Draft Submittal

(Pink Paper)

DRAFT Written Exam Quality Checklist (ES-401-6)

& Written Exam Sample Plan

CRYSTAL RIVER OCTOBER 2007

EXAM NO. 50-302/2007-301

Facility: Crystal River Unit #3	Date of Exam: October 29, 2007

Item Description				Initials a	b*	☆c#
1. Questions and answers are technically accurate and applicable to the facility.				AG	MGL	MB
2. a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.				AG	MGL	MB
3. SRO questions are appropriate in accordance with Section D.2.d of ES-401				AG	MGL	MB
4. The facility licensee's sampling process was random and systematic (i.e., no more than 4 RO and/or 2 SRO questions were repeated from the last 2 NRC licensing exams).				AG	MGL	MB
5. Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: __ the audit exam was systematically and randomly developed __ the audit exam was completed before the license exam was started __ the examinations were developed independently X the licensee certifies that there is no duplication __ other (explain)				AG	MGL	MB
6. Bank use meets limits (no more than 75 percent from the bank, at least 10 percent new, and the rest new or modified); enter the actual RO / SRO-only question distribution(s) at right.	Bank 35 / 11	Modified 3 / 1	New 37 / 13	AG	MGL	MB
7. Between 50 and 60 percent of the questions on the RO exam are written at the comprehension/ analysis level; the SRO exam may exceed 60 percent if the randomly selected K/As support the higher cognitive levels; enter the actual RO / SRO question distribution(s) at right.	Memory 33 / 8	C/A 42 / 17		AG	MGL	MB
8. References/handouts provided do not give away answers or aid in the elimination of distractors.				AG	MGL	MB
9. Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.				AG	MGL	MB
10. Question psychometric quality and format meet the guidelines in ES Appendix B.				AG	MGL	MB
11. The exam contains the required number of one-point, multiple choice items; the total is correct and agrees with the value on the cover sheet.				AG	MGL	MB

☆ Exceptions noted on ES-401-9.

	Printed Name / Signature	Date
a. Author	Floyd Lawrence / Floyd E Lawrence	9/5/07
b. Facility Reviewer (*)	Mark Van Sicklen / [signature]	9-5-7
c. NRC Chief Examiner (#)	Mark A. Bates / [signature]	09/24/2007
d. NRC Supervisor	Malcolm T. Widmann / [signature]	09/25/07

Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations.
Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.

8/6/2007

Facility:	Crystal River Unit #3	Date of Exam:	October 29, 2007

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	3	5	N/A			3	3	N/A		2	18			6
	2	1	1	2				1	2			2	9			4
	Tier Totals	3	4	7				4	5			4	27			10
2. Plant Systems	1	3	2	3	4	3	1	3	3	1	5	0	28			5
	2	3	0	1	0	0	1	0	1	1	1	2	10			3
	Tier Totals	6	2	4	4	3	2	3	4	2	6	2	38			8

3. Generic Knowledge and Abilities Categories	1	2	3	4	10	1	2	3	4	7
	2	3	2	3						

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 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. N/A 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. 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.

The random sampling guidance provided in ES-401, Attachments 1 & 2, was used to generate this outline.

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
007 (BW/E02 & E10) Reactor Trip – Stabilization – Recovery - 1		X					BW/E02EK2.1 - Knowledge of the interrelations between the (Vital System Status Verification) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.8 ✓	1
008 Pressurizer Vapor Space Accident / 3			X				008AK3.03 - Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident: Actions contained in EOP for PZR vapor space accident/ LOCA.	4.1 ✓	1
009 Small Break LOCA / 3		X					009EK2.03 - Knowledge of the interrelations between the small break LOCA and the S/Gs.	3.0 ✓	1
011 Large Break LOCA / 3				X			011EA1.12 - Ability to operate and monitor long-term containment of radioactivity as it applies to a Large Break LOCA.	4.1 ✓	1
015/17 RCP Malfunctions /4					X		015/017AA2.10 - Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): When to secure RCPs on loss of cooling or seal injection.	3.7 ✓	1
022 Loss of Rx Coolant Makeup / 2						X	022G2.1.30 - Ability to locate and operate components, including local controls.	3.9 ✓	1
025 Loss of RHR System / 4		X					025AK2.05 - Knowledge of the interrelations between the Loss of Decay Heat Removal System and the following: Reactor building sump.	2.6 ✓	1
026 Loss of Component Cooling Water / 8						X	026G2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	3.5 ✓	1

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Emergency and Abnormal Plant Evolutions – Tier 1 / Group 1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
027 PZR Pressure Control System Malfunction / 3			X				027AK3.04 - Knowledge of the reasons for the following responses as they apply to the Pressurizer Pressure Control Malfunctions: Why, if PZR level is lost and then restored, that pressure recovers much more slowly.	2.8 ✓	1
029 ATWS / 1	X						029EK1.03 - Knowledge of the operational implications of the following concepts as they apply to the ATWS: Effects of boron on reactivity.	3.6 ✓	1
038 Steam Generator Tube Rupture / 3			X				038EK3.06 - Knowledge of the reasons for the following responses as the apply to the SGTR: Actions contained in EOP for RCS water inventory balance, S/G tube rupture and plant shutdown procedures.	4.2 ✓	1
040 (BW/E05) Steam Line Rupture – Excessive Heat Transfer / 4	X						BW/E05EK1.2 - Knowledge of the operational implications of the following concepts as they apply to the (Excessive Heat Transfer): Normal, abnormal and emergency operating procedures associated with (Excessive Heat Transfer).	4.0 ✓	1
054 Loss of Main Feedwater / 4				X			054AA1.03 - Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW): EFW auxiliaries, including oil cooling water supply.	3.5 ✓	1
055 Station Blackout / 6					X		055EA2.01 - Ability to determine or interpret the following as they apply to a Station Blackout: Existing valve positioning on a loss of instrument air system.	3.4 ✓	1
056 Loss of Offsite Power / 6			X				056AK3.02 - Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power: Actions contained in EOP for loss of offsite power.	4.4 ✓	1

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Emergency and Abnormal Plant Evolutions – Tier 1 / Group 1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
057 Loss of Vital AC Instrument Bus / 6				X			057AA1.04 - Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Normal makeup control valve.	3.5	1
058 Loss of DC Power / 6									
062 Loss of Nuclear Services Water / 4					X		062AA2.04 - Ability to determine and interpret the following as they apply to the Loss of Raw Water: The normal values and upper limits for the temperatures of the components cooled by RWS.	2.5	1
065 Loss of Instrument Air / 8									
~~*W/E04 LOCA Outside Containment / 3*~~							*N/A*		
~~*W/E11 Loss of Emergency Coolant Recirc / 4*~~							*N/A*		
BW/E04 Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4			X				BW/E04EK3.3 - Knowledge of the reasons for the following responses as they apply to the (Inadequate Heat Transfer): Manipulation of controls required to obtain desired operating results during abnormal and emergency situations.	4.2	1
K/A Category Totals	2	3	5	3	3	2	Group Point Total		18/6

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
001 Continuous Rod Withdrawal / 1									
003 Dropped Control Rod / 1									
005 Inoperable/Stuck Rod / 1									
024 Emergency Boration / 1						X	024G2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	3.4 ✓	1
028 Pressurizer Level Malfunction / 2									
032 Loss of Source Range NI / 7									
033 Loss of Intermediate Range NI / 7									
036 (BW/A08) Fuel Handling Accident / 8		X					BW/A08AK2.1 - Knowledge of the interrelations between the (Refueling Canal Level Decrease) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	4.0 ✓	1
037 Steam Generator Tube Leak / 3									
051 Loss of Condenser Vacuum / 4									
059 Accidental Liquid RadWaste Rel. / 9									
060 Accidental Gaseous Radwaste Rel. / 9									

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
061 ARM System Alarms / 7				X			061AA1.01 - Ability to operate and / or monitor the following as they apply to the ARM system: Automatic actuation.	3.6 ✓	1
067 Plant Fire On-site / 8									
068 (BW/A06) Control Room Evac. / 8									
069 Loss of CTMT Integrity / 5									
074 Inad. Core Cooling / 4 New K/A 3.04 provided 10/10/2007 (or 3.07 if that won't work)			X				074EK3.06 - Knowledge of the reasons for the following responses as they apply to the Inadequate Core Cooling: Confirming that the PORV cycles open at the specified setpoint.	3.9 ✓	1
076 High Reactor Coolant Activity / 9						X	076G2.2.22 - Knowledge of limiting conditions for operations and safety limits.	3.4 ✓	1
~~*W/EO1 & E02 Rediagnosis & SI Termination / 3*~~							*N/A*		
~~*W/E13 Steam Generator Over-pressure / 4*~~							*N/A*		
~~*W/E15 Containment Flooding / 5*~~							*N/A*		
~~*W/E16 High Containment Radiation / 9*~~							*N/A*		
BW/A01 Plant Runback / 1					X		BW/A01AA2.2 - Ability to determine and interpret the following as they apply to the (Plant Runback): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.5 ✓	1

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6	X						BW/A05AK1.3 - Knowledge of the operational implications of the following concepts as they apply to the (Emergency Diesel Actuation): Annunciators and conditions indicating signals, and remedial actions associated with the (Emergency Diesel Actuation).	3.8 ✓	1
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4					X		BW/E03EA2.1 - Ability to determine and interpret the following as they apply to the (Inadequate Subcooling Margin): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.0 ✓	1
BW/E08 LOCA Cooldown - Depress. / 4									
BW/E09 Natural Circ. / 4			X				BW/E09EK3.1 - Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Cooldown): 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.	3.2 ✓	1
BW/E13&E14 EOP Rules and Enclosures									
~~*CE/A11; W/E08 RCS Overcooling - PTS / 4*~~							*N/A*		

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2							Form ES-401-2
E/APE # / Name / Safety Function	**K 1**	**K 2**	**K 3**	**A 1**	**A 2**	**G**	**K/A Topic(s)**	**IR**	**#**
~~*CE/A16 Excess RCS Leakage / 2*~~							*N/A*		
~~*CE/E09 Functional Recovery*~~							*N/A*		
K/A Category Totals	1✓	1✓	2✓	1✓	2✓	2✓	Group Point Total		9✓/4

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems – Tier 2 / Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump / 4										X		003A4.03 - Ability to manually operate and/or monitor the RCP lube oil and lift pump motor controls in the control room.	2.8	1
004 Chemical and Volume Control / 1 & 2					X							004K5.26 - Knowledge of the relationship between MUT pressure and NPSH for makeup pumps.	3.1	1
									X			004A3.15 - Ability to monitor automatic operation of the MUPS, including PZR pressure and temperature.	3.5	1
005 Residual Heat Removal / 4					X							005K5.09 - Knowledge of the operational implications of the following concepts as they apply the Decay Heat System: Dilution and boration considerations.	3.2	1
006 Emergency Core Cooling / 2 & 3				X								006K4.21 - Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the following: Bypassing/blocking ESF channels.	4.1	1
										X		006A4.08 - Ability to manually operate and/or monitor in the control room: ESF system, including reset.	4.2	1
007 Pressurizer Relief/Quench Tank / 5								X				007A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the RCDT; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Abnormal pressure in the RCDT.	2.6	1
008 Component Cooling Water / 8			X									008K3.02 - Knowledge of the effect that a loss or malfunction of the SWS / DCS will have on the following: CRDS.	2.9	1

ES-401 **PWR Examination Outline** **Form ES-401-2**
Plant Systems – Tier 2 / Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
010 Pressurizer Pressure Control / 3			X									010K3.03 - Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following: ESFAS.	4.0 ✓	1
012 Reactor Protection / 7							X					012A1.01 - Ability to predict and/or monitor changes in trip setpoint adjustment (to prevent exceeding design limits) associated with operating the RPS controls.	2.9 ✓	1
013 Engineered Safety Features Actuation / 2				X								013K4.12 - Knowledge of ESFAS design feature(s) and/or interlock(s) which provide for the safety injection bypass. block	3.7 ✓	1
022 Containment Cooling / 5	X											022K1.04 - Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: Chilled water.	2.9 ✓	1
~~*025 Ice Condenser*~~												*N/A*		
026 Containment Spray / 5		X										026K2.02 - Knowledge of bus power supplies to the MOVs.	2.7 ✓	1
039 Main and Reheat Steam / 4					X							039K5.05 - Knowledge of the operational implications of the following concepts as they apply to the MRSS: Bases for RCS cooldown limits.	2.7 ✓	1
										X		039A4.04 - Ability to manually operate and/or monitor in the control room: Emergency feedwater pump turbines.	3.8 ✓	1

	K1	2	3	4	5	6	A1	2	3	4	G			
059 Main Feedwater / 4				X								059K4.19 - Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic feedwater isolation of MFW.	3.2 ✓	1
							X					059A1.03 - 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 ✓	1
061 Auxiliary / Emergency Feedwater / 4	X											061K1.10 - Knowledge of the physical connections and/or cause-effect relationships between the EFW and the following systems: Diesel fuel oil.	2.6 ✓	1
062 AC Electrical Distribution / 6								X				062A2.12 - 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.	3.2 ✓	1
063 DC Electrical Distribution / 6			X									063K3.01 - Knowledge of the effect that a loss or malfunction of the dc electrical system will have on the following: ED/G.	3.7 ✓	1
064 Emergency Diesel Generator / 6						X						064K6.07 - Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Air receivers.	2.7 ✓	1
								X				064A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Load, VARS, pressure on air compressor, speed droop, frequency, voltage, fuel oil level, temperatures.	2.7 ✓	1

	K1	2	3	4	5	6	A1	2	3	4	G			
073 Process Radiation Monitoring / 7							X					073A1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRM system controls including: Radiation levels.	3.2	1
										X		073A4.03 - Ability to manually operate and/or monitor in the control room: Check source for operability demonstration.	3.1	1
076 Service Water / 4				X								076K4.02 - Knowledge of RWS design feature(s) and/or interlock(s) which provide for the following: Automatic start features associated with RWS pump controls.	2.9	1
078 Instrument Air / 8	X											078K1.04 - Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Cooling water to compressor.	2.6	1
		X										078K2.01 - Knowledge of bus power supplies to the following: Instrument air compressor.	2.7	1
103 Containment / 5										X		103A4.06 - Ability to manually operate and/or monitor in the control room: Operation of the reactor building personnel airlock door.	2.7	1
K/A Category Totals	3	2	3	4	3	1	3	3	1	5	0	Group Point Total		28/5

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems – Tier 2 / Group 2

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 / 1														
002 Reactor Coolant / 2 & 4									X			002A3.01 - Ability to monitor automatic operation of the RCS, including the reactor coolant leak detection system.	3.7 ✓	1
011 Pressurizer Level Control / 2														
014 Rod Position Indication / 1										X		014A4.02 - Ability to manually operate and/or monitor the control rod mode-select switch.	3.4 ✓	1
015 Nuclear Instrumentation / 7														
016 Non-nuclear Instrumentation / 7								X				016A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the NNIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of power supply.	2.9 ✓	1
017 In-core Temperature Monitor / 7														
027 Containment Iodine Removal / 5														
028 Hydrogen Recombiner and Purge Control / 5														
029 Containment Purge / 8														
033 Spent Fuel Pool Cooling / 8			X									033K3.03 - Knowledge of the effect that a loss or malfunction of the Spent Fuel Pool Cooling System will have on the following: Spent fuel temperature.	3.0 ✓	1

ES-401 **PWR Examination Outline** **Form ES-401-2**
Plant Systems – Tier 2 / Group 2

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	#
034 Fuel Handling Equipment / 8											X	034G2.4.31 - Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3 ✓	1
035 Steam Generator / 4						X						035K6.03 - Knowledge of the effect of a loss or malfunction of a S/G level detector will have on the S/G's.	2.6 ✓	1
041 Steam Dump/Turbine Bypass Control / 4											X	041G2.4.35 - Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.3 ✓	1
045 Main Turbine Generator / 4	X											045K1.18 - Knowledge of the physical connections and/or cause-effect relationships between the MT/G system and the RPS.	3.6 ✓	1
055 Condenser Air Removal / 4														
056 Condensate / 4														
068 Liquid Radwaste / 9														
071 Waste Gas Disposal / 9														
072 Area Radiation Monitoring / 7	X											072K1.04 - Knowledge of the physical connections and/or cause-effect relationships between the ARM system and the following systems: Control room ventilation.	3.3 ✓	1
075 Circulating Water / 8	X											075K1.01 - Knowledge of the physical connections and/or cause-effect relationships between the CW system and the following systems: RW System.	2.5 ✓	1
079 Station Air / 8														
086 Fire Protection / 8														
K/A Category Totals	3 ✓	0 ✓	1 ✓	0 ✓	0 ✓	1 ✓	0 ✓	1 ✓	1 ✓	1 ✓	2 ✓	Group Point Total		10/3 ✓

RO

Facility:	Crystal River Unit #3		Date of Exam:	October 29, 2007		
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.16	Ability to operate plant phone, paging system, and two-way radio.	2.9	1		
	2.1.32	Ability to explain and apply all system limits and precautions.	3.4	1		
	Subtotal			2		
2. Equipment Control	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1		
	2.2.28	Knowledge of new and spent fuel movement procedures.	2.6	1		
	2.2.33	Knowledge of control rod programming.	2.5	1		
	Subtotal			3		
3. Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.5	1		
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	1		
	Subtotal			2		
4. Emergency Procedures / Plan	2.4.10	Knowledge of annunciator response procedures.	3.0	1		
	2.4.18	Knowledge of the specific bases for EOPs.	2.7	1		
	2.4.25	Knowledge of fire protection procedures.	2.9	1		
	Subtotal			3		
Tier 3 Point Total				**10**		7

RO

Tier/ Group	Randomly Selected K/A	Reason for Rejection	
1/1	025AK2.11	Importance Rating < 2.5	✓
1/1	025AK2.08	Importance Rating < 2.5	✓
1/1	026AK1	No KAs ≥ 2.5	✓
2/1	004A3.17	Importance Rating < 2.5	✓
2/1	004K5.38	Importance Rating < 2.5	✓
2/1	004K5.53	Importance Rating < 2.5	✓
2/1	004K5.39	Importance Rating < 2.5	✓
2/1	004K5.22	Importance Rating < 2.5	✓
2/1	004K5.45	Importance Rating < 2.5	✓
2/1	004K5.03	Importance Rating < 2.5	✓
2/1	007A2.07	Importance Rating < 2.5	✓
2/1	013K4.15	Not applicable at CR #3	✓
2/1	013K4.06	Not applicable at CR #3	✓
2/1	059K5	No KAs ≥ 2.5	✓
2/1	063K5	No KAs ≥ 2.5	✓
2/1	064A4.01	Randomly deselected for category balance (inadequate K6 coverage in Tier 2) Replaced with what K/A?	✓
2/1	073A3	No KAs ≥ 2.5	✓
2/1	076K4.04	Importance Rating < 2.5	✓
2/1	076K4.05	Importance Rating < 2.5	✓
2/1	078K5	No KAs ≥ 2.5	✓
2/1	078A2	No KAs ≥ 2.5	✓
2/1	078K4.01	Randomly deselected for category balance (inadequate K2 coverage in Tier 2) Replaced with what K/A?	✓
2/2	033K2	No KAs ≥ 2.5	✓
2/2	035K6.09	Importance Rating < 2.5	✓
2/2	045K1.13	Importance Rating < 2.5	✓
2/2	045K1.07	Importance Rating < 2.5	✓
2/2	045K1.08	Importance Rating < 2.5	✓
2/2	072K2	No KAs ≥ 2.5	✓
2/2	075K5	No KAs ≥ 2.5	✓
2/2	075K1.06	Importance Rating < 2.5	✓
3	2.2.15	Importance Rating < 2.5	✓
3	2.2.3	Not applicable to single unit site	✓
3	2.2.8	Importance Rating < 2.5	✓
3	2.2.10	Importance Rating < 2.5	✓
3	2.3.5	Importance Rating < 2.5	✓
3	2.4.38	Importance Rating < 2.5	✓
3	2.4.41	Importance Rating < 2.5	✓

8/6/2007

Facility:	Crystal River Unit #3	Date of Exam:	October 29, 2007

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				N/A					N/A			18	3	3	6
	2												9	2	2	4
	Tier Totals												27	5	5	10
2. Plant Systems	1												28	3	2	5
	2												10	1 / 1	1	3
	Tier Totals												38	5	3	8

3. Generic Knowledge and Abilities Categories	1	2	3	4	10	1	2	3	4	7
						2	2	1	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 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. Use duplicate pages for RO and SRO-only exams.

   034A4.02
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.

   → G2.4.25 Does not have a 43 Tie.

The random sampling guidance provided in ES-401, Attachments 1 & 2, was used to generate this outline.

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
007 (BW/E02 & E10) Reactor Trip – Stabilization – Recovery - 1									
008 Pressurizer Vapor Space Accident / 3									
009 Small Break LOCA / 3						X	009G2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3 ✓	1
011 Large Break LOCA / 3									
015/17 RCP Malfunctions /4									
022 Loss of Rx Coolant Makeup / 2									
025 Loss of RHR System / 4						X	025G2.1.25 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	3.1 ✓	1
026 Loss of Component Cooling Water / 8									
027 PZR Pressure Control System Malfunction / 3					X		027AA2.11 - Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: RCS pressure.	4.1 ✓	1
029 ATWS / 1									
038 Steam Generator Tube Rupture / 3									
040 (BW/E05) Steam Line Rupture – Excessive Heat Transfer / 4						X	BW/E05G2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4 ✓	1

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
054 Loss of Main Feedwater / 4					X		054AA2.04 - Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): Proper operation of EFW pumps and regulating valves.	4.3 ✓	1
055 Station Blackout / 6					X		055EA2.02 - Ability to determine or interpret the following as they apply to a Station Blackout: RCS core cooling through natural circulation cooling to S/G cooling.	4.6 ✓	1
056 Loss of Offsite Power / 6									
057 Loss of Vital AC Instrument Bus / 6									
058 Loss of DC Power / 6									
062 Loss of Nuclear Services Water / 4									
065 Loss of Instrument Air / 8									
~~*W/E04 LOCA Outside Containment / 3*~~							*N/A*		
~~*W/E11 Loss of Emergency Coolant Recirc / 4*~~							*N/A*		
BW/E04 Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4									
K/A Category Totals					3 ✓	3 ✓	Group Point Total		18/6 ✓

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
001 Continuous Rod Withdrawal / 1									
003 Dropped Control Rod / 1									
005 Inoperable/Stuck Rod / 1					X		005AA2.03 - Ability to determine and interpret the following as they apply to the Inoperable / Stuck Control Rod: Required actions if more than one rod is stuck or inoperable.	4.4	1
024 Emergency Boration / 1									
028 Pressurizer Level Malfunction / 2									
032 Loss of Source Range NI / 7									
033 Loss of Intermediate Range NI / 7									
036 (BW/A08) Fuel Handling Accident / 8					X		036AA2.02 - Ability to determine and interpret the following as they apply to the Fuel Handling Incidents: Occurrence of a fuel handling incident.	4.1	1
037 Steam Generator Tube Leak / 3									
051 Loss of Condenser Vacuum / 4									
059 Accidental Liquid RadWaste Rel. / 9									
060 Accidental Gaseous Radwaste Rel. / 9									
061 ARM System Alarms / 7									

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
067 Plant Fire On-site / 8						X	067G2.4.41 - Knowledge of the emergency action level thresholds and classifications.	4.1	1
068 (BW/A06) Control Room Evac. / 8									
069 Loss of CTMT Integrity / 5						X	069G2.1.12 - Ability to apply technical specifications for a system.	4.0	1
074 Inad. Core Cooling / 4									
076 High Reactor Coolant Activity / 9									
~~*W/E01 & E02 Rediagnosis & SI Termination / 3*~~							*N/A*		
~~*W/E13 Steam Generator Over-pressure / 4*~~							*N/A*		
~~*W/E15 Containment Flooding / 5*~~							*N/A*		
~~*W/E16 High Containment Radiation / 9*~~							*N/A*		
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions – Tier 1 / Group 2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08 LOCA Cooldown - Depress. / 4									
BW/E09 Natural Circ. / 4									
BW/E13&E14 EOP Rules and Enclosures									
~~*CE/A11; W/E08 RCS Overcooling - PTS / 4*~~							*N/A*		
~~*CE/A16 Excess RCS Leakage / 2*~~							*N/A*		
~~*CE/E09 Functional Recovery*~~							*N/A*		
K/A Category Totals					2 ✓	2 ✓	Group Point Total		9/4 ✓

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems – Tier 2 / Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump / 4								X				003A2.02 - Ability to (a) predict the impacts of the following malfunctions or operations on the RCPs; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown of an RCP.	3.9 ✓	1
004 Chemical and Volume Control / 1 & 2											X	004G2.2.25 - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7 ✓	1
005 Residual Heat Removal / 4														
006 Emergency Core Cooling / 2 & 3														
007 Pressurizer Relief/Quench Tank / 5														
008 Component Cooling Water / 8														
010 Pressurizer Pressure Control / 3														
012 Reactor Protection / 7														
013 Engineered Safety Features Actuation / 2														

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems – Tier 2 / Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
022 Containment Cooling / 5														
~~*025 Ice Condenser*~~												*N/A*		
026 Containment Spray / 5								X				026A2.08 - 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: Safe securing of containment spray when it can be done.	3.7 ✓	1
039 Main and Reheat Steam / 4														
059 Main Feedwater / 4														
061 Auxiliary / Emergency Feedwater / 4														
062 AC Electrical Distribution / 6								X				062A2.16 - 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: Degraded system voltages.	2.9 ✓	1
063 DC Electrical Distribution / 6														
064 Emergency Diesel Generator / 6											X	064G2.1.22 - Ability to determine Mode of Operation.	3.3 ✓	1

ES-401	PWR Examination Outline Plant Systems – Tier 2 / Group 1	Form ES-401-2

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	#
073 Process Radiation Monitoring / 7														
076 Service Water / 4														
078 Instrument Air / 8														
103 Containment / 5														
K/A Category Totals								3			2	Group Point Total		28/5

ES-401 **PWR Examination Outline** **Form ES-401-2**
Plant Systems – Tier 2 / Group 2

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 / 1															
002 Reactor Coolant / 2 & 4															
011 Pressurizer Level Control / 2															
014 Rod Position Indication / 1															
015 Nuclear Instrumentation / 7															
016 Non-nuclear Instrumentation / 7															
017 In-core Temperature Monitor / 7															
027 Containment Iodine Removal / 5															
028 Hydrogen Recombiner and Purge Control / 5															
029 Containment Purge / 8											X	029G2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.0 ✓	1	No 43 tie
033 Spent Fuel Pool Cooling / 8															
034 Fuel Handling Equipment / 8										X		034A4.02 - Ability to manually operate and/or monitor in the control room: Neutron levels.	3.9 ✓	1	No 43 Tie
035 Steam Generator / 4															
041 Steam Dump/Turbine Bypass Control / 4															

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems – Tier 2 / Group 2

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	#
045 Main Turbine Generator / 4														
055 Condenser Air Removal / 4														
056 Condensate / 4														
068 Liquid Radwaste / 9														
071 Waste Gas Disposal / 9								X				071A2.02 - 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: Use of waste gas release monitors, radiation, gas flow rate, and totalizer.	3.6 ✓	1
072 Area Radiation Monitoring / 7														
075 Circulating Water / 8														
079 Station Air / 8														
086 Fire Protection / 8														
K/A Category Totals								1 ✓		1 ✓	1 ✓	Group Point Total		10/3 ✓

SRO

Facility:	Crystal River Unit #3		Date of Exam:	October, 2007			
Category	K/A #	Topic	RO		SRO-Only		
			IR	#	IR	#	
1. Conduct of Operations	2.1.4	Knowledge of shift staffing requirements.			3.4	1	✓
	2.1.34	Ability to maintain primary and secondary plant chemistry within allowable limits.			2.9	1	✓
	Subtotal					2	
2. Equipment Control	2.2.17	Knowledge of the process for managing maintenance activities during power operations.			3.5	1	✓
	2.2.26	Knowledge of refueling administrative requirements.			3.7	1	✓
	Subtotal					2	
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.			3.1	1	✓
	Subtotal					1	
4. Emergency Procedures / Plan	2.4.25	Knowledge of fire protection procedures.			3.4	1	← No 43 ti
	2.4.40	Knowledge of the SRO's responsibilities in emergency plan implementation.			4.0	1	✓
	Subtotal					2	
Tier 3 Point Total						7	

SRO

Tier/ Group	Randomly Selected K/A	Reason for Rejection
2/1	026A2.02	Not applicable to CR3
2/2	034K2	No KAs ≥ 2.5