulator; 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

Control Room/In-Plant Systems Outline

Form ES-301-2

Facility: <u>South Texas Project</u>		Date of Examination: <u>11/05/2007</u>
Exam Level (circle one): <u>RO</u> / SRO(I) / SRO(U)		Operating Test No.: 1 (LOT 16 NRC)
Control Room Systems [@] (8 for RO; 7 for SROI; 2 or 3 for SROU, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
(S1) RESPOND TO CCW LEAK (LEAK OCCURS WHILE SHIFTING PUMPS)	S,A,N	VIII
(S2) TRANSFER MFW CONTROL TO MFW REG. VALVES	S,D	IV - S
(S3) RESTORE OFFSITE POWER TO ESF BUSES	S,D	VI
(S4) RE-ESTABLISH RCP SEAL INJECTION	S,A,M	II
(S5) REACTOR MAKEUP SYSTEM FAILURE	S,A,M	I
(S6) RESPOND TO A CONTAINMENT RAD MONITOR ALARM (RT-8012) (ESF SYSTEM)	S,A,D	VII
(C1) TRANSFER TO HOT LEG RECIRC	C,L,D	III
(C2) PLACE H ₂ RECOMBINER IN SERVICE (RO ONLY)	C,L,D	V
In-Plant Systems [@] (3 for RO; 3 for SROI; 3 or 2 for SROU)		
(P1) LOCALLY VERIFY CONTAINMENT ISOLATION PHASE B	R,D,L,E	V
(P2) PLACE 1E BATTERY CHARGER IN SERVICE	A,D	VI
(P3) LOCALLY OPERATE SG PORV	D,L,E	IV - S
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SROU 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	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(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		

NOTE: The following simulator JPMs are designed to be done concurrent: S1&S2; S3&S4; S5&S6

ES-301

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

Facility: <u>South Texas Project</u>		Date of Examination: <u>11/05/2007</u>
Exam Level (circle one): RO / SRO(I) / SRO(U)		Operating Test No.: 1 (LOT 16 NRC)
Control Room Systems [@] (8 for RO; 7 for SROI; 2 or 3 for SROU, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
(S5) REACTOR MAKEUP SYSTEM FAILURE	S,A,M	I
(S6) RESPOND TO A CONTAINMENT RAD MONITOR ALARM (RT-8012) (ESF SYSTEM)	S,A,D	VII
In-Plant Systems [@] (3 for RO; 3 for SROI; 3 or 2 for SROU)		
(P1) LOCALLY VERIFY CONTAINMENT ISOLATION PHASE B	R,D,L,E	V
(P2) PLACE 1E BATTERY CHARGER IN SERVICE	A,D	VI
(P3) LOCALLY OPERATE SG PORV	D,L,E	IV - S
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SROU 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	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(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		

NOTE: The following simulator JPMs are designed to be done concurrent: S5&S6

Facility: STP

NRC Exam Scenario No.: 1

Op-Test No.: 1

Source:

New X Bank - Significantly Modified _____ Bank - Initial Condition Change _____

Initial Conditions: 30% power, BOL, RCS boron at 1664 ppmB.

Turnover: Performing a plant startup following a maintenance outage. Maintain current power until CWP #14 has been started. AFWP #11 OOS for maintenance.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	BOP (N) SRO (N)	Start Circulating Water Pump (CWP) #14
2 (7 min)	02-20-01 (1.0)	RO (I) SRO (I)	PZR level controlling channel LT-465 fails high - after #14 CWP started – integral to scenario (actuated from Green light on #14 CWP discharge valve going out indicating the valve is full open).
3 (25 min)	05-22-01 (0)	BOP (I) SRO (I)	1A Steam Generator controlling pressure channel (PT-0514) fails low – after TS consulted for Pzr level channel failure or 12 minutes
4 (40 min)	05-03-02 (0.1)	ALL (M)	1B Steam Generator Tube Leak/Rupture (5 min. ramp) – after TS consulted for Steam Pressure Channel failure or after 14 minutes
5 (N/A)	01-12-02 (True)	RO (C) BOP (C) SRO (C)	ATWS (failure of auto and manual reactor trip) becomes apparent when Reactor trip required on SGTR.
6 (N/A)	05-16-01 (True)	BOP (C) SRO (C)	Steam Dump Valves fail to open during cooldown for SGTR - integral to scenario, will occur when Steam Pressure mode is selected
7 (~60 min)	01-35-02 (True)	RO (C) SRO (C)	Intermediate Range Channel N36 failure of compensating voltage - integral to scenario, will be apparent approx. 15 minutes after reactor trip

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

Facility: STP

NRC Exam Scenario No.: Backup

Op-Test No.: 1

Source:

New Bank - Significantly Modified Bank - Initial Condition Change

Initial Conditions: 73% power at BOL, 1469 ppmB. Power reduction in progress for turbine blade inspection. FWBP # 11 and "B" Train HHSI, LHSI, CCW Pumps OOS for motor maintenance.

Turnover: 73% power, shutdown in progress. Currently at step 5.12 of 0POP03-ZG-0006.

Event No.	Malf. No.	Event Type*	Event Description
1 (1 min)	NA	RO (R) BOP (R) SRO (R)	Power Reduction
2 (3-5 min)	03-17-02 (True)	RO (C) SRO (C)	Boric Acid Pump 'B' trips during first boration of the power reduction – (within approximately 5 minutes of starting power reduction) – integral to scenario.
3 (15 min)	10-09-03 (True)	RO (C) BOP (C) SRO (C)	Loss of Standby Bus 1H – after TRM consulted for BA Pump failure and cue from examiner for load reduction.
4 (35 min)	05-17-01 (1.0)	BOP (I) SRO (I)	1A SG PORV Pressure Transmitter PT-7411 fails high – after crew transitions to 0POP04-AE-0003, or after 15 min.
5 (45 min)	03-23-05 (0.129/0.4)	RO (C) SRO (C)	RCP 1C #1 seal leakage ramped in over 3 min. then increased in severity after 7 min – after T.S. addressed for SG PORV Transmitter or after 10 minutes
6 (60 Min)	02-01-01 (0.0009)	All (M)	SBLOCA – occurs at step 6 of ES01
7 (NA)	Remote L2-60 (True)	BOP (C) SRO (C) RO (C)	Failure of ESF DG # 13 to load - integral to scenario, will occur following SBLOCA on re-sequence

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

NRC Scenario 1 Description

The plant is initially at 30% power. After the crew takes the watch they will start a Circulating Water Pump. Shortly after this normal evolution is completed, a Pressurizer level channel fails high requiring the crew to take manual control of Pressurizer Level Control to re-establish inventory control in the RCS. Once the Pressurizer level channel failure is mitigated, a SG pressure channel on SG 1A fails low. This will result in a loss of automatic level control on 1A SG requiring manual operator action to prevent a plant trip. Once the 1A SG level control is returned to automatic, a SGTR will occur in 1B SG. The crew will initially address the malfunction as a leak, but will reach a point that a reactor trip and safety injection will be necessary. The reactor will fail to trip automatically or manually. The crew will enter the ATWS procedure to effect a reactor trip/shutdown. Later, while performing actions in the Emergency Operating procedures, Intermediate Range Channel N36 will have a compensating voltage failure that will prevent the Source Ranges from energizing automatically following the reactor trip. The operator will have to manually energize the Source Ranges. During the cooldown following the SGTR, a failure of the Steam Dumps will occur that requires the crew to use the SG PORV's for cooldown. The scenario will be terminated once the target cooldown temperature is reached and RCS depressurization is completed.

The EOP procedures invoked will include:

- 0POP05-EO-EO00, Reactor Trip or Safety Injection
- 0POP05-EO-FRS1, Response to Nuclear Power Generation - ATWS
- 0POP05-EO-EO30, SGTR

Critical Tasks:

1. Manually control SG level such that a manual or automatic reactor trip is not necessary.
2. Properly select and maintain target temperature for cooldown based on the chart provided in EO30.

Scenario Source: New

NRC Scenario 2 Description

The plant is initially at 60% power with power escalation on hold until Condensate Pumps are shifted which will be the first activity the crew performs once they take the watch. Following this normal evolution, a loss of power to ESF 4160V Bus E1B will occur. In addition to the equipment actions that the crew will perform, they must also recognize the equipment loss represents an entry into Tech Spec 3.0.3 because a different train of equipment was out of service at the beginning of the scenario. Once the bus failure has been addressed and Tech Specs consulted, Condensate Pump 13 will trip followed by a trip of the standby Condensate Pump 45 seconds after it is started. This will require the crew to reduce turbine load to maintain Deaerator level, otherwise a manual reactor trip will be necessary. During the power reduction a control rod will drop into the core. The crew will have to place control rods in manual and use boric acid to accommodate any further power reduction. After power is reduced, a steam break then occurs on SG 1D inside containment. Following the SI condition, Essential Chiller 'A' will fail to start automatically or manually and will require manual compensatory actions for the associated HVAC. The scenario will terminate once the crew has completed performance of 0POP05-EO-EO20, Faulted SG Isolation, and 0POP05-EO-FRZ1, Response to High Containment Pressure

The EOP procedures invoked will include:

- 0POP05-EO-EO00, Reactor Trip or Safety Injection
- 0POP05-EO-FRZ1, Response to High Containment Pressure
- 0POP05-EO-EO20, Faulted SG Isolation

Critical Tasks:

- Manually reduce plant power such that a manual or automatic reactor trip is not necessary.
- Isolate the faulted SG before transition out of EO20.

Scenario Source: New

NRC Backup Scenario Description

The plant is initially at 73% power with a shutdown in progress to allow for turbine blade inspections. A normal evolution of a power reduction will begin, but Boric Acid Pump 1B will trip during the first boration. The RO will have to use an alternate pump and perform checks on the Reactor Makeup Water System to ensure its operability for use. Once this is done, 13.8 kV Standby Bus 1H will develop an electrical fault and de-energize. This will cause a loss of power to 4160v ESF bus E1C resulting in the associated ESF Diesel Generator starting and loading onto the bus. Once the crew verifies that necessary equipment has loaded and the plant is stable, the steam pressure transmitter on SG 1A controlling the 'A' SG PORV fails. This will cause the SG 'A' PORV to open resulting in a plant transient. The PORV can be manually closed. Once the 1A SG PORV is closed and TS have been consulted, a seal leak develops on RCP 'C' #1 seal. This leak will grow to the point of requiring a manual reactor trip. Once the crew leaves the EOP entry procedure, a Small Break LOCA (SBLOCA) will occur. This will result in a Safety Injection however, #13 ESF DG will fail to automatically load requiring the crew to manually load equipment, some of which is very important to plant and/or equipment operation (e.g. ECW pump for ESF DG cooling, HHSI pump otherwise only one will be in service). The scenario is terminated once the crew transitions to OPOP05-EO-ES12, Post LOCA Cooldown and Depressurization.

The EOP procedures invoked will include:

- OPOP05-EO-EO00, Reactor Trip or Safety Injection
- OPOP05-EO-ES01, Reactor Trip Response
- OPOP05-EO-EO10, Loss of Reactor or Secondary Coolant.

Critical Tasks:

- De-pressurizing SG's to less than or equal to 1000 psig within 45 minutes of a SBLOCA.
- With RCP trip criteria met (RCS pressure < 1430 psig) and only 1 HHSI pump in service, trip RCP's.

Scenario Source: New