

Facility: SONGS		Date of Exam: 10/24/2005															
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 & Abnormal Plant Evolutions	1	2	2	2				6	3				3	18	3	3	6
	2	1	2	1				2	3				0	9	2	2	4
	Tier Totals	3	4	3				8	6				3	27	5	5	10
2. Plant Systems	1	2	3	4	3	2	1	3	1	2	4	3	28	2	3	5	
	2	1	0	1	2	2	1	0	2	1	0	0	10	1	2	3	
	Tier Totals	3	3	5	5	4	2	3	3	3	4	3	38	3	5	8	
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4
					3		3		2		2			2	1	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 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: 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. 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															

ES-401	SONGS PWR Written Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1 Group 1	Form ES-401-2
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E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
007 / Reactor Trip - Stabilization - Recovery / 1	X						2.4.6	Emergency Procedures/Plan: Knowledge of symptom based EOP mitigation strategies	4.0	76
015 / 17 / RCP Malfunctions / 4	X						2.4.11	Emergency Procedures/Plan: Knowledge of abnormal condition procedures	3.6	77
022 / Loss of Rx Coolant Makeup / 2						X	AA2.01	Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: Whether charging line leak exists	3.8	78
040 / Steam Line Rupture - Excessive Heat Transfer / 4	X						2.4.16	Emergency Procedures / Plan Knowledge of EOP implementation hierarchy and coordination with other support procedures	4.0	79
056 / Loss of Off-site Power / 6						X	AA2.57	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: RCS hot-leg and cold-leg temperatures	4.1	80
057 / Loss of Vital AC Inst. Bus / 6						X	AA2.19	Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: The plant automatic actions that will occur on the loss of a vital ac electrical instrument bus	4.3	81
007 / Reactor Trip - Stabilization - Recovery / 1			X				EK2.02	Knowledge of the interrelations between a reactor trip and the following: Breakers, relays and disconnects	2.6	39
008 / Pressurizer Vapor Space Accident / 3		X					AK1.02	Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Change in leak rate with change in pressure	3.1	40
009 / Small Break LOCA / 3					X		EA1.17	Ability to operate and monitor the following as they apply to a small break LOCA: PRT	3.4	41
015 / 17 / RCP Malfunctions / 4					X		AA1.20	Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): RCP bearing temperature indicators	2.7	42
025 / Loss of RHR System / 4					X		AA1.08	Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: RHR cooler inlet and outlet temperature indicators	2.9	43
026 / Loss of Component Cooling Water / 8					X		AA1.05	Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: The CCWS surge tank, including level control and level alarms, and radiation alarm	3.1	44
027 / Pressurizer Pressure Control System Malfunction / 3						X	AA2.05	Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: PZR Heater setpoints	3.2	45
029 / ATWS / 1				X			EK3.11	Knowledge of the reasons for the following responses as the apply to the ATWS: Initiating emergency boration	4.2	46

ES-401	<p style="text-align: center;">SONGS</p> <p style="text-align: center;">PWR Written Examination Outline</p> <p style="text-align: center;">Emergency and Abnormal Plant Evolutions – Tier 1 Group 1</p>	Form ES-401-2
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E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
038 / Steam Gen. Tube Rupture / 3					X		EA1.39	Ability to operate and monitor the following as they apply to a SGTR: : Drawing SG into the RCS, using the "Feed and Bleed" method	3.6	47
040 / Steam Line Rupture - Excessive Heat Transfer / 4					X		AA1.09	Ability to operate and / or monitor the following as they apply to the Steam Line Rupture: Setpoints of main steam safety and PORVs	3.4	48
054 / Loss of Main Feedwater / 4		X					AK1.01	Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): MFW line break depressurizes the S/G (similar to a steam line break)	4.1	49
055 / Station Blackout / 6						X	EA2.05	Ability to determine or interpret the following as they apply to a Station Blackout: When battery is approaching fully discharged	3.4	50
056 / Loss of Off-site Power / 6						X	AA2.83	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Instrument air pressure gauge	2.7	51
057 / Loss of Vital AC Inst. Bus / 6	X						2.4.6	Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.	3.1	52
062 / Loss of Nuclear Svc. Water / 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.	4.0	53
065 / Loss of Instrument Air / 8	X						2.4.46	Emergency Procedures / Plan Ability to verify that alarms are consistent with plant conditions	4.3	54
E02 / Reactor Trip - Stabilization - Recovery / 1				X			EK3.2	Knowledge of the reasons for the following responses as they apply to the (Reactor Trip Recovery) Normal, abnormal and emergency operating procedures associated with (Reactor Trip Recovery).	2.8	55
E06 / Loss of Main Feedwater / 4			X				EK2.2	Knowledge of the interrelations between the (Loss of Feedwater) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.5	56
K/A Category Point Totals:	3/3	2	2	2	6	3/3	Group Point Total:			18/6

ES-401	SONGS PWR Written Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1 Group 2										Form ES-401-2
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E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
003 / Dropped Control Rod / 1	X						2.2.25	Equipment Control: Knowledge of bases in technical specifications for LCOs and safety limits	3.7	82
024 / Emergency Boration / 1	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	83
A13 / Natural Circulation / 4						X	AA2.1	Ability to determine and interpret the following as they apply to the Natural Circulation Operations: Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.7	84
A16 / Excess RCS Leakage / 2						X	AA2.2	Ability to determine and interpret the following as they apply to the (Excess RCS Leakage) Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.7	85
024 / Emergency Boration / 1					X		AA1.25	Ability to operate and / or monitor the following as they apply to the Emergency Boration: Boration valve indicators	3.4	57
028 / Pressurizer Level Malfunction / 2						X	AA2.06	Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: Letdown flow indicator	2.7	58
051 / Loss of Condenser Vacuum / 4				X			AK3.01	Knowledge of the reasons for the following responses as they apply to the Loss of Condenser Vacuum: Loss of steam dump capability on loss of vacuum	2.8	59
037 / Steam Generator Tube Leak / 2						X	AA2.12	Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: Flow rate of leak	3.3	60
061 / ARM System Alarms / 7						X	AA2.03	Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Setpoints for alert and high alarms	3.0	61
074 / Inad. Core Cooling / 4		X					EK1.08	Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling : Definition of subcooled liquid	2.8	62
A11 / RCS Overcooling - PTS / 4					X		AA1.3	Ability to operate and / or monitor the following as they apply to the (RCS Overcooling) Desired operating results during abnormal and emergency situations.	3.0	63
A13 / Natural Circ. / 4			X				AK2.1	Knowledge of the interrelations between the (Natural Circulation Operations) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.0	64

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E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
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A16 / Excess RCS Leakage / 2			X				AK2.2	Knowledge of the interrelations between the (Excess RCS Leakage) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.0	65
K/A Category Point Total:	0/2	1	2	1	2	3/2	Group Point Total:			9/4

ES-401		SONGS PWR Written Examination Outline Plant Systems – Tier 2 Group 1											Form ES-401-2		
System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp	Q#
008 Component Cooling Water									X			A2.08	Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effects of shutting (automatically or otherwise) the isolation valves of the letdown cooler	2.7	86
013 Engineered Safety Features Actuation									X			A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; LOCA	4.8	87
062 AC Electrical Distribution	X											2.1.11	Conduct of Operations: Knowledge of les than 1 hour technical specification action statements for systems	3.8	88
064 Emergency Diesel Generator	X											2.1.14	Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.	3.3	89
103 Containment	X											2.1.12	Conduct of Operations: Ability to apply technical specifications for a system	4.0	90
003 Reactor Coolant Pump											X	A4.08	Ability to manually operate and/or monitor in the control room: RCP Cooling Water Supply	3.2	1
003 Reactor Coolant Pump					X							K4.03	Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following: Adequate lubrication of the RCP	2.8	2
004 Chemical and Volume Control			X									K2.01	Knowledge of bus power supplies to the following: Boric Acid Makeup Pumps	2.9	3
004 Chemical and Volume Control										X		A3.13	Ability to monitor automatic operation of the CVCS, including: RCS temperature and pressure	3.4	4
005 Residual Heat Removal								X				A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including: Heatup/cooldown rate	3.5	5
005 Residual Heat Removal						X						K5.09	Knowledge of the operational implications of the following concepts as they apply the RHRS: Dilution and boration considerations	3.2	6
006 Emergency Core Cooling								X				A1.16	Ability to predict and/or monitor changes in parameters RCS temperature, including superheat, saturation, and subcooled	4.1	7
007 Pressurizer Relief/Quench Tank											X	A4.10	Ability to manually operate and/or monitor in the control room: Recognition of a leaking PORV/code safety	3.6	8

ES-401		SONGS PWR Written Examination Outline Plant Systems – Tier 2 Group 1											Form ES-401-2		
System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp	Q#
008 Component Cooling Water									X			A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of CCW pump	3.3	9
010 Pressurizer Pressure Control						X						K5.01	Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables	3.5	10
010 Pressurizer Pressure Control	X											2.2.22	Equipment Control Knowledge of limiting conditions for operations and safety limits.	3.4	11
010 Pressurizer Pressure Control			X									K2.01	Knowledge of bus power supplies to the following: PZR heaters	3.0	12
012 Reactor Protection			X									K2.01	Knowledge of bus power supplies to the following: RPS channels, components, and interconnections	3.3	13
013 Engineered Safety Features Actuation				X								K3.01	Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Fuel	4.4	14
022 Containment Cooling											X	A4.01	Ability to manually operate and/or monitor in the control room: CCS fans	3.6	15
026 Containment Spray								X				A1.02	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment temperature	3.6	16
039 Main and Reheat Steam	X											2.1.30	Conduct of Operations: Ability to locate and operate components, including local controls.	3.9	17
059 Main Feedwater				X								K3.02	Knowledge of the effect that a loss or malfunction of the MFW will have on the following: AFW system	3.6	18
061 Auxiliary/Emergency Feedwater							X					K6.01	Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Controllers and positioners	2.5	19
062 AC Electrical Distribution	X											2.4.6	Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.	3.1	20
063 DC Electrical Distribution											X	A4.01	Ability to manually operate and/or monitor in the control room: Major breakers and control power fuses	2.8	21
064 Emergency Diesel Generator		X										K1.03	Knowledge of the physical connections and/or cause-effect relationships between the ED/G system and the following systems: Diesel fuel oil supply system	3.6	22

ES-401	SONGS PWR Written Examination Outline Plant Systems – Tier 2 Group 1													Form ES-401-2	
System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp	Q#
073 Process Radiation Monitoring		X										K1.01	Knowledge of the physical connections and/or cause-effect relationships between the PRM system and the following systems: Those systems served by PRMs	3.6	23
073 Process Radiation Monitoring					X							K4.01	Knowledge of PRM system design feature(s) and/or interlocks which provide for the following: Release termination when radiation exceeds setpoint	4.0	24
076 Service Water										X		A3.02	Ability to monitor automatic operation of the SWS, including: Emergency heat loads	3.7	25
078 Instrument Air					X							K4.01	Knowledge of IAS design feature(s) and/or interlock(s) which provide for the following: Manual/automatic transfers of control	2.7	26
078 Instrument Air				X								K3.01	Knowledge of the effect that a loss or malfunction of the IAS will have on the following: Containment air system	3.1	27
103 Containment				X								K3.01	Knowledge of the effect that a loss or malfunction of the containment system will have on the following: Loss of containment integrity under shutdown conditions	3.3	28
K/A Category Point Totals:	3/3	2	3	4	3	2	1	3	1/2	2	4	Group Point Total:		28/5	

ES-401	SONGS PWR Written Examination Outline Plant Systems – Tier 2 Group 2												Form ES-401-2
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System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
041 Steam Dump/Turbine Bypass Control	X											2.1.33	Conduct of Operations: Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	91
002 Reactor Coolant System	X											2.2.25	Equipment Control Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	92
071 Waste Gas Disposal									X			A2.09	Ability to (a) predict the impacts of the following malfunctions or operations on the Waste Gas Disposal System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Stuck open relief	3.5	93
001 Control Rod Drive							X					K6.13	Knowledge of the effect of a loss or malfunction on the following CRDS components: Location and operation of RPIS	3.6	29
002 Reactor Coolant System										X		A3.03	Ability to monitor automatic operation of the RCS, including: Pressure, temperature, and flows	4.4	38
011 Pressurizer Level Control						X						K5.09	Knowledge of the operational implications of the following concepts as they apply to the PZR LCS Reason for manually controlling PZR level	2.6	30
014 Rod Position Indication									X			A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Misaligned rod	3.4	31
015 Nuclear Instrumentation					X							K4.06	Knowledge of NIS design feature(s) and/or interlock(s) provide for the following: Reactor trip bypasses	3.9	32
016 Non-Nuclear Instrumentation		X										K1.02	Knowledge of the physical connections and/or cause-effect relationships between the NNIS and the following systems: PZR LCS	3.4	33
029 Containment Purge				X								K3.01	Knowledge of the effect that a loss or malfunction of the Containment Purge System will have on the following: Containment parameters	2.9	34
035 Steam Generator									X			A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the S/GS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Steam flow/feed mismatch	3.6	35

ES-401	SONGS PWR Written Examination Outline Plant Systems – Tier 2 Group 2													Form ES-401-2	
System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
041 Steam Dump/Turbine Bypass Control						X						K5.01	Knowledge of the operational implications of the following concepts as the apply to the SDS: Relationship of no-load T-ave. to saturation pressure relief setting on valves	2.9	36
045 Main Turbine Generator					X							K4.42	Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the following: Operation of SDS (turbine bypass) in event of load loss or plant trip	2.8	37
K/A Category Point Totals:	0/2	1	0	1	2	2	1	0	2/1	1	0	Group Point Total:			10/3

Facility:	SONGS		Date of Exam:	10/24/2005			
Category	K/A #	Topic	RO		SRO-Only		
			IR	Q#	IR	Q#	
1. Conduct of Operations	2.1.5	Ability to locate and use procedures and directives related to shift staffing and activities.			3.4	94	
	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.			4.0	95	
	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component STATUS	3.0	66			
	2.1.16	Ability to operate plant phone, paging system, and two-way radio.	2.9	67			
	2.1.22	Ability to determine Mode of Operation.	2.8	68			
	Subtotal			3		2	
2. Equipment Control	2.2.29	Knowledge of SRO fuel handling responsibilities.			3.8	96	
	2.2.13	Knowledge of tagging and clearance procedures.	3.6	69			
	2.2.27	Knowledge of the refueling process.	2.6	70			
	2.2.34	Knowledge of the process for determining internal and external effects on core reactivity	2.8	71			
	Subtotal			3		1	
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.			3.1	97	
	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements			3.0	98	
	2.3.2	Knowledge of facility ALARA program.	2.5	72			
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	73			
	Subtotal			2		2	
4. Emergency Procedures / Plan	2.4.41	Knowledge of the emergency action level thresholds and classifications.			4.1	99	
	2.4.29	Knowledge of the emergency plan.			4.0	100	
	2.4.39	Knowledge of the RO's responsibilities in emergency plan implementation.	3.3	74			
	2.4.46	Ability to verify that the alarms are consistent with the plant conditions.	3.5	75			
	Subtotal			2		2	
Tier 3 Point Total				10		7	

Tier / Group	Randomly Selected K/A	Reason for Rejection
1 / 1	027 AA2.14	Facility does not have RCP Injection flow
1 / 1	029 EK3.05	Facility does not have Centrifugal Charging Pumps
1 / 1	065 G2.2.25	No Technical Specifications associated with Instrument Air
2 / 1	004 K2.07	No Heat Trace associated with CVCS at this facility
2 / 2	055 A3.03	CARS exhaust does not automatically divert at this facility
1 / 1	024 2.4.30	KA did not fit topic for generic. Would be no off-site notifications directly related to the APE. Only way to o it would be to classify an event related to APE, and 2 classifications already exist.
1 / 1	060 AA2.04	Impossible to prepare a psychometrically written sound test item for selected topic. Could not develop a test item above LOD 1
2 / 1	007 A4.01	Facility does not have a spray valve for the Quench Tank
2 / 2	071 A2.07	Could not develop a psychometrically sound written SRO test item for topic. No supporting procedural information is available for this event
2 / 2	028 K1.01	System abandoned in place, removed from TS and EOIs
2 / 1	003 A4.07	No RCP seal bypass at facility. Reselected 003 A4.08
2 / 1	005 A1.06	No procedure or evolution that performs this function at facility. Reselected 005 A1.01
1 / 1	038 EA1.15	KA not suitable for written test item. Facility has a 15 minute JPM for this topic, could not shorten to make a psychometrically sound test item. Reselected 038 EA1.39
1 / 1	007 G2.1.30	No relation to 10CFR55.43(b) items for SRO. Reselected 007 G2.4.6
1 / 1	015 G2.1.30	No relation to 10CFR55.43(b) items for SRO. Reselected 015 G2.4.11
1 / 1	040 G2.4.31	No relation to 10CFR55.43(b) items for SRO. Reselected 040 G2.4.16
1 / 2	003 G2.1.14	Could not develop an SRO test item above LOD 1. Same generic KA used on another event. Reselected 003 G2.2.25
2 / 1	103 G2.1.30	No relation to 10CFR55.43(b) items for SRO. Reselected 103 G2.1.12
2 / 1	062 G2.4.50	No relation to 10CFR55.43(b) items for SRO. Reselected 062 G2.1.11
2 / 2	056 G2.2.25	System has no relation to the generic topic selected. Reselected system 002
1 / 2	036 AK3.03	Not RO level knowledge. Replaced with 051 AK3.01
1 / 2	060 AA2.06	Could not develop a test item that would adequately meet the KA. Submitted item rejected. Replaced with 037 AA2.12
3 / 2	G2.2.23	Not RO level knowledge. Replaced with 2.2.34
1 / 2	068 AA2.09	Could not develop an adequate SRO level item for the KA. Submitted item rejected. Replaced with A13 AA2.1

Facility: SONGS		Date of Examination: 10/24/2005
Examination Level RO		Operating Test Number: NRC
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	2.1.25 Ability to obtain and interpret station reference materials such as graphs, nomographs, and tables which contain performance data (2.8) JPM: Determine time until Shutdown Cooling is required (J053A)
Conduct of Operations	M, R	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation (3.9) JPM: Calculate a makeup to the RWST (J215A)
Equipment Control	-	
Radiation Control	M, P, R	2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure (3.3) JPM: Determine stay time for work to be performed and take action for change in radiological conditions (J216A)
Emergency Plan	C, D, S	2.4.39 Knowledge of the RO responsibilities in emergency plan implementation (3.3) JPM: Perform the Siren and PA Coordination (J157A)
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 & Criteria: (C)ontrol room (D)irect from bank (≤ 3 for ROs; \leq for 4 for SROs & RO retakes) (N)ew or (M)odified from bank (> 1) (P)revious 2 exams (≤ 1 ; randomly selected) (S)imulator Class(R)oom		

Administrative Topics Outline
Task Summary

- A.1.a Unit 2 has experienced a Loss of Forced Circulation/Loss of Offsite Power. Recovery actions have commenced and SO23-12-7, Loss of Forced Circulation/Loss of Offsite Power, is in progress. Cooldown and Depressurization, Attachment 3 of SO23-12-11, has been started. The candidate will use Attachment 16 of SO23-12-11, EOI Supporting Attachments, to determine the time until Shutdown Cooling is required. The critical tasks include determining amount of water required and net feedwater available for the cooldown. This is a modified bank JPM.
- A.1.b The candidate is directed to perform a blended makeup to the RWSTs at a total flow of 40 gpm. The Plant Monitoring System is not available. The candidate will determine the required Boric Acid Flow Rate and PMW Flow Rate for the required RWST make up. The critical tasks include determining Primary Water and Boric Acid flowrates and completing Prerequisites for Attachment 14. This is a modified bank JPM.
- A.2 N/A
- A.3 The candidate will determine stay time for work to be performed and take action for a change in radiological conditions. The critical task is to select the correct REP for the work to be performed and determine stay time for the operator. This is a modified bank JPM used on the 2003 NRC Exam.
- A.4 The candidate will perform the Siren and PA Coordination during the Emergency Plan. The critical tasks include proper form preparation as well as operating the siren and public address system consoles that were recently upgraded. This is a bank JPM.

Facility: SONGS		Date of Examination: 10/24/2005
Examination Level SRO(I) & (U)		Operating Test Number: NRC
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	C, M, S	2.1.20 Ability to execute procedure steps (4.2) JPM: Review Reactor Power Calculation (J207A)
Conduct of Operations	M, R	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation (4.0) JPM: Calculate a makeup to the RWST (J215A)
Equipment Control	M, R	2.2.24 Ability to analyze the affect of maintenance activities on LCO status (3.8) JPM: Perform a LCOAR for TSP Dodecahydrate (J164A)
Radiation Control	M, P, R	2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure (3.3) JPM: Determine stay time for work to be performed and take action for change in radiological conditions (J216A)
Emergency Plan	N, R	2.4.41 Knowledge of emergency action level thresholds and classifications (4.1) JPM: Classify an emergency event (New)
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 & Criteria: (C)ontrol room (D)irect from bank (≤ 3 for ROs; \leq for 4 for SROs & RO retakes) (N)ew or (M)odified from bank (> 1) (P)revious 2 exams (≤ 1 ; randomly selected) (S)imulator Class(R)oom		

Administrative Topics Outline
Task Summary

- A.1.a Unit 2 has been operating for several days at a steady state power level greater than 20%. A reactor power calculation (Manual Method) has been performed due to COLSS Primary calculation being unavailable. As the Control Room Supervisor, review the Reactor Power Calculation (Manual Method) IAW SO23-3-3.38. The critical task is to locate and correct calculation errors and final power level. This is a modified bank JPM.
- A.1.b The candidate is directed to perform a blended makeup to the RWSTs at a total flow of 40 gpm. The Plant Monitoring System is not available. The candidate will determine the required Boric Acid Flow Rate and PMW Flow Rate for the required RWST make up. The critical tasks include determining Primary Water and Boric Acid flowrates and completing Prerequisites for Attachment 14. This is a modified bank JPM.
- A.2 The candidate will complete a manual Limiting Condition for Operation ACTION Requirement (LCOAR) for Trisodium Phosphate Dodecahydrate. The critical task is to choose the correct Technical Specification ACTION(s) and properly complete the paperwork for a manual LCOAR. This is a modified bank JPM.
- A.3 The candidate will determine stay time for work to be performed and take action for a change in radiological conditions. The critical task is to select the correct REP for the work to be performed and determine stay time for the operator. This is a modified bank JPM used on the 2003 NRC Exam.
- A.4 A Security Safeguards Contingency event is in progress. The candidate will perform an EPIP classification. The critical task is to properly classify the event. This is a new JPM.

Facility: <u>SONGS</u>		Date of Examination: <u>10/24/2005</u>	
Exam Level (circle one): <u>RO / SRO(I) / SRO (U)</u>		Operating Test No.: <u>NRC</u>	
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
S-1	041 Steam Bypass Control System Verify correct SG isolated following SGTR	A, M, S	4-S
S-2	005 Shutdown Cooling System Place Shutdown Cooling System in service	L, S	4-P
S-3	013 ESFAS Perform Recirculation Actuation Signal actions	A, N, S	2
S-4	008 Component Cooling Water Place the Train A CCW/SWC Critical Loop in Standby	D, S	8
C-5	EPE 055 Station Blackout Perform Control Building Ventilation Emergency Actions	A, C, D, E	6
S-6	001 Control Rod Drive System Dampen ASI oscillation	A, D, P, S	1
S-7	006 ECCS Raise Safety Injection Tank pressure	D, S	3
S-8	022 Containment Cooling System (RO only) Initiate Containment Cooling System	A, N, S	5
In-Plant Systems® (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)			
P-1	015 Nuclear Instrumentation System Align G005 to Essential Plant Parameters Monitoring Panel	E, D, R	7
P-2	064 Emergency Diesel Generator Locally start the Emergency Diesel Generator	D, E	6
P-3	068 Control Room Evacuation Align CVCS from outside the Control Room	A, D, E, R	1

@ 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	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(L)ow-Power	$\geq 1 / \geq 1 / \geq 1$
(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	

**JPM NRC Examination
Summary Description**

- S-1 The candidate will verify the correct SG is isolated following a Steam Generator Tube Rupture. The alternate path requires that the candidate recognize that the wrong SG was isolated and re-aligns for the ruptured SG. This is a modified JPM that requires the operator to use an alternate means of SG pressure control due to a Main Steam Isolation Signal. This is a Steam Bypass System – Secondary System Heat Removal from Reactor Core safety function.
- S-2 The candidate will perform the actions required to place the Shutdown Cooling System in a single pump/single heat exchanger lineup. This is a low power JPM under the Residual Heat Removal System – Primary System Heat Removal from Reactor Core safety function.
- S-3 The candidate will align for sump recirculation per Emergency Operating Instructions. The alternate path requires manual actions to contend with Containment Sump blockage. This JPM was developed for new Floating Step and Attachment criteria established by EOI procedure revision. This is a new JPM under the Emergency Core Cooling System – Reactor Inventory Control safety function. This is a PRA significant action.
- S-4 The candidate must place the Component Cooling Water Train A CCW/SWC Critical Loop in standby. This is a Component Cooling Water System– Plant Service Systems safety function.
- C-5 The candidate will perform Control Building Ventilation Emergency Actions. The alternate path is performed when the normal cooling system is not available during a Station Blackout. This is a JPM under the Plant Service Systems safety function. This is a PRA significant action.
- S-6 The candidate will use the Control Rod Drive System to dampen an Axial Shape Index oscillation. The alternate path requires a Reactor trip when two rods fall into the core. This is a Control Rod Drive System – Reactivity Control safety function.
- S-7 The candidate will perform actions to raise Safety Injection Tank pressure using S023-3-2.7.1, Safety Injection Tank Operations. This is a JPM under the Emergency Core Cooling System – Reactor Pressure Control safety function.
- S-8 The candidate will be required to initiate a Containment Cooling Actuation Signal (CCAS). The alternate path requires that the candidate start the Train A Containment Emergency Cooling Fans and the Train A Containment Dome Air Fans when it is determined that the components have not started. This is a new JPM under the Containment Cooling System – Containment Integrity safety function.
- P-1 The candidate will align G005 to the Essential Plant Parameters Monitoring Panel (EPPM). This is a Nuclear Instrumentation System – Instrumentation safety function. This is a PRA significant action.
- P-2 The candidate will perform Emergency Diesel Generator duties of the Assistant Control Operator during AOI SO23-13-2. This is an Emergency Diesel Generators – Electrical Systems safety function.
- P-3 The candidate will align Emergency boration and Saltwater Cooling flowpaths from outside the Control Room. The alternate path requires the candidate to align a Saltwater Cooling overboard valve when it is determined that the normal flowpath is not available. This is a Chemical and Volume Control System - Reactivity Control safety function. This is a PRA significant action.

Facility:	San Onofre	Scenario No.:	1	Op Test No.:	NRC
Examiners:	_____	Operators:	_____	_____	_____
	_____		_____	_____	_____
	_____		_____	_____	_____
Initial Conditions: <ul style="list-style-type: none"> 100% power - RCS Boron is 888 ppm by Chemistry Sample Train A Component Cooling Water Pump (P-025) in service Train A Auxiliary Feedwater Pump (P-141) OOS Train A High Pressure Safety Injection (P-017) OOS Condenser Air Ejector Low Range Radiation Monitor (RM-7818) OOS 					
Turnover: Maintain steady-state power conditions.					
Critical Tasks: <ul style="list-style-type: none"> Establish RCS temperature control (Turbine fails to trip). Trip any RCP not satisfying RCP operating limits. Stabilize RCS temperature/pressure following loss of heat removal from the faulted Steam Generator. 					
Event No.	Malf. No.	Event Type*	Event Description		
1 + 5 min	FW23	C (ACO, CRS)	Partial loss of Condenser vacuum @ 3%.		
2 + 10 min		R (CO) N (ACO, CRS)	Downpower for Condenser Backpressure.		
3 + 20 min	CV17A CV17B	C (CO, CRS) TS(CRS)	Both BAMU Pumps trip.		
4 + 25 min		TS (CRS)	Main Steam and Main Feedwater Isolation Valves declared <i>inoperable</i> .		
5 + 30 min	RD2103	C (CO, ACO, CRS) TS (CRS)	Dropped CEA #21.		
6 + 50 min	MS03B	M (ALL)	ESDE on E089 inside Containment.		
7 +50 min	TU07	C (ACO)	Turbine auto trip failure, manual trip required.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					

SCENARIO SUMMARY NRC #1

The crew will assume the watch at 100% power and maintain steady-state conditions per SO23-5-1.7, Power Operations.

When turnover is complete, a partial loss of vacuum will occur. The crew will respond per the Annunciator Response Procedures (ARP) and AOI SO23-13-10, Loss of Condenser Vacuum and lower power level until the Turbine Vacuum Limit is in the Area of Unrestricted Operation.

When the CO initiates RCS boration for the power reduction, the in-service and standby Boric Acid Makeup Pumps (BAMU) will trip, requiring gravity feed from the BAMU tanks for boration. The CRS will evaluate Technical Specifications.

Once the plant is stabilized, the Main Steam and Main Feedwater Isolation Valves will be declared *inoperable* due to improper hydraulic fluid. The CRS will evaluate Technical Specifications.

This is followed by a dropped CEA and requires crew actions per the ARPs and AOI SO23-13-13, Misaligned or Immovable Control Element Assembly.

The EOP entry point is caused by an ESDE on E089 inside Containment. The crew performs SO23-12-1, Standard Post Trip Actions and diagnoses an ESDE. The crew will transition to SO23-12-5, Excess Steam Demand Event and perform necessary actions to stabilize RCS temperature.

During this event the Turbine fails to trip requiring manual actions on the part of the ACO. The scenario is terminated when the crew stabilizes RCS temperature/pressure following pressure following loss of heat removal from the faulted Steam Generator.

Risk Significance:

- | | |
|---|------------------------------|
| • Risk important components out of service: | HPSI P-017, AFW P-141 |
| • Failure of risk important system prior to trip: | Loss of BAMU Pumps |
| • Risk significant core damage sequence: failure | ESDE with Turbine trip |
| • Risk significant operator actions: | Failure to trip Main Turbine |
| following | Stabilize RCS temperature |
| | ESDE |

Facility:	San Onofre	Scenario No.:	3	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		

Initial Conditions:	<ul style="list-style-type: none"> 30% power – RCS Boron is 1237 ppm by Chemistry Sample Train A Component Cooling Water Pump (P-025) in service Train A Auxiliary Feedwater Pump (P-141) OOS Train A High Pressure Safety Injection (P-017) OOS Condenser Air Ejector Low Range Radiation Monitor (RM-7818) OOS
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Turnover:	Boration and downpower as directed by Operations Management.
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Critical Tasks:	<ul style="list-style-type: none"> Energize at least one vital electrical AC bus and associated 480 V 1E bus. Restore flow to the Component Cooling Water Non-Critical Loop (RCPs operating).
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Event No.	Malf. No.	Event Type*	Event Description
1 + 15 min		R (CO) N (ACO, CRS)	Boration and downpower at 10%/hr.
2 + 20 min	NI08B	I (CO, CRS) TS (CRS)	NI Channel B Upper Detector failure.
3 +30 min	PG22 PG23	C (ACO, CRS) TS (CRS)	Degraded grid voltage to Sustained Degraded Voltage Setpoint.
4 +45 min		I (CO, CRS)	Letdown Pressure instrument fails low (2PIC-0201 B-CR58-MOI).
5 +55 min	FW18A	I(ACO, CRS)	SG E089 Feed Flow Transmitter fails high.
6 + 65 min	PG24 TU08	M (ALL)	Loss of Offsite Power. Turbine trip.
7 + 66 min	ED03B	M (ALL)	2A06 Bus Fault.
8 +67 min	EG08A	C (ACO)	EDG 2G002 mechanical failure.
9 +70 min	PG57	M (ALL)	Loss of SDG&E Switchyard.

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

SCENARIO SUMMARY NRC #3

The crew will assume the watch with a boration requested by Reactor Engineering (to obtain calorimetric data at 25% power) per SO23-5-1.7, Power Operations.

After the crew has demonstrated control of the power change, a Nuclear Instrument Upper Detector failure will occur. The crew will respond per the Annunciator Response Procedures (ARP) and Abnormal Operating Instruction (AOI) SO23-13-18, Reactor Protection System Failure. The CRS will evaluate Technical Specifications.

This is followed by a frequency drop and grid voltage decrease to the Sustained Degraded Voltage Signal (SDVS) for 110 seconds that will require crew response and entry into AOI SO23-13-4, Operation during Major System Disturbances. The ACO will be required to adjust Main Generator MVARs and restart a CCW Pump. The CRS will evaluate Technical Specifications.

With the plant stable, the crew will respond to a Letdown Pressure Instrument failure. This will require action per the Annunciator Response Procedures and SO23-3-2.1, CVCS Charging and Letdown Operations.

Once Letdown is restored, a feed flow transmitter will fail high on SG E089. The crew will regain control of feedwater flow per Annunciator Response Procedures and AOI SO23-13-24, Feedwater Malfunctions.

When the crew has stabilized feedwater flow, a Loss of Offsite Power will occur along with a mechanical failure of 2G002 and 2A06 Bus fault. The crew will perform SO23-12-1, Standard Post Trip Actions and during the SPTAs the ACO will take action associated with the mechanical failure of EDG 2G002. The crew will then transition to SO23-12-8, Station Blackout and attempt to restore offsite power.

Event termination will occur once an offsite line is restored and aligned to 1E Bus 2A04 with plant conditions stable.

Risk Significance:

- | | |
|---|-------------------------------------|
| • Risk important components out of service: | HPSI P-017, AFW P-141 |
| • Failure of risk important system prior to trip: | Loss of CCW Pump |
| • Risk significant core damage sequence: | LOOP with loss of EDGs |
| • Risk significant operator actions: | Restore Non-Critical Loop |
| | Recover Offsite Power in 60 minutes |