Final Submittal

SURRY EXAM
50-280, 50-281/2004-301

FEBRUARY 24 - MARCH 2
& MARCH 4,2004 (WRITTEN)

FINAL SAMPLE PLANS / OUTLINES

Facility: Surry Date of Exam: 2004

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	K	A	A 2	G *	Total
1. Emergency & Abnormal Plant Evolutions	1	2	2	6				4	3			1	18	0	0	4	3	7
	2	0	2	1				2	2			2	9	0	0	4	1	5
	Tier Totals	2	4	7				6	5			3	27	0	0	8	4	12
2. Plant Systems	1	2	2	2	3	2	1	5	3	1	4	3	28	0	0	2	2	4
	2	0	0	0	3	0	1	0	1	1	3	1	10	0	0	0	2	2
	Tier Totals	2	2	2	6	2	2	5	4	2	7	4	38	0	0	2	4	6
3. Generic Knowledge and Abilities Categories		1		2		3		4					10	1	2	3	4	7
		2		2		3		3						2	3	0	2	

Note:
1. Ensure that at least two topics from every K/A category are sampled within each tier of the RO outline (i.e., the "Tier Totals" in each WA category shall not be less than two). Refer to Section 691.c for additional guidance regarding SRO sampling.
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. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system or evolution unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6. 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. The SRO K/As must also be linked to 10 CFR 55.43 or an SWO-Bevel learning objective.
7. On the following pages, enter the WA 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; summarize all the SRO-only knowledge and non-A2 ability categories in the columns labeled " K and "A." Use duplicate pages for RO and SRO-only exams.
8. For Tier 3, enter the WA numbers, descriptions, importance ratings, and point totals on Form ES-401-3.
9. Refer to E%-401,Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.

Emergency and Abnormal Plant Evolutions - Tier 1/Group I (RO✓ / **SROx**)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1		✓					✓ EK2.02: Knowledge of the interrelationships between a reactor trip and the following: Breakers, relays, and disconnects.	2.6 / 2.8	1
000008 Pressurizer Vapor Space Accident / 3					✓		✓ AA2.06: Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: PORV logic control under low-pressure conditions.	3.3 / 3.6	1
000009 Small Break LOCA / 3					x		**x EA2.39: Ability to determine or interpret the following as**	4514.7	1
000011 Large Break LOCA / 3				✓			✓ EA1.13: Ability to operate and monitor the following as they apply to a Large Break LOCA: Safety Injection Components.	4.1 / 4.2	1
000015/17 RCP Malfunctions/ 4							Not Selected.		
000022 Loss of Rx Coolant Makeup/ 2	✓						✓ AK1.01: Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Consequences of thermal shock to RCP seals.	2.8 / 3.2	1
000025 Loss of RHR System / 4						x	**x 2.4.7: Knowledge of event based EOP mitigation strategies.**	**3.1 / 3.8**	**1**
000026 Loss of Component Cooling Water / 8			✓				✓ AK3.02: Knowledge of the reasons for the following responses as they apply to Loss of Component Cooling Water: The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS.	3.6 / 3.9	1
000027 Pressurizer Pressure Control System Malfunction/ 3			✓				✓ AK3.01: Knowledge of the reasons for the following responses as they apply to Pressurizer Pressure Control Malfunctions: Isolation of PZR spray following loss of PZR heaters.	3.5 / 3.8	1
000029 ATWS / 1			✓				✓ EK3.09: Knowledge of the reasons for the following responses as they apply to the ATWS: Opening centrifugal charging pump suction valves from RWST.	3.7 / 4.0	1
000038 Steam Gen. Tube Rupture / 3			✓				✓ EK3.09: Knowledge of the reasons for the following responses as they apply to the SGTR: Criteria for securing / throttling ECCS.	4.1 / 4.5	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4		✓					✓ W/E12 EK2.2: Knowledge of the interrelations between (Uncontrolled Depressurization of all Steam Generators) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal system and relations between the proper operation of these systems to the operation of the facility.	3.6 / 3.9	1
000064 (CE/E06) Loss of Main Feedwater / 4						✓	✓ 2.4.31: Knowledge of annunciators, alarms, and indications and use of response instructions.	3.3 / 3.4	1
000055 Station Blackout / 6	✓				x		✓ EK1.01: Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Effect of battery discharge rates on capacity. **x EA2.03: Ability to determine or interpret the following as they apply to a Station Blackout: Actions necessary to restore power.**	3.3 / 3.7 **3.9 / 4.7**	1 **1**
000056 Loss of Off-site Power / 6				✓			✓ AA1.26: Ability to operate and / or monitor the following as they apply to Loss of Offsite Power: Circuit Breakers.	2.5 / 2.6	1
000057 Loss of Vital AC Inst. Bus / 6			✓			x	✓ AK3.01: Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital ac electrical instrument bus. **x 2.1.6: Ability to supervise and assume a management role during transient and upset conditions.**	4.1 / 4.4 **2.1/4.3**	1 **1**
000058 Loss of DC Power / 6					✓	x	✓ AA2.01: Ability to determine and interpret the following as they apply to the loss of DC Power: That a loss of dc power has occurred; verification that substitute power sources have come on line. **x 2.4.32: Knowledge of operator response to loss of all annunciators.**	3.7 / 4.1 **3.3 / 3.5**	1 **1**
000862 Loss of Nuclear Svc Water / 4				✓	x		✓ AA1.06: Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water (SWS): Control of flow rates to components cooled by the SWS. **x AA2.04: Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The normal values and upper limits for the temperatures of components cooled by SWS.**	2.9 / 2.9 **2.5 / 2.9**	1 **1**
000065 Loss of Instrument Air / 8					✓		✓ AA2.01: Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Cause and effect of low-pressure instrument air alarm.	2.9 / 3.2	1
WE04 LOCA Outside Containment / 3			✓				✓ W/E04 EK3.2: Knowledge of the reasons for the following responses as they apply to the (LOCA Outside Containment): Normal, abnormal and emergency operating procedures associated with (LOCA Outside Containment).	3.4 / 4.0	1

W/E11 Loss of **Emergency** Coolant Recirc. / 4				✓			✓ W/E11 EA1.2: Ability to operate and / or monitor the following as they apply to the (Loss of Emergency Coolant Recirculation): Operating behavior characteristics of the facility.	3.5 / 3.8	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4					x		**x W/E05 EA2.1: Ability to determine and interpret the following as they apply to the (Loss of Secondary Heat Sink): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.**	**3.4 / 4.4**	**1**
	K 1	K 2	K 3	A 1	A 2	G			
K/A Category Totals:	2 0	2 0	6 0	4 0	3 4	1 3	Group Point Total:		18 / 7

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1							Not Selected.		
000003 Dropped Control Rod / 1							Not Selected.		
000005 Inoperable/Stuck Control Rod / 1							Not Selected.		
000024 Emergency Boration / 1							Not Selected.		
000028 Pressurizer Level Malfunction / 2							Not Selected.		
000032 Loss of Source Range NI / 7				✓			✓ AA1.01: Ability to operate and / or monitor the following as they apply to the Loss of Source Range Nuclear Instrumentation: Manual restoration of power.	3.1 / 3.4	1
000033 Loss of Intermediate Range NI / 7					✓		✓ AA2.04: Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Satisfactory overlap between source-range, intermediate-range, and power-range instrumentation.	3.2 / 3.6	1
000036 (BW/A08) Fuel Handling Accident / 8							Not Selected.		
000037 Steam Generator Tube Leak / 3							Not Selected.		
000051 Loss of Condenser Vacuum / 4							Not Selected.		
000059 Accidental Liquid RadWaste Rel. / 9				✓			✓ AA1.01: Ability to operate and / or monitor the following as they apply to the Accidental Liquid Radwaste Release: Radioactive-liquid monitor.	3.5 / 3.5	1
000060 Accidental Gaseous Radwaste Rel. / 9							Not Selected.		
030061 ARM System Alarms / 7					✓		✓ AA2.01: Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: ARM panel displays.	3.5 / 3.7	1
000067 Plant Fire On-site / 8						✓	✓ 2.4.18: Knowledge for specific bases for EOPs.	2.7 / 3.6	1
000068 (BW/A06) Control Room Evac. / 8							Not Selected.		
000069 (W/E14) Loss of CTMT Integrity / 5							Not Selected.		
000074 (W/E06&E07) Inad. Core Cooling / 4			✓				✓ W/E06 EK3.1: Knowledge of the reasons for the following responses as they apply to (Degraded Core Cooling): Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.4 / 3.8	1
000076 High Reactor Coolant Activity / 9		✓					✓ AK2.01 Knowledge of the interrelations between the High Reactor Coolant Activity and the following: Process radiation monitors.	2.6 / 3.0	1
W/E01 & E02 Rediagnosis & SI Termination / 3						x	**x 2.1.20: Ability to execute procedures.**	**4.3 /4.2**	**1**
W/E13 Steam Generator Over-pressure / 4		✓			x		✓ W/E13 EK 2.1 Knowledge of the interrelations between the (Steam Generator Overpressure) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. **x W/E13 EA2.1: Ability to determine and interpret the following as they apply to the (Steam Generator Overpressure): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.**	3.0 / 3.1 **2.9 / 3.4**	1 **1**
W/E15 Containment Flooding / 5					x		**x W/E15 EA2.1: Ability to determine and interpret the following as they apply to (Containment Flooding): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.**	**2.7 / 3.2**	**1**
W/E16 High Containment Radiation / 9							Not Selected.		
BW/A01 Plant Runback / 1							NA		
BW/A02&A03 Loss of NNI-X/Y / 7							NA		
BW/A04 Turbine Trip / 4							NA		
BW/A05 Emergency Diesel Actuation / 6							NA		

BW/A07 Flooding/ E							NA		
BW/E03 Inadequate Subcooling Margin / 4							NA		
BW/E08; W/E03 LOCA Cooldown - Depress. / 4					x		x W/E03 EA2.1: Ability to determine and interpret the following as they apply to the (LOCA Cooldown and Depressurization): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.4 / 4.2	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4					x		x W/E10 EA 2.1: Ability to determine and interpret the following as they apply to the (Natural Circulation with Steam Void in Vessel with / without RVLIS): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.2 / 3.9	1
BW/E13&E14 EOP Rules and Enclosures							NA		
CE/A11; W/E08 RCS Overcooling - PTS / 4						✓	✓ W/E08 G2.1.7: Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.	3.7 / 4.4	1
CE/A16 Excess RCS Leakage / 2							NA		
CE/E09 Functional Recovery							NA		
	K 1	K 2	K 3	A 1	A 2	G			
K/A Category Point Totals:	0 1	2 0	1 0	2 0	2 4	2 1	Group Point Total:		9/5

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump				✓								✓ K4.03: Knowledge of RCPs design feature(s) and / or interlock(s) which provide for the following: Adequate lubrication of the RCP.	2.5 / 2.8	1
004 Chemical and Volume Control								✓			x	✓ A2.17: Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Low PZR pressure. **x 2.1.32 Ability to explain system limits and**	3.4 / 3.7 **3.4 / 3.8**	1 **1**
005 Residual Heat Removal					✓							✓ K5.02: Knowledge of the operational implications of the following concepts as they apply to the RHRS: Need for adequate subcooling.	3.4 / 3.5	1
006 Emergency Core Cooling						✓						✓ K6.03: Knowledge of the effect of a loss or malfunction on the following will have on the ECCS: Safety Injection Pumps.	3.6 / 3.9	1
007 Pressurizer Relief/Quench Tank					✓							✓ *K5.M:* Knowledge of the operational implications of the following concepts as they apply to PRTS: Method of forming a steam bubble in the PZR.	3.1 / 3.4	1
008 Component Cooling Water	✓			✓								✓ K1.02: Knowledge of the physical connections and / or cause-effect relationships between the CCWS and the following systems: Loads cooled by CCWS. ✓ K4.01: Knowledge of CCWS design feature(s) and / or interlock(s) which provide for the following: Automatic start of standby pump.	3.3 / 3.4 3.1 / 3.3	1 1
010 Pressurizer Pressure Control							✓					✓ A1.01: Ability to predict and / or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including: PZR and RCS boron concentrations.	2.8 / 2.9	1
012 Reactor Protection	✓									✓		✓ K1.05: Knowledge of the physical connections and / or cause-effect relationships between the RPS and the following systems: ESFAS. ✓ A4.04: Ability to manually operate and / or monitor in the control room: Bistable, trips, reset **and test switches.**	3.8 / 3.9 3.3 / 3.3	1 1
013 Engineered Safety Features Actuation			✓						✓			✓ K3.01: Knowledge of the effect that a loss or malfunction of the ESFAS will have *on* the following: Fuel. ✓ A3.02: Ability to monitor automatic operation of the ESFAS including Operation of actuated equipment.	4.4 / 4.7 4.1 14.2	1 1
022 Containment Cooling			✓								✓	✓ K3.02: Knowledge of the effect that a loss or malfunction of the CCS will have on the following: Containment instrument readings. ✓ 2.4.22: Knowledge of the bases for prioritizing safety functions during abnormal / emergency operations.	3.0 / 3.3 3.0 / 4.0	1 1
025 Ice Condenser												NA - Surry has no Ice Condensers		
026 Containment Spray								✓			✓	✓ A2.07: Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of containment spray pump suction when in recirculation mode, possibly caused by clogged sump screen, pump inlet high temperature (exceeded cavitation, voiding), or sump level below cutoff (interlock) limit. ✓ 2.4.46: Ability to verify that alarms are consistent with plant conditions.	3.6 / 3.9 **3.5 / 3.6**	1 1
039 Main and Reheat Steam							✓					✓ A1.09: Ability to predict and / or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: Main steam line radiation monitors.	2.5 / 2.7	1
056 Condensate								✓			x	✓ A2.04: Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; *and* (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps. **x 2.4.45: Ability to prioritize and interpret the significance of each annunciator or alarm.**	2.6 / 2.8 **3.3 / 3.6**	1 1
059 Main Feedwater							✓					✓ A1.03: Ability to predict and / or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: Power level restrictions for operation of MFW pumps and valves.	2.7 / 2.9	1

061 Auxiliary/Emergency Feedwater							✓					✓ A1.04: Ability to predict and / or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AFW controls including: AFW source tank level.	3.9 / 3.9	1
062 AC Electrical Distribution							✓	x				✓ A1.01: Ability to predict and / or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ac distribution system controls including: Significant D/G load limits. **x A2.12: Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Restoration of power to a system with a fault on it.**	3.4 / 3.8 **3.2 / 3.6**	1 1
063 DC Electrical Distribution										✓		✓ A4.01: Ability to manually operate and / or monitor in the control room: Major breakers and control power fuses.	2.8 / 3.1	1
064 Emergency Diesel Generator		✓										✓ K2.01: Knowledge of bus power supplies to the following: Air compressors.	2.7 / 3.1	1
073 Process Radiation Monitoring											✓	✓ 2.1.23: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9 / 4.0	1
076 Service Water		✓										✓ K2.04: Knowledge of bus power supplies to the following: Reactor building closed cooling water.	2.5 / 2.6	1
078 Instrument Air				✓						✓		✓ A4.01: Ability to manually operate and / or monitor in the control room: Pressure guages. ✓ K4.02: Knowledge of IAS design feature(s) and / or interlock(s) which provide for the following: Cross-over to other air systems.	3.1 / 3.1 3.2 / 3.5	1 1
103 Containment								x		✓		✓ A4.04: Ability to manually operate and / or monitor in the control room: Phase A and phase B resets. **x A2.01: Ability to (a) predict the impacts of the following malfunctions or operations on the containment system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Integrated leak rate tests.**	3.5 / 3.5 **2.0 / 2.6**	1 1
	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	A 5			
K/A Category Point Totals:	2 0	2 0	2 0	3 0	2 0	1 0	5 0	3 2	1 0	4 0	3 2	Group Point Total:		28/4

Plant Sysitems - Tier 2/Group 2 (RO✓ / **SROx**)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive											x	**x 2.4.30: Knowledge of which events related to system operations / status should be reported to outside agencies.**		1
002 Reactor Coolant												Not Selected.		
011 Pressurizer bevel Control						✓						✓ K6.06: Knowledge of the effect of a loss or malfunction on the following will have on the PZR LCS: Correlation of demand signal indication on charging pump flow valve controller to the valve position.	2.5 / 2.8	1
014 **Rod** Position Indication								✓				✓ A2.05: Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Reactor trip.	3.9/ 4.1	1
015 Nuclear Instrumentation				✓								✓ K4.07: Knowledge of NIS design feature(s) and / or interlock(s) provide for the following: Permissives.	3.7 13.8	1
016 Non-nuclear Instrumentation										✓		✓ A4.01: Ability to manually operate and / or monitor in the control room: NNI channel select controls.	2.9 / 2.8	1
017 In-core Temperature Monitor												Not Selected.		
027 Containment Iodine Removal										✓		✓ A4.03: Ability to manually operate and / or monitor in the control room: CIRS fans.	3.3 13.2	1
028 Hydrogen Recombiner and Purge Control											✓	✓ 2.2.12: Knowledge of surveillance procedures.	3.0 / 3.4	1
029 Containment Purge												Not Selected.		
033 Spent Fuel Pool Cooling												Not Selected.		
034 Fuel Handling Equipment										✓		✓ A4.01: Ability to manually operate and / or monitor in the control room: Radiation levels.	3.3/ 3.7	1
035 Steam Generator									✓			✓ A3.01: Ability to monitor automatic operation of the S/G including: S/G water level control.	4.0 / 3.9	1
041 Steam Dump/Turbine Bypass Control												Not Selected.		
045 Main Turbine Generator												Not Selected.		
055 Condenser Air Removal												Not Selected.		
068 Liquid Radwaste				✓								✓ K4.01: Knowledge of design feature(s) and / or interlock(s) which provide for the following: Safety and environmental precautions for handling hot, acidic, and radioactive liquids.	3.4 / 4.1	1
071 Waste Gas Disposal				✓								✓ K4.06: Knowledge of design feature(s) and / or interlock(s) which provide for the following: Sampling and monitoring of waste gas release tanks.	2.7 13.5	1
072 Area Radiation Monitoring												Not Selected.		
075 Circulating Water												Not Selected.		
079 Station Air											x	**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 / 3.8	1
086 Fire Protection												Not Selected.		
K/A Category Point Totals	0 0	0 0	0 0	3 0	0 0	1 0	0 0	1 1	1 0	3 0	1 1	Group Point Total:		10/2

Facility: Surry	**Date of Examination:** FEB2004
Examination Level (Underline one): RO / SRO	**Operating Test Number:** 2004-301

Administrative Topic (see Note)	Describe activity to be performed
Conduct of Operations	Calculate the Maximum Allowable Reactor Vessel Hydrogen Venting Time G2.1.23 (3.9/4.0); G2.1.25 (2.8/3.1)
Conduct of Operations	Shutdown Margin Calculation at Zero Power G2.1.7 (3.7/4.4)
Equipment Control	Construct Tagout for 1-RT-P-1C (SG Recirc & Transfer Pump) G2.2.13 (3.6/3.8)
Radiation Control	Dose / Stay Time Calculation G2.3.1(2.6/3.1); G2.3.4 (2.5/3.1)
Emergency Plan	N/A

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.

Facility: Surry **Date of Examination:** FEB2004
Examination Level (Underline one): RO / SRO **Operating Test Number:** 2004-301

Administrative Topic (see Note)	Describe activity to be performed
Conduct of Operations	Calculate the Maximum Allowable Reactor Vessel Hydrogen Venting Time G2.1.23 (3.9/4.0); 62.1.25 (2.8/3.1)
Conduct of Operations	Shutdown Margin Calculation at Zero Power G2.1.7 (3.7/4.4)
Equipment Control	Construct Tagout for 1-RT-P-1 C (SG Recirc & Transfer Pump) G2.2.13 (3.6/3.8)
Radiation Control	Dose / Stay Time Calculation G2.3.1 (2.6/3.1); G2.3.4 (2.5/3.1)
Emergency Plan	Emergency Classification 2.4.41 (2.3/4.1); 2.4.44 (2.1/4.0)

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

Facility: Surry **Date of Examination:** FEB2004
Exam Level (underline one): RO / SRO(I) / SRO(U) **Operating Test No.:** 2004-301

Control Room Systems (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)		
System / JPM Title	Type Code*	Safety Function
a. Start 2nd RCP / High Vibration 015AA1.23 (3.1/3.2)	N A S	$4_{primary}$
b. Place Hydrogen Analyzer In Service Following LOCA (58.01) 028A4.03 (3.1/3.3)	D S	5
c. 0-AP-22.00, Fuel Handling Abnormal Condition Immediate Actions (35.06) 034A2.01 (3.6/4.4); 036AK1.01 (3.5/4.1)	D A S	8
d. Restore Offsite Power to 1H 4160V Emergency Bus IAW AP-10.08 (18.06) 062A4.01 (3.3/3.1); 055EA2.06 (3.7/4.1)	D S	6
e. Transfer to Hot Leg Recirculation with 1 Charging Pump in Service (52.02) - ESF 011EA1.11(4.2/4.2)	M A S	3
f. Swap operating Main Feedwater Pumps due to problems with operating pump 059A4.08 (3.0/2.9)	N L S	$4_{secondary}$
g. Response to failed low Pressurizer Level Channel (38.07) 028AA1.08 (3.7/3.6)	D S	2
h. Remove a failed Source Range NI from Service During a Reactor Startup (62.02) 015A2.02 (3.1/3.5); 015A4.03(3.8/3.9)	D S	7
In-Plant Systems (3 for RO; 3 for SWQ-I; 3 or 2 far SRO-U)		
i. Cross-Tie Unit 2 Emergency Buses for Circulating Water Isolation (35.02) 062A2.12 (3.2/3.6); 062AA2.02 (2.9/3.6); 076A2.01 (3.5/3.7); 056AA1.02(4.0/3.9)	D	6
j. Locally Emergency Borate per AOP-3.0, Emergency Boration (44.01B) 024AA1.04 (3.6/3.7)	D A R	1

k. Cross-Connect Turbine Building Instrument Air (17.02) 065AK3.04 (3.0/3.2); 078K1.03 (3.3/3.4); 065AK3.08(3.7/3.9);069AA2.02(3.9/4.4)	D R	8
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA		

Facility: Surry Exam Level (underline one): RO / SRO(I) / SRO(U)	Date of Examination: FEB2004 operating Test No.: 2004-301

Control Room Systems (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)		
System / JPM Title	**Type Code***	**Safety Function**
a. Start 2nd RCP / High Vibration 015AA1.23 (3.1/3.2)	N A S	$4_{primary}$
b.		
c. 0-AP-22.00, Fuel Handling Abnormal Condition Immediate Actions (38.06) 034A2.01 (3.6/4.4); 036AK1.01 (3.5/4.1)	D A S	8
d. Restore Offsite Power to 1H 4160V Emergency Bus IAW AP-10.08 (18.06) 062A4.01 (3.3/3.1); 055EA2.06 (3.7/4.1)	D S	6
e. Transfer to Hot Leg Recirculation with 1 Charging Bump in Service (52.02) - ESF 011EA1.11(4.2/4.2)	M A S	3
f. Swap operating Main Feedwater Pumps due to problems with operating pump 059A4.08 (3.0/2.9)	N L S	$4_{secondary}$
g. Response to failed low Pressurizer Level Channel (38.07) 028AA1.08 (3.7/3.6)	D A S	2
h. Remove a failed Source Range NI from Service During a Reactor Startup (52.02) 015A2.02 (3.1/3.5); 015A4.03(3.8/3.9)	D S	7
In-Plant Systems (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i. Cross-Tie Unit 2 Emergency Buses for Circulating Water Isolation (35.02) 062A2.12 (3.2/3.6); 062AA2.02 (2.9/3.6); 076A2.01 (3.5/3.7); 056AA1.02(4.0/3.9)	D	6
j. Locally Emergency Borate per AOP-3.0, Emergency Boration (41.01B) 024AA1.04 (3.6/3.7)	D A R	1

k. Cross-Connect Turbine Building Instrument Air (17.02) 065AK3.04 (3.0/3.2); 078K1.03 (3.3/3.4); 065AK3.08(3.7/3.9);069AA2.02(3.9/4.4)	D R	8

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Facility: Surry
Exam Level (underline one): RO / SRO(I) / SRO(U)

Date of Examination: FEB2004
Operating Test No.: 2004-301

Control Room Systems (8 for RO; 7 for SRO-E; 2 or 3 far SRO-U)

System / JPM Title	Type Code*	Safety Function
a. Start 2nd RCP / High Vibration 015AA1.23 (3.1/3.2)	N A S	4primary
b.		
c.		
d.		
e. Transfer to Hot Leg Recirculation with 1 Charging Pump in Service (52.02)- ESF 011EA1.11(4.2/4.2)	M A S	3
f. Swap operating Main Feedwater Pumps due to problems with operating pump 059A4.08 (3.0/2.9)	N L S	4secondary
g.		
h.		
In-Plant Systems (3far RO; 3 for SRO-I; 4 or 2 for SRO-U)		
i.		
j. Locally Emergency Borate per AOP-3.0, Emergency Boration (41.015) 024AA1.04 (3.6/3.7)	D A R	1

k. Cross-Connect Turbine Building Instrument Air (17.02) 065AK3.04 (3.0/3.2); 078K1.03 (3.3/3.4); 065AK3.08(3.7/3.9);069AA2.02(3.9/4.4)	D R	8

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Facility: Surry **Scenario No.:** Scenario #1 **Op-Test No.: 2004-301**

Examiners: _____ **Operators:** _____

Initial Conditions:
75% Reactor Power
Known leakage in 1A Steam Generator
Thunderstorms are approaching from the West

Turnover:
Shift orders are to maintain power at 75%.

Event NO.	Malf. No.	Event Type*	Event Description
1	MMC-04	C	(RO / SRO) boss of CC to NWHX requiring normal letdown to be secured.
2		N	(BOP/SRO) Place excess letdown in service.
3	MRC-08	I	(RO / SRO) Median select Tave fails high.
4	MFW-13	I	(BOP / SRO) 1-FW-LT-1476 1A Steam Generator Level Transmitter fails law. Ramped to allow adequate operator response to gain control of SG level prior to trip on steam / feed mismatch.
5	MRC-15	C	(RO / SRO) Pressurizer Pressure Controller (PC-444A / Channel 1) fails high. Ramped to allow adequate operator response to gain control of pressure.
6	MRM-02	C	(BOP / SRO) 1C Steam Generator tube leak with failure of Condenser Air Ejector Rad Monitor auto actions.
7	MRC-24 MEL-01	M	(ALL) 1C Steam Generator tube rupture coincident with Loss of Offsite Power.
8	MEL-27	C	(BOP / SRO) #3 Emergency Diesel Generator fails to start. EDG can be manually started from the Control Room.

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

Facility: Surry **Scenario No.:** Scenario #2 **Op-Test No.:** 2004-301

Examiners: _____ **Operators:** _____

initial Conditions:
50% Reactor Power
Known leakage in 1A Steam Generator
Thunderstorms are approaching from the West
1-EH-P-MP2 (EHC Pump) is Tagged Out of Service for Thermal Overload Replacement

Turnover:
Shift orders are to maintain power at 50%.

Event No.	Malf. No.	Event Type*	Event Description
1	MBC-01	C	(BOP/SRO) Bearing Cooling Water Pump trips and standby pump fails to auto start.
2		C	(RO/SRO) Letdown Divert Valve fails open.
3	MMS-14	I	(RO/SRO) Selected 1st Stage Turbine Pressure Transmitter fails low (MS-PT-446)
4	MRC-17	C	(RO/SRO) Pressurizer Level Controller fails low.
5	MRC-08	C	(RO/SRO) Tavg Taylor Math Unit Fails low.
6	MMS-08	I	(BOP/SRO) Selected 1B Steam Generator Steam Flow Transmitter fails high.
7	MTU-09	C	(BOP/SRO) Turbine Governor Valve fails closed. Ramp in slow enough for BOP to detect and respond.
8	MRC-01	M	(ALL) LBLOCA - Auto Reactor Trip
9	MTU-03	C	(BOP/SRO) Turbine fails to trip and Gen Brks fail to open.
10	MSI-12	C	(RO/SRO) Both trains of Safety Injection Fail to automatically actuate. Manual actuation from the control room is necessary.

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

Facility: Surry **Scenario No.:** Scenario 3 **Op-Test No.:** 2004-301

Examiners: _____ **Operators:** _____

Initial Conditions:
Reactor Power is 75%
Known leakage in 1A Steam Generator
Thunderstorms are approaching from the West

Turnover:
Shift orders are to raise power immediately following turnover.

Event No.	Malf. No.	Event Type*	Event Description
1		R	(RO/SRO) Raise power. (Rods initially should be positioned to prompt dilution, as opposed to rod pull)
2	MCH-27	I	(RO/SRO) FT-CH-1114, Primary Water Flow XMTR fails low.
3	MCN-06	C	(BOP/SRO) 1-CN-P-1A Condensate Pump Performance Degradation ramped in to require timely operator response. Failure of standby pump auto start. Manual start required.
4	MFW-18	I	(BOP/SRO) 1A SG MFW Flow XMTR fails low.
5	MMS-15	C	(BOP/SRO) 1A S/G PORV Controller Fails high.
6	MCH-01	C	(RO/SRO) Isolable letdown line leak in containment.
7	MMS-03	M	(ALL) Main Steam Line Break in Containment in 18 Steam Generator.
8	MRD-18 MRD-21	C	(RO/SRO) Auto and Manual Reactor Trips fail.
9	MRS-09	C	(RO/SRO) Failure of one HI CLS Train To Activate.
10		C	(BOP/SRO) Failure of 1-CC-TV-105A (CCW return from RCP 1A) to close on Phase III Isolation.

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

Facility: Surry **Scenario No.**: Spare Scenario **Op-Test No.:** 2004-301

Examiners: _____ **Operators:** _____

initial Conditions:
100% Reactor Power
Preparing to conduct partial rod movement testing.

Turnover: Off normal conditions for Unit 1: 1-RC-HCV-1557A (Excess Letdown) **is** isolated due to leakby, 1-EH-P-MP2 (EHC Pump) *is* tagged out for thermal overload replacement. Unit 2 is **at** 100% power with 2-FW-P-2 (TDAFW Pump) tagged out **for** governor replacement.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	(SRO/RO) Conduct Rod Movement Testing (OPT-RX-005)
2	MRC48	I	(SRO/RO) PRZR pressure transmitter fails high (1-RC-PT-445)
3	MRC40	C	(SRO/RO) PORV leakage (1-RC-PCV-2455C)
4	N/A	R	(SRO/RO) Unit Load Reduction (AP-23.00)
5	MFW13	I	(SRO/BOP) "A" SG level transmitter fails low (1-FW-LT-1476)
6	MMS15	C	(SRO/BOP) "B" SG PORV fails open (1-MS-RV-101B)
7	MMS01	M	(ALL) Main Steam Line Break at header (E-0, E-2)
8	MCH05	C	(SRO/RO) "B" Charging Pump Trips - "A" & "C" auto start failure
9	MFW01	C	(SRO/BOP) Motor Driven and Steam Driven AFW pumps trip
10	DISA	C	(SRO/BOP) MSTVs fail to close (1-MS-TV-101A, B, & C)
11	DISA	C	(SRO/BOP) "B" & "C" Main Steam NRVs fail to close
12	N/A	M	(ALL) RCS bleed and feed

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