

# Final Submittal

(Blue Paper)

HARRIS 2008-301

OP TEST 3/10-3/13/2008

Written ~~ADMINISTERED~~ 3/21/2008

**FINAL OUTLINES**

Facility: HARRIS	Date of Examination: March, 2008	
Examination Level (circle one): <b>RO</b> / SRO	Operating Test Number: <b>NRC</b>	
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M	Determine the cold, xenon free boron concentration requirement prior to commencing a natural circulation cooldown. (EPP-005/OST-1036) G2.1.25 (2.8/3.1) – Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.
Conduct of Operations	M	Estimate Primary to Secondary Leak Rate. (AOP-016, Curve Book) 2.1.25 (2.8) – Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.
Equipment Control	M	Perform a Quadrant Power Tilt Ratio (QPTR) calculation with a control rod misaligned. (OST-1039) 2.2.12 (3.0) – Knowledge of surveillance procedures.
Radiation Control	M	Given an emergency situation, determine the applicable dose limit and the number of people that will be required to perform the task, with no one exceeding the limit. 2.3.4 (2.5/3.1) – Knowledge of radiation exposure limits and contamination control, including permissible limits in excess of those authorized.
Emergency Plan		<b>NOT SELECTED FOR RO</b>
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 ( $\leq 3$ for ROs; $\leq$ for SROs & RO retakes) (N)ew or (M)odified from bank ( $> 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected) (S)imulator		

Facility: HARRIS		Date of Examination: March, 2008
Examination Level (circle one): RO / <b>SRO</b>		Operating Test Number: <b>NRC</b>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M	Determine the cold, xenon free RCS boron concentration requirement prior to commencing a natural circulation cooldown. (EPP-005/OST-1036) G2.1.25 (2.8/3.1) – Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.
Conduct of Operations	P, M	Perform a Control Room Supervisor review of the control board readings log. (OST-1021, Attachment 4) G2.1.18 (3.0) – Ability to make accurate, clear and concise logs, records, status boards, and reports.
Equipment Control	N	Review the completed surveillance for Motor Driven AFW Pump "A". (OST-1211) 2.2.12 (3.4) – Knowledge of surveillance procedures.
Radiation Control	M	Given an emergency situation, determine the applicable dose limit and the number of people that will be required to perform the task, with no one exceeding the limit. 2.3.4 (2.5/3.1) – Knowledge of radiation exposure limits and contamination control, including permissible limits in excess of those authorized.
Emergency Plan	M	Evaluate a change in conditions with an EAL in effect and take the required actions. 2.2.41(4.1) – Knowledge of the emergency action level thresholds and classifications.
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 ( $\leq 3$ for ROs; $\leq$ for SROs & RO retakes) (N)ew or (M)odified from bank ( $> 1$ ) (P)revious 2 exams ( $\leq 1$ ; randomly selected) (S)imulator		

Facility:	<u>HARRIS</u>	Date of Examination:	<u>3/2008</u>
Exam Level (circle one):	RO / SRO(I) / <b>SRO (U)</b>	Operating Test No.:	<b>NRC</b>
Control Room Systems <sup>®</sup> (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title		Type Code*	Safety Function
a.	Initiate Emergency Boration following a reactor trip (AOP-002) System: 004/Bank JPM CR-037	M, A, S	1
b.	<b>Align ECCS for long-term recirculation (EPP-010)</b> <b>System: EPE011/Bank JPM CR-031</b>	<b>M, A, S</b>	<b>3</b>
c.	Initiate RCS Feed and Bleed (FRP-H.1) System: E05/2007 NRC Exam JPM d	P, D, A, S	4P
d.	Respond to a loss of Normal Service Water (AOP-022) System: 076	N, A, S	4S
e.	Place the Containment Hydrogen Purge System in operation (OP-125) <b>RO Only</b> System: 028/Bank JPM CR-021	D, C	5
f.	<b>Transfer an Emergency Bus to an EDG due to a degraded grid condition (AOP-028, Attachment 2)</b> <b>System: 062</b>	<b>N, A, S</b>	<b>6</b>
g.	Respond to a Fuel Handling Building RMS alarm (AOP-005, OP-170) System: 072	N, L, S	7
h.	<b>Align CCW to support RHR Initiation (OP-145)</b> <b>System: 008/Bank JPM CR-085</b>	<b>D, L, S</b>	<b>8</b>
In-Plant Systems <sup>®</sup> (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)			
i.	<b>Perform the local actions for a dropped rod recovery (AOP-001)</b> <b>System: 001/Bank JPM IP-153</b>	<b>D, E</b>	<b>1</b>

j. Isolate the ECCS Accumulators after a control room evacuation (AOP-004, Step 38)  System: APE068	N, E	8
k. <b>Terminate a Waste Gas Release (OP-120.07)</b>  System: 071/2007 NRC JPM k	P, D, R	9
@ 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 (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3  ≤ 9 / ≤ 8 / ≤ 4 ≥ 1 / ≥ 1 / ≥ 1 ≥ 1 / ≥ 1 / ≥ 1 ≥ 2 / ≥ 2 / ≥ 1 ≤ 3 / ≤ 3 / ≤ 2 (randomly selected) ≥ 1 / ≥ 1 / ≥ 1	

### HARRIS 2008 NRC 301-2 JPM SUMMARY STATEMENTS

- a. Initiate Emergency Boration in accordance with AOP-002, EMERGENCY BORATION, following a reactor trip. The alternate path is to take corrective action for two or more stuck rods as determined in EPP-004, REACTOR TRIP. Modified from Bank JPM CR-037 by failing first boration path driving candidate to use secondary means.
- b. Transfer to Cold Leg Recirculation in accordance with EPP-010, TRANSFER TO COLD LEG RECIRCULATION, following a LBLOCA. The alternate paths are corrective actions for alignment failures in two different flowpaths. Modify Bank JPM CR-031 by changing the misaligned valve in one RNO step and the running pump combination.
- c. Initiate RCS Feed and Bleed IAW FRP-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK. The alternate path is to establish an adequate vent path using RV Head Vents following failure of one PORV to open. Randomly selected repeat from 2007 NRC Exam (JPM d) not in the facility bank.
- d. Respond to a loss of the only available Normal Service Water Pump in accordance with AOP-022, LOSS OF SERVICE WATER. The alternate path is to start one Essential Service Water Pump and to trip the Main Turbine with power less than P-10. New JPM.
- e. Place the Containment Hydrogen Purge System in operation in accordance with OP-125, POST ACCIDENT HYDROGEN SYSTEM. Bank JPM CR-021. This JPM will be simulated in the Main Control Room (using cues) because some equipment important to the task is not simulated.

- f. With a degraded grid condition, transfer an emergency bus to an EDG in accordance with AOP-028, GRID INSTABILITY – Attachment 2, ENERGIZING EMERGENCY BUSES FROM EDGS, by purposely de-energizing a bus. The alternate path is starting an EDG following evaluation of Voltage/Frequency on an emergency bus and manually resetting the Load Sequencer after the cycle is complete. New JPM.
- g. Respond to a Fuel Handling Building RMS alarm in accordance with AOP-005, RADIATION MONITORING SYSTEM, and OP-170, FUEL HANDLING BUILDING HVAC. A FHB monitor alarms and FHB HVAC components fail to align properly. New JPM.
- h. Align CCW to support RHR Initiation in accordance with OP-145, COMPONENT COOLING WATER. Bank JPM CR-085.
- i. Perform the local actions for a dropped rod recovery in accordance with AOP-001, MALFUNCTION OF ROD CONTROL AND INDICATION SYSTEM. Bank JPM-IP-153.
- j. Isolate the ECCS Accumulators after a control room evacuation in accordance with AOP-004, REMOTE SHUTDOWN, Step 38. New JPM.
- k. Terminate a Waste Gas Release in accordance with OP-120.07, WASTE GAS PROCESSING. Randomly selected repeat from 2007 NRC Exam (JPM k).

Facility:		Harris 2008 NRC Outline										Date of Exam:		3/10/08				
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	3	3	3				3	3			3	18	3	3	6		
	2	2	2	1				1	1			2	9	2	2	4		
	Tier Totals	5	5	4				4	4			5	27	5	5	10		
2. Plant Systems	1	3	1	3	3	3	2	3	2	3	2	3	28	2	3	5		
	2	1	1	1	0	1	1	0	2	1	1	1	10	0	2	3		
	Tier Totals	4	2	4	3	4	3	3	4	4	3	4	38	4	4	8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					2		2		2		4			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 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 (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.																
	9.	For Tier 3, select topics from Section 2 of the K/A Catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10CFR55.43																

Harris 2008 NRC  
Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
025 / Loss of Residual Heat Removal System / 4						X	AA2.02	Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Leakage of reactor coolant from RHR into closed cooling water system or into reactor building atmosphere	3.8	76
057 / Loss of Vital AC Instrument Bus / 8	X						2.1.7	Conduct of Operations: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	77
038 / Steam Generator Tube Rupture / 3	X						2.1.14	Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.	3.3	78
040 / Steam Line Rupture / 4						X	AA2.05	Ability to determine and interpret the following as they apply to the Steam Line Rupture: When ESFAS systems may be secured	4.5	79
E04 / LOCA Outside Containment / 3	X						EA1.3	Ability to operate and / or monitor the following as they apply to LOCA Outside Containment: Desired operating results during abnormal and emergency situations.	4.0	80
E11 / Loss of Emergency Coolant Recirculation / 4						X	EA2.2	Ability to determine and interpret the following as they apply to the (Loss of Emergency Coolant Recirculation): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	4.2	81
007 / Reactor Trip / 1	X						2.1.23	Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	39
008 / Pressurizer Vapor Space Accident / 3			X				AK2.03	Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Controllers and positioners	2.5	40
009 / Small Break LOCA / 3			X				EK2.03	Knowledge of the interrelations between the small break LOCA and the following: S/Gs	3.0	41
011 / Large Break LOCA / 3					X		EA1.15	Ability to operate and monitor the following as they apply to a Large Break LOCA: RCS temperature and pressure	4.2	42

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

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
015 / 17 / Reactor Coolant Pump Malfunctions / 4		X					AK1.05	Knowledge of the operational implications of the following concepts as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Effects of unbalanced RCS flow on in-core average temperature, core imbalance, and quadrant power tilt	2.7	43
022 / Loss of Reactor Coolant Makeup / 2	X						2.1.28	Conduct of Operations: Knowledge of the purpose and function of major system components and controls.	3.2	44
025 / Loss of Residual Heat Removal System / 4					X		AA1.20	Ability to operate and/or monitor the following as they apply to the Loss of Residual Heat Removal System: HPI pump control switch, indicators, ammeter running lights, and flow meter	2.6	45
027 / Pressurizer Pressure Control System Malfunction / 3					X		AA1.03	Ability to operate and/or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: Pressure control when on a steam bubble	3.6	46
029 / Anticipated Transient Without Scram (ATWS) / 1						X	EA2.05	Ability to determine or interpret the following as they apply to a ATWS: System component valve position indications	3.4	47
038 / Steam Generator Tube Rupture / 3		X					EK1.03	Knowledge of the operational implications of the following concepts as they apply to the SGTR: Natural Circulation	3.9	48
040 / Steam Line Rupture / 4		X					AK1.07	Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: Effects of feedwater introduction on dry S/G	3.4	49
054 / Loss of Main Feedwater / 4						X	AA2.04	Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): Proper operation of AFW pumps and regulating valves	4.2	50
056 / Loss of Off-site Power / 6	X						2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	3.0	51
058 / Loss of DC Power / 6				X			AK3.02	Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of DC power	4.0	52

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

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
062 / Loss of Nuclear Service Water / 4				X			AK3.02	Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: The automatic actions (alignments) within the nuclear service water resulting from the actuation of the ESFAS	3.6	53
E04 / LOCA Outside Containment / 3			X				EK2.2	Knowledge of the interrelations between the (LOCA Outside Containment) 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.	3.8	54
E05 / Loss of Secondary Heat Sink / 4						X	EA2.2	Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.7	55
E11 / Loss of Emergency Coolant Recirculation / 4				X			EK3.3	Knowledge of the reasons for the following responses as they apply to the (Loss of Emergency Coolant Recirculation): Manipulation of controls required to obtain desired operating results during abnormal and emergency situations.	3.8	56
K/A Category Point Totals:	3/3	3	3	3	3	3/3	Group Point Total:			18/6

Harris 2008 NRC  
Written Examination Outline  
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
005 / Inoperable/Stuck Control Rod / 1	X						2.4.50	Emergency Procedures/Plan: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	82
068 / Control Room Evacuation / 8						X	AA2.10	Ability to determine and interpret the following as they apply to the Control Room Evacuation: Source range count rate	4.4	83
E06 / Degraded Core Cooling / 4	X						2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	4.0	84
E10 / Natural Circulation with Steam Void in Vessel with/without RVLIS / 4						X	EA2.1	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.	3.9	85
003 / Dropped Control Rod / 1		X					AK1.11	Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: Long-range effects of core quadrant power tilt	2.5	57
024 / Emergency Boration / 1			X				AK2.03	Knowledge of the interrelations between the Emergency Boration and the following: Controllers and positioners	2.6	58
033 / Loss of Intermediate Range Nuclear Instrumentation / 7				X			AK3.02	Knowledge of the reasons for the following responses as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Guidance contained in EOP for loss of intermediate range instrumentation	3.6	59
036 / Fuel Handling Incidents / 8						X	AA2.01	Ability to determine and interpret the following as they apply to the Fuel Handling Incidents: ARM system indications	3.2	60
059 / Accidental Liquid RadWaste Release / 9	X						2.4.50	Emergency Procedures/Plan: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	61
060 / Accidental Gaseous RadWaste Release / 9	X						2.1.32	Conduct of Operations: Ability to explain and apply all system limits and precautions.	3.4	62
069 / Loss of Containment Integrity / 5			X				AK2.03	Knowledge of the interrelations between the Loss of Containment Integrity and the following: Personnel access hatch and emergency access hatch	2.8	63
074 / Inadequate Core Cooling / 4		X					EK1.06	Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Definition of superheated steam	3.0	64

Harris 2008 NRC  
 Written Examination Outline  
 Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
E10 / Natural Circulation with Steam Void in Vessel with/without RVLIS / 4					X		EA1.3	Ability to operate and/or monitor the following as they apply to the (Natural Circulation with Steam Void in Vessel with/without RVLIS): Desired operating results during abnormal and emergency situations.	3.4	65
K/A Category Point Total:	2/2	2	2	1	1	1/2	Group Point Total:			9/4

Harris 2008 NRC  
Written Examination Outline  
Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
006 Emergency Core Cooling	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	86
012 Reactor Protection									X			A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Erratic power supply operation	3.2	87
026 Containment Spray	X											2.4.31	Emergency Procedures/Plan: Knowledge of annunciators, alarms and indications, and use of the response instructions.	3.4	88
073 Process Radiation Monitoring	X											2.1.32	Conduct of Operations: Ability to explain and apply all system limits and precautions.	3.8	89
008 Component Cooling Water									X			A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of CCW Pump	3.6	90
003 Reactor Coolant Pump						X						K5.03	Knowledge of the operational implications of the following concepts as they apply to the RCPS: Effects of RCP shutdown on Tave, including the reason for the unreliability of Tave in the shutdown loop	3.1	1
004 Chemical and Volume Control						X						K5.19	Knowledge of the operational implications of the following concepts as they apply to the CVCS: Concept of SDM	3.5	2
005 Residual Heat Removal		X										K1.11	Knowledge of the physical connections and/or cause-effect relationships between the RHRS and the following systems: RWST	3.5	3
005 Residual Heat Removal							X					K6.03	Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger	2.5	4
006 Emergency Core Cooling		X										K1.08	Knowledge of the physical connections and/or cause effect relationships between the ECCS and the following systems: CVCS	3.6	5
006 Emergency Core Cooling					X							K4.05	Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the following: Auto start of HPI/LPI/SIP	4.3	6

Harris 2008 NRC  
Written Examination Outline  
Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
007 Pressurizer Relief/Quench Tank					X							K4.01	Knowledge of PRTS design feature(s) and/or interlock(s) which provide for the following: Quench tank cooling	2.6	7
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	2.5	8
010 Pressurizer Pressure Control			X									K2.01	Knowledge of bus power supplies to the following: Pressurizer Heaters	3.0	9
012 Reactor Protection							X					K6.03	Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Trip logic circuits	3.1	10
012 Reactor Protection										X		A3.02	Ability to monitor automatic operation of the RPS, including: Bistables	3.6	11
013 Engineered Safety Features Actuation				X								K3.03	Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Containment	4.3	12
022 Containment Cooling								X				A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Containment temperature	3.6	13
022 Containment Cooling		X										K1.01	Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: SWS/cooling system	3.5	14
026 Containment Spray										X		A3.01	Ability to monitor automatic operation of the CSS, including: Pump starts and correct MOV positioning	4.3	15
026 Containment Spray	X											2.2.22	Equipment Control: Knowledge of limiting conditions for operations and safety limits.	3.4	16
039 Main and Reheat Steam											X	A4.01	Ability to manually operate and/or monitor in the control room: Main Steam supply valves	2.9	17
059 Main Feedwater										X		A3.02	Ability to monitor automatic operation of the MFW, including: Programmed levels of the S/G	2.9	18
059 Main Feedwater				X								K3.03	Knowledge of the effect that a loss or malfunction of the MFW will have on the following: S/GS	3.5	19
061 Auxiliary/Emergency Feedwater	X											2.2.22	Equipment Control: Knowledge of limiting conditions for operations and safety limits.	3.4	20

Harris 2008 NRC  
Written Examination Outline  
Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
061 Auxiliary/Emergency Feedwater						X						K5.01	Knowledge of the operational implications of the following concepts as they apply to the AFW: Relationship between AFW flow and RCS heat transfer	3.6	21
062 AC Electrical Distribution								X				A1.03	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AC distribution system controls including: Effect on instrumentation and controls of switching power supplies	2.5	22
063 DC Electrical Distribution				X								K3.02	Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following: Components using DC control power	3.5	23
064 Emergency Diesel Generator					X							K4.04	Knowledge of ED/G system design feature(s) and/or interlock(s) which provide for the following: Overload ratings	3.1	24
073 Process Radiation Monitoring											X	A4.02	Ability to manually operate and/or monitor in the control room: Radiation monitoring system control panel	3.7	25
076 Service Water									X			A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS	3.5	26
078 Instrument Air	X											2.1.28	Conduct of Operations: Knowledge of the purpose and function of major system components and controls.	3.3	27
103 Containment								X				A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the containment system controls including: Containment pressure, temperature, and humidity	3.7	28
K/A Category Point Totals:	3/3	3	1	3	3	3	2	3	2/2	3	2	Group Point Total:			28/5

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Plant Systems – Tier 2 Group 2

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
002 Reactor Coolant	X											2.2.22	Equipment Control: Knowledge of limiting conditions for operations and safety limits.	4.1	91
015 Nuclear Instrumentation									X			A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the NIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Faulty or erratic operation of detectors or compensating components	3.5	92
016 Non-nuclear Instrumentation									X			A2.03	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: Interruption of transmitted signal	3.3	93
001 Control Rod Drive										X		A3.04	Ability to monitor automatic operation of the CRDS, including: Radial imbalance	3.5	29
002 Reactor Coolant									X			A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the RCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of coolant pressure	4.2	30
011 Pressurizer Level Control			X									K2.01	Knowledge of bus power supplies to the following: Charging Pumps	3.1	31
016 Non-nuclear Instrumentation				X								K3.03	Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: SDS	3.0	32
017 In-core Temperature Monitor							X					K6.01	Knowledge of the effect of a loss or malfunction of the following ITM system components: Sensors and detectors	2.7	33
041 Steam Dump		X										K1.05	Knowledge of the physical connections and/or cause-effect relationships between the SDS and the following systems: RCS	3.5	34
029 Containment Purge											X	A4.04	Ability to manually operate and/or monitor in the control room: Containment Evacuation Signal	3.5	35
034 Fuel Handling Equipment	X											2.1.14	Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.	2.5	36

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 Plant Systems – Tier 2 Group 2

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
045 Main Turbine Generator						X						K5.23	Knowledge of the operational implications of the following concepts as they apply to the MT/G System: Relationship between rod control and RCS boron concentration during T/G load increases	2.7	37
056 Condensate System									X			A2.12	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: Opening of the heater string bypass valve	2.8	38
K/A Category Point Totals:	1/1	1	1	1	0	1	1	0	2/2	1	1	Group Point Total:			<b>10/3</b>

Facility:	Harris 2008 NRC Outline	Date of Exam:	3/10/08			
Category	K/A #	Topic	RO		SRO-Only	
			IR	Q#	IR	Q#
1. Conduct of Operations	2.1.34	Ability to maintain primary and secondary plant chemistry within allowable limits.			2.9	94
	2.1.20	Ability to execute procedure steps.			4.2	95
	2.1.3	Knowledge of shift turnover practices.	3.0	66		
	2.1.32	Ability to explain and apply all system limits and precautions.	3.4	67		
		Subtotal		2		2
2. Equipment Control	2.2.28	Knowledge of new and spent fuel movement procedures.			3.5	96
	2.2.22	Knowledge of limiting conditions for operations and safety limits.			4.1	97
	2.2.26	Knowledge of refueling administrative requirements.	2.5	68		
	2.2.12	Knowledge of surveillance procedures.	3.0	69		
		Subtotal		2		2
3. Radiation Control	2.3.6	Knowledge of the requirements for reviewing and approving release permits.			3.1	98
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	70		
	2.3.2	Knowledge of facility ALARA program.	2.5	71		
		Subtotal		2		1
4. Emergency Procedures / Plan	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.			4.0	99
	2.4.41	Knowledge of the emergency action level thresholds and classifications.			4.1	100
	2.4.10	Knowledge of annunciator response procedures.	3.0	72		
	2.4.6	Knowledge symptom based EOP mitigation strategies.	3.1	73		
	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	74		
	2.4.29	Knowledge of the emergency plan.	2.6	75		
		Subtotal		4		2
Tier 3 Point Total				10		7

