To: Mr. David Silk
From: Kyle Garnish, General Supervisor Operations Training
Subject: R.E. Ginna 2011 Retake Written Examination Outline
Date: December 6, 2010

Please find enclosed materials supporting administration of the R.E. Ginna 2011 Retake examination scheduled to be administered to Dan Tiberio the week of January 24th 2011.

The following documents are enclosed:

1. Form ES-201-2 Examination Outline Quality Checklist
2. R.E. Ginna 2011 NRC Initial License Written Retake Examination Written Examination Outline Methodology
3. Topic Level and Statement Level Suppression list
4. Form ES-401-2 Written Examination Outline
5. Form ES-401-3 Generic Knowledge and Abilities Outline
6. Form ES-401-4 Record of Rejected K/A's

The enclosed examination materials must be withheld from public disclosure until after the examination is complete. Administration of the exam is scheduled to be concluded on or about January 28th 2011.

Contact the Ginna General Supervisor-Operations Training if you have any questions.

Sincerely,

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Facility: R.E. Ginna 2011 Retake													Date of Exam: 01/27/11					
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 & Plant Evaluations	1	3	3	3				3	3			3	18	3		3		6
	2	1	1	2				2	2			1	9	2		2		4
	Tier Totals	4	4	5				5	5			4	27	5		5		10
2. Plant Systems	1	3	2	2	3	3	2	2	3	3	2	3	28	2		3		5
	2	1	1	1	1	1	0	1	1	1	1	1	10	0	1	2		3
	Tier Totals	4	3	3	4	4	2	3	4	4	3	4	38	3		5		8
3. Generic Knowledge & Abilities					1		2		3		4		10	1	2	3	4	7
					3		2		3		2			2	1	2	2	

Note

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the Tier Totals in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to section D.1.b of ES-401, 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. Refer to Section D.1.b of ES-401 for the applicable K/A's

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. If fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (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

R.E. Ginna 2011 Retake
Written Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 Group 1

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
008 / Pressurizer Vapor Space Accident / 3					X		AA2.12 - Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: PZR level indicators	3.7	76
027 / Pressurizer Pressure Control System Malfunction / 3					X		AA2.15 - Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Actions to be taken if PZR pressure instrument fails high	4.0	77
038 / Steam Generator Tube Rupture / 3					X		EA2.16 - Ability to determine or interpret the following as they apply to a SGTR: Actions to be taken if S/G goes solid and water enters steam line	4.6	78
026 / Loss of Component Cooling Water / 8						X	2.4.47 - Emergency Procedures / Plan: Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	79
077 / Generator Voltage and Electric Grid Disturbances						X	2.2.39 - Equipment Control: Knowledge of less than or equal to one hour technical specification action statements for systems.	4.5	80
015 / 17 / Reactor Coolant Pump Malfunctions / 4						X	2.4.8 - Emergency Procedures / Plan: Knowledge of how abnormal operating procedures are used in conjunction with EOP's.	4.5	81
029 / Anticipated Transient Without Scram (ATWS) / 1	X						EK1.05 - Knowledge of the operational implications of the following concepts as they apply to the ATWS: definition of negative temperature coefficient as applied to large PWR coolant systems	2.8	39

R.E. Ginna 2011 Retake
Written Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 Group 1

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
027 / Pressurizer Pressure Control System Malfunction / 3	X						AK1.02 - Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: Expansion of liquids as temperature increases	2.8	40
E04 / LOCA Outside Containment / 3	X						EK1.3 - Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment) Annunciators and conditions indicating signals, and remedial actions associated with the (LOCA Outside Containment).	3.5	41
E11 / Loss of Emergency Coolant Recirculation / 4		X					EK2.1 - Knowledge of the interrelations between the (Loss of Emergency Coolant Recirculation) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.6	42
077 / Generator Voltage and Electric Grid Disturbances		X					AK2.02 - Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: Breakers, relays	3.1	43

R.E. Ginna 2011 Retake
Written Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 Group 1

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
E05 / Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4		X					EK2.2 - Knowledge of the interrelations between the (Loss of Secondary Heat Sink) 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.	3.9	44
065 / Loss of Instrument Air / 8			X				AK3.03 - Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Knowing effects on plant operation of isolating certain equipment from instrument air	2.9	45
E12 / Steam Line Rupture - Excessive Heat Transfer / 4			X				EK3.1 - Knowledge of the reasons for the following responses as they apply to the (Uncontrolled Depressurization of all Steam Generators) 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.	3.5	46
057 / Loss of Vital AC Electrical Instrument 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	4.1	47

R.E. Ginna 2011 Retake
Written Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 Group 1

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
007 / Reactor Trip - Stabilization - Recovery / 1				X			EA1.04 - Ability to operate and monitor the following as they apply to a reactor trip: RCP operation and flow rates	3.6	48
011 / Large Break LOCA / 3				X			EA1.05 - Ability to operate and monitor the following as they apply to a Large Break LOCA: Manual and/or automatic transfer of suction of charging pumps to borated source	4.3	49
026 / Loss of Component Cooling Water / 8				X			AA1.01 - Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: CCW/nuclear service water temperature indications	3.1	50
056 / Loss of Off-site Power / 6					X		AA2.43 - Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Occurrence of a turbine trip	3.9	51
058 / 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	3.7	52
022 / Loss of Reactor Coolant Makeup / 2					X		AA2.02 - Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: Charging pump problems	3.2	53
055 / Station Blackout / 6						X	2.1.19 - Conduct of Operations: Ability to use plant computers to evaluate system or component status.	3.9	54
009 / Small Break LOCA / 3						X	2.4.3 - Emergency Procedures / Plan: Ability to identify post-accident instrumentation.	3.7	55

R.E. Ginna 2011 Retake
Written Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 Group 1

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
038 / Steam Generator Tube Rupture / 3						X	2.4.8 - Emergency Procedures / Plan: Knowledge of how abnormal operating procedures are used in conjunction with EOP's.	3.8	56
K/A CategoryTotals	3	3	3	3	3/3	3/3	Group Point Total:		18/6

R.E. Ginna 2011 Retake
Written Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 Group 2

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
E13 / Steam Generator Overpressure / 4					X		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.	3.4	82
037 / Steam Generator Tube Leak / 3					X		AA2.01 - Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: Unusual readings of the monitors; steps needed to verify readings	3.4	83
E07 / Saturated Core Cooling / 4						X	2.4.1 - Emergency Procedures / Plan: Knowledge of EOP entry conditions and immediate action steps.	4.8	84
076 / High Reactor Coolant Activity / 9						X	2.1.32 - Conduct of Operations: Ability to explain and apply all system limits and precautions.	4.0	85
E09 / Natural Circulation Operations / 4	X						EK1.1 - Knowledge of the operational implications of the following concepts as they apply to the (Natural Circulation Operations) Components, capacity, and function of emergency systems.	3.0	57
036 / Fuel Handling Incidents / 8		X					AK2.01 - Knowledge of the interrelations between the Fuel Handling Incidents and the following: Fuel handling equipment	2.9	58
068 / Control Room Evacuation / 8			X				AK3.17 - Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: Injection of boric acid into the RCS	3.7	59

R.E. Ginna 2011 Retake
Written Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 Group 2

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
003 / Dropped Control Rod / 1				X			AA1.01 - Ability to operate and / or monitor the following as they apply to the Dropped Control Rod: Demand position counter and pulse/analog converter	2.9	60
E03 / LOCA Cooldown and Depressurization / 4					X		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	61
E07 / Saturated Core Cooling / 4						X	2.1.27 - Conduct of Operations: Knowledge of system purpose and / or function.	3.9	62
001 / Continuous Rod Withdrawal / 1				X			AA1.02 - Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal: Rod in-out-hold switch	3.6	63
051 / Loss of Condenser Vacuum / 4					X		AA2.02 - Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip	3.9	64
067 / Plant Fire On-site / 8			X				AK3.02 - Knowledge of the reasons for the following responses as they apply to the Plant Fire on Site Steps called out in the site fire protection plan, FPS manual, and fire zone manual	2.5	65
K/A CategoryTotals	1	1	2	2	2/2	1/2	Group Point Total:	9/4	

R.E. Ginna 2011 Retake
Written Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
010 Pressurizer Pressure Control								X				A2.01 - Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Heater failures	3.6	86
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	3.7	87
061 Auxillary/Emergency Feedwater											X	2.4.46 - Emergency Procedures / Plan: Ability to verify that the alarms are consistent with the plant conditions.	4.2	88
064 Emergency Diesel Generator											X	2.4.4 - Emergency Procedures / Plan: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.7	89
073 Process Radiation Monitoring											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.	4.7	90

R.E. Ginna 2011 Retake
Written Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
062 AC Electrical Distribution	X											K1.03 - Knowledge of the physical connections and/or cause-effect relationships between the ac distribution system and the following systems: DC distribution	3.5	1
012 Reactor Protection	X											K1.05 - Knowledge of the physical connections and/or cause effect relationships between the RPS and the following systems: ESFAS	3.8	2
064 Emergency Diesel Generator		X										K2.02 - Knowledge of bus power supplies to the following: Fuel oil pumps	2.8	3
061 Auxillary/Emergency Feedwater		X										K2.01 - Knowledge of bus power supplies to the following: AFW system MOVs	3.2	4
073 Process Radiation Monitoring			X									K3.01 - Knowledge of the effect that a loss or malfunction of the PRM system will have on the following: Radioactive effluent releases	3.6	5
022 Containment Cooling			X									K3.01 - Knowledge of the effect that a loss or malfunction of the CCS will have on the following: Containment equipment subject to damage by high or low temperature, humidity, and pressure	2.9	6
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

R.E. Ginna 2011 Retake
Written Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
003 Reactor Coolant Pump				X								K4.02 - Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following: Prevention of cold water accidents or transients	2.5	8
010 Pressurizer Pressure Control					X							K5.01 - Knowledge of the operational implications of the following concepts as the apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables	3.5	9
006 Emergency Core Cooling					X							K5.05 - Knowledge of the operational implications of the following concepts as they apply to ECCS: Effects of pressure on a solid system	3.4	10
013 Engineered Safety Features Actuation						X						K6.01 - Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: Sensors and detectors	2.7	11
004 Chemical and Volume Control						X						K6.05 - Knowledge of the effect of a loss or malfunction on the following CVCS components: Sensors and detectors	2.5	12
005 Residual Heat Removal							X					A1.02 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including: RHR flow rate	3.3	13

R.E. Ginna 2011 Retake
Written Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
063 DC Electrical Distribution							X					A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the dc electrical system controls including: Battery capacity as it is affected by discharge rate	2.5	14
026 Containment Spray								X				A2.04 - 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: Failure of spray pump	3.9	15
076 Service Water								X				A2.02 - 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: Service water header pressure	2.7	16
008 Component Cooling Water									X			A3.05 - Ability to monitor automatic operation of the CCWS, including: Control of the electrically operated, automatic isolation valves in the CCWS	3.0	17
078 Instrument Air									X			A3.01 - Ability to monitor automatic operation of the IAS, including: Air pressure	3.1	18

R.E. Ginna 2011 Retake
Written Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
039 Main and Reheat Steam										X		A4.04 - Ability to manually operate and/or monitor in the control room: Emergency feedwater pump turbines	3.8	19
059 Main Feedwater										X		A4.12 - Ability to manually operate and monitor in the control room: Initiation of automatic feedwater isolation	3.4	20
103 Containment											X	2.2.42 - Equipment Control:: Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	3.9	21
063 DC Electrical Distribution											X	2.4.6 - Emergency Procedures / Plan: Knowledge of EOP mitigation strategies.	3.7	22
012 Reactor Protection											X	2.2.36 - Equipment Control: Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	3.1	23
061 Auxillary/Emergency Feedwater					X							K5.02 - Knowledge of the operational implications of the following concepts as the apply to the AFW: Decay heat sources and magnitude	3.2	24

R.E. Ginna 2011 Retake
Written Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
006 Emergency Core Cooling								X				A2.12 - Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Conditions requiring actuation of ECCS	4.5	25
076 Service Water				X								K4.03 - Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Conditions initiating automatic closure of closed cooling water auxiliary building header supply/return valves.	2.5	26
010 Pressurizer Pressure Control									X			A3.02 - Ability to monitor automatic operation of the PZR PCS, including: PZR pressure	3.6	27
078 Instrument Air	X											K1.04 - Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Cooling water to compressor	2.6	28
K/A Category Totals	3	2	2	3	3	2	2	3/2	3	2	3/3	Group Point Total:	28/5	

R.E. Ginna 2011 Retake
Written Examination Outline
Plant Systems - Tier 2 Group 2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
035 Steam Generator								X				A2.02 - Ability to (a) predict the impacts of the following mal-functions or operations on the GS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Reactor trip/turbine trip	4.4	91
034 Fuel Handling Equipment											X	2.4.3 - Emergency Procedures / Plan: Ability to identify post-accident instrumentation.	3.9	92
014 Rod Position Indication											X	2.2.22 - Equipment Control: Knowledge of limiting conditions for operations and safety limits.	4.7	93
056 Condensate System	X											K1.03 - Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: MFW.	2.6	29
034 Fuel Handling Equipment							X					A1.02 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Fuel Handling System operating the controls including: Water level in the refueling canal	2.9	30
086 Fire Protection									X			A3.01 - Ability to monitor automatic operation of the Fire Protection System including: Starting mechanisms of fire water pumps	2.9	31

R.E. Ginna 2011 Retake
Written Examination Outline
Plant Systems - Tier 2 Group 2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
029 Containment Purge			X									K3.02 - Knowledge of the effect that a loss or malfunction of the Containment Purge System will have on the following: Containment entry	2.9	32
045 Main Turbine Generator										X		A4.06 - Ability to manually operate and/or monitor in the control room: Turbine stop valves	2.8	33
016 Non-nuclear Instrumentation								X				A2.03 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the NNIS controls including: Interruption of transmitted signal	3	34
035 Steam Generator				X								K4.01 - Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the following: S/G level control	3.6	35
027 Containment Iodine Removal		X										K2.01 - Knowledge of bus power supplies to the following: Fans	3.1	36
001 Control Rod Drive					X							K5.73 - Knowledge of the following operational implications as they apply to the CRDS: Need for maintenance of stable plant conditions during rod exercising	2.7	37
071 Waste Gas Disposal											X	2.4.46 - Emergency Procedures / Plan: Ability to verify that the alarms are consistent with the plant conditions.	4.2	38
K/A Category Totals	1	1	1	1	1	0	1	1/1	1	1	1/2	Group Point Total:	10/3	

Facility: R.E. Ginna 2011 Retake		Date: 01/27/11				
Category	KA #	Topic	RO		SRO-Only	
			IR	Q#	IR	Q#
1. Conduct of Operations	2.1.3	Knowledge of shift or short-term relief turnover practices.	3.7	66		
	2.1.31	Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.	4.6	67		
	2.1.28	Knowledge of the purpose and function of major system components and controls.	4.1	75		
	2.1.42	Knowledge of new and spent fuel movement procedures.			3.4	94
	2.1.39	Knowledge of conservative decision making practices.			4.3	98
	Subtotal			3		2
2. Equipment Control	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.	2.6	68		
	2.2.43	Knowledge of the process used to track inoperable alarms.	3.0	69		
	2.2.14	Knowledge of the process for controlling equipment configuration or status.			4.3	95
	Subtotal			2		1

3. Radiation Control	2.3.15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	70		
	2.3.11	Ability to control radiation releases.	3.8	71		
	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions.	3.5	74		
	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.			3.7	96
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.			2.9	99
	Subtotal			3		2
4. Emergency Procedures / Plan	2.4.34	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.	4.2	72		
	2.4.39	Knowledge of the RO's responsibilities in emergency plan implementation.	3.9	73		
	2.4.29	Knowledge of the emergency plan.			4.4	97
	2.4.25	Knowledge of fire protection procedures.			3.7	100
	Subtotal			2		2
Tier 3 Point Total:				10		7

Tier / Group	Randomly Selected KA	Reason for Rejection
1 / 1	027 / AA2.05 replaced by 027 / AA2.15	Topic will result in excessive overlap with Question 86
1 / 1	027 / AK1.01 replaced by 027 / AK1.03	Topic will result in excessive overlap with Question 9
1 / 2	E07 / 2.4.34 replaced by E07 / 2.4.1	There are no RO actions outside the control room related to this EPE
2 / 1	061 / 2.4.49 replaced by 061 / 2.4.46	Topic selected is RO knowledge and inappropriate for SRO level. Additionally, there are no immediate actions associated with this system
2 / 1	076 / A2.01 replaced by 076 / A2.02	This topic is duplicated with SRO question 87
2 / 1	103 / 2.1.25 replaced by 103 / 2.2.42	No applicable references to support a test item for system selected
2 / 1	006 / A2.05 replaced by 006 / A2.12	There is no guidance related to the topic selected
2 / 2	071 / 2.4.6 replaced by 071 / 2.4.46	There are no EOPs related to this system
3 / 3	G3 / 2.3.4 replaced by G3 / 2.3.11	Duplicated on SRO question 96

R.E. Ginna
2011 NRC Initial License Written Retake Examination
Written Examination Outline Methodology

The written examination outline was developed using a proprietary electronic random outline generator developed by Western Technical Services, Inc.

The software was designed to provide a written examination outline in accordance with the criteria contained in NUREG 1021, Revision 9, Supplement 1.

The application was developed using Visual Basic code, relying on a true random function based on the PC system clock. The random generator selects topics in a Microsoft Access Database containing Revision 2, Supplement 1 of the PWR K&A catalogue. The selected data is then written to a separate data table. The process for selection of topics is similar to the guidance in ES-401, Attachment 1.

The attached outline report is written directly from the data tables created by the software. Electronic copies of the data tables are on file, as well as a log file containing all activities related to generation of the outline.

The process used to develop the outlines is as follows:

- For Tier 1 and Tier 2 generic items, only the items required to be included in accordance with ES-401, Section D.1.b are included in the generation process.
- Outline is generated for all topics with KA importance ≥2.5.
- 25 SRO topics are randomly selected from Tier 1 AA2 and required generic items, Tier 2 A2 and required generic items, (including all System 034 topics) and Tier 3 generic items (All with ties to 10CFR55.43). 75 RO topics are randomly selected to complete the outline, 100 topics total.
- The exam report generated lists the topic (Question) number in the far right column. RO topics are numbered 1-75, and SRO topics are numbered 76–100. The SRO topics are written in red ink for ease of identification.
- Items that are rejected after the initial generation process are placed on the rejected items page. Replacement topics are either randomly generated or are inserted upon direction of the Chief Examiner.
- Disposition of any item randomly selected but not included in the outline is documented and included on ES-401-4.
- The outline log file tracks all manipulations of the outline, including topic deletions and random or manual topic additions. The log file is retained as a permanent record. Printouts are available upon request.

Topic Level Suppression:

EPE/APE:

SYSTEM: 025

GENERIC: 224 223

Statement Level Suppression:

EAPE/SYS	KA	KA Beginning & End Statement	Notes
001	AK1.14	Knowledge of the operational implications of the following concepts as they apply to Continuous Rod Withdrawal: Interaction of ICS control stations as well as purpose, function, and modes of operation of ICS	
003	AA1.04	Ability to operate and / or monitor the following as they apply to the Dropped Control Rod: Control rod drive safety rod out limit bypass switch or key	
003	AK1.01	Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: Reason for turbine following reactor on dropped rod event	
003	AK1.13	Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: Interaction of ICS control stations as well as purpose, function, and modes of operation of ICS	
003	AK2.03	Knowledge of the interrelations between the Dropped Control Rod and the following: Metroscope	
003	AK3.01	Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod: When ICS logic has failed on a dropped rod, the load must be reduced until flux is within specified target bank	
003	AK3.02	Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod: Reactor runback with a dropped control rod	
003	AK3.03	Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod: Turbine automatic runback with reactor in order to balance power output	
005	AA1.03	Ability to operate and / or monitor the following as they apply to the Inoperable / Stuck Control Rod: Metroscope	
005	AA2.02	Ability to determine and interpret the following as they apply to the Inoperable / Stuck Control Rod: Difference between jog and run rod speeds, effect on CRDM of stuck rod	

005	AK2.03	Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following: Metroscope	
008	AA1.02	Ability to operate and / or monitor the following as they apply to the Pressurizer Vapor Space Accident: HPI pump to control PZR level/pressure	
008	AA2.11	Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Turbine bypass header pressure indicators	
008	AA2.14	Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Saturation temperature monitor	
008	AA2.23	Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Criteria for throttling high-pressure injection after a small LOCA	
009	EA1.18	Ability to operate and monitor the following as they apply to a small break LOCA: Balancing of HPI loop flows	
009	EA2.12	Ability to determine or interpret the following as they apply to a small break LOCA: Charging pump ammeter	
009	EA2.16	Ability to determine or interpret the following as they apply to a small break LOCA: CCWuction pressure gauge	
009	EA2.17	Ability to determine or interpret the following as they apply to a small break LOCA: Total flow meter	
009	EA2.22	Ability to determine or interpret the following as they apply to a small break LOCA: Charging flow trend recorder	
009	EA2.26	Ability to determine or interpret the following as they apply to a small break LOCA: Activity waste tank level gauges	
009	EA2.27	Ability to determine or interpret the following as they apply to a small break LOCA: Activity waste tank trend recorders	
009	EA2.30	Ability to determine or interpret the following as they apply to a small break LOCA: Tech Specs limits for plant operation with less than four loops	
009	EA2.35	Ability to determine or interpret the following as they apply to a small break LOCA: Conditions for throttling or stopping reflux boiling spray	
009	EK3.01	Knowledge of the reasons for the following responses as the apply to the small break LOCA: CCW System automatic isolation on high delta flow/ temperature to RCP thermal barrier	
009	EK3.27	Knowledge of the reasons for the following responses as the apply to the small break LOCA: Manual depressurization or HPI recirculation for sustained high pressure	
011	EA1.02	Ability to operate and monitor the following as they apply to a Large Break LOCA: Reflux boiling sump level indicators	
011	EA1.14	Ability to operate and monitor the following as they apply to a Large Break LOCA: Subcooling margin monitors	
011	EA1.16	Ability to operate and monitor the following as they apply to a Large Break LOCA: Balancing of HPI loop flows	
011	EA2.12	Ability to determine or interpret the following as they apply to a Large Break LOCA: Conditions for throttling or stopping reflux boiling spray	
011	EK3.07	Knowledge of the reasons for the following responses as the apply to the Large Break LOCA: Stopping charging pump bypass flow	

015	AA1.04	Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): RCP ventilation cooling fan run indicators	
015	AA1.19	Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Power transfer confirm lamp	
015	AA2.04	Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Temperature differential across the RCP air cooler	
015	AA2.05	Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Relationship between RCP ammeter readings and RCS aver- age temperature	
015	AA2.06	Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Relationship between cooling air flow and oil reservoir temperature/level for RCP	
015	AA2.09	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 high stator temperatures	
015	AK3.05	Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow) : Shift of T-ave. sensors to the loop with the highest flow	
015	AK3.06	Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow) : Performance of a core power map, calculations of quadrant power tilt, monitoring of core imbalance	
022	AA2.03	Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: Failures of flow control valve or controller	
022	AK1.02	Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Relationship of charging flow to pressure differential between charging and RCS	
022	AK1.04	Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Reason for changing from manual to automatic control of charging flow valve controller	
024	AA1.01	Ability to operate and / or monitor the following as they apply to the Emergency Boration: Use of spent fuel pool as backup to BWST	
024	AA1.06	Ability to operate and / or monitor the following as they apply to the Emergency Boration: BWST temperature	
024	AA1.07	Ability to operate and / or monitor the following as they apply to the Emergency Boration: BWST level	
024	AA1.08	Ability to operate and / or monitor the following as they apply to the Emergency Boration: Pump speed controlled to protect pump seals	
024	AA1.10	Ability to operate and / or monitor the following as they apply to the Emergency Boration: CVCS centrifugal charging pumps	

024	AA1.11	Ability to operate and / or monitor the following as they apply to the Emergency Boration: BIT suction and recirculation valves	
024	AA1.21	Ability to operate and / or monitor the following as they apply to the Emergency Boration: CVCS charging pump miniflow isolation valves and indicators	
024	AA1.23	Ability to operate and / or monitor the following as they apply to the Emergency Boration: CVCS centrifugal charging pump switches and indicators	
024	AA1.24	Ability to operate and / or monitor the following as they apply to the Emergency Boration: BIT inlet and outlet valve switches and indicators	
024	AA2.04	Ability to determine and interpret the following as they apply to the Emergency Boration: Availability of BWST	
025	AA1.05	Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: Raw water or sea water pumps	
025	AA1.18	Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: LPI header cross-connect valve controller and indicators	
025	AA1.19	Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: Block orifice bypass valve controller and indicators	
025	AA1.22	Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: Obtaining of water from BWST for LPI system	
025	AK2.04	Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: Raw water or sea water pumps	
026	AA1.03	Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: SWS as a backup to the CCWS	
026	AA1.04	Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: CRDM high-temperature alarm system	
027	AA1.04	Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: Pressure recovery, using emergency-only heaters	
027	AA1.05	Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: Transfer of heaters to backup power supply	
027	AA2.17	Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Allowable RCS temperature difference vs. reactor power	
027	AK3.02	Knowledge of the reasons for the following responses as they apply to the Pressurizer Pressure Control Malfunctions: Verification of alternate transmitter and/or plant computer prior to shifting flow chart transmitters	
028	AA2.05	Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: Flow control valve isolation valve indicator	
028	AA2.13	Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: The actual PZR level, given uncompensated level with an appropriate graph	

028	AK3.04	Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: Change in PZR level with power change, even though RCS T-ave. constant, due to loop size difference	
029	EA1.04	Ability to operate and monitor the following as they apply to a ATWS: BIT inlet valve switches	
029	EA1.05	Ability to operate and monitor the following as they apply to a ATWS: BIT outlet valve switches	
029	EA1.06	Ability to operate and monitor the following as they apply to a ATWS: Operating switches for normal charging header isolation valves	
029	EA1.07	Ability to operate and monitor the following as they apply to a ATWS: Operating switch for charging pump recirculation valve	
029	EA2.03	Ability to determine or interpret the following as they apply to a ATWS: Centrifugal charging pump ammeter	
029	EA2.04	Ability to determine or interpret the following as they apply to a ATWS: CVCS centrifugal charging pump operating indication	
029	EK3.03	Knowledge of the reasons for the following responses as the apply to the ATWS: Opening BIT inlet and outlet valves	
029	EK3.04	Knowledge of the reasons for the following responses as the apply to the ATWS: Closing the normal charging header isolation valves	
029	EK3.05	Knowledge of the reasons for the following responses as the apply to the ATWS: Closing the centrifugal charging pump recirculation valve	
029	EK3.09	Knowledge of the reasons for the following responses as the apply to the ATWS: Opening centrifugal charging pump suction valves from RWST	
032	AA2.08	Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: Testing required if power lost, then restored	
033	AA2.13	Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Testing required if power lost, then restored	
037	AA1.03	Ability to operate and / or monitor the following as they apply to the Steam Generator Tube Leak: Loop isolation valves	
038	EA1.26	Ability to operate and monitor the following as they apply to a SGTR: High-head safety injection mini-flow valves and position indicators	
038	EA1.28	Ability to operate and monitor the following as they apply to a SGTR: Interlock between MSIV and bypass valve	
038	EA1.42	Ability to operate and monitor the following as they apply to a SGTR: Shutting of high-head safety injection mini-flow valves	
038	EK3.07	Knowledge of the reasons for the following responses as the apply to the SGTR: RCS loop isolation values	
040	AA1.23	Ability to operate and / or monitor the following as they apply to the Steam Line Rupture: All pressure gauges per steam generator (for pressure drop)	

051	AA1.01	Ability to operate and / or monitor the following as they apply to the Loss of Condenser Vacuum: Condenser vacuum pump	
055	EA1.03	Ability to operate and monitor the following as they apply to a Station Blackout: Manual MT jacking	
056	AA1.15	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Service water booster pump	
056	AA1.16	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: ESF switch gear room cooling unit	
056	AA1.17	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Service water building normal ventilation supply fan	
056	AA1.20	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Speed switch room ventilation fan	
056	AA1.25	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Main steam supply valve control switch	
056	AA1.28	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: SWS flow control valve for the CCW cooler to control CCW outlet temperature	
056	AA1.29	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: CCW heat exchanger temperature control valves	
056	AA2.02	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: ESF load sequencer status lights	
056	AA2.11	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Operational status of service water booster pump	
056	AA2.12	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Operational status of ESF switch gear room cooling unit	
056	AA2.29	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Service water booster pump ammeter and flowmeter	
056	AA2.30	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Switch gear room cooling unit run indicator	
056	AA2.38	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Load sequencer status lights	
056	AA2.40	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Service water pump ammeter and flowmeter	
056	AA2.65	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Screen wash pump	
056	AA2.80	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Input/output voltage alarm	
056	AA2.87	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Circulation water pump ammeter readings	

057	AA1.03	Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Feedwater pump speed to control pressure and level in S/G	
057	AA2.01	Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: Safety injection tank pressure and level indicators	
059	AA1.03	Ability to operate and / or monitor the following as they apply to the Accidental Liquid Radwaste Release: Flow rate controller	
062	AA1.03	Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water: SWS as a backup to the CCWS	
062	AA1.04	Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water: CRDM high-temperature alarm system	
062	AK3.01	Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water The conditions that will initiate the automatic opening and closing of the SWS isolation valves to the nuclear service water coolers	
062	AK3.04	Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water Effect on the nuclear service water discharge flow header of a loss of CCW	
065	AA2.02	Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Relationship of flow readings to system operation	
065	AK3.05	Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Checking electric loads on a running compressor	
068	AA1.09	Ability to operate and / or monitor the following as they apply to the Control Room Evacuation: Synchroscope key	
068	AA1.18	Ability to operate and / or monitor the following as they apply to the Control Room Evacuation: Turbine automatic-stop oil pressure indicators and lights	
068	AA1.20	Ability to operate and / or monitor the following as they apply to the Control Room Evacuation: Indicators for operation of startup transformer	
068	AK3.04	Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: Filling the feedwater system and closing the AFW pump discharge valve	
068	AK3.05	Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: Repositioning valves to isolate and drain the AFW pump turbine and steam supply header	
074	EA1.03	Ability to operate and monitor the following as they apply to a Inadequate Core Cooling: The alternate control station for turbine bypass valve operation	
074	EK3.09	Knowledge of the reasons for the following responses as the apply to the Inadequate Core Cooling: Opening the cross-connect valve from the LPI to the HPI suction	

001	A1.08	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including: Verification that CRDS temperatures are within limits before starting	
001	A1.10	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including: Location and operation of controls and indications for CRDS component cooling water	
001	A1.13	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including: Prepower dependent insertion limit and power dependent insertion limit, determined with metroscope	
001	A2.04	Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Positioning of axial shaping rods and their effect on SDM	
001	A2.08	Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of CCW to CRDS	
001	A2.20	Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Isolation of left coil on affected rod to prevent coil burnout	
001	A4.01	Ability to manually operate and/or monitor in the control room: Controls for CCWS	
001	A4.04	Ability to manually operate and/or monitor in the control room: Part-length rod position	
001	A4.09	Ability to manually operate and/or monitor in the control room: CCWS	
001	A4.12	Ability to manually operate and/or monitor in the control room: Stopping T/G load changes; only make minor adjustments to prevent coil burnout	
001	K1.01	Knowledge of the physical connections and/or cause-effect relationships between the CRDS and the following systems: CCW	
001	K1.02	Knowledge of the physical connections and/or cause-effect relationships between the CRDS and the following systems: CVCS	
001	K1.06	Knowledge of the physical connections and/or cause-effect relationships between the CRDS and the following systems: WGDS	
001	K1.07	Knowledge of the physical connections and/or cause-effect relationships between the CRDS and the following systems: Quench tank	
001	K1.08	Knowledge of the physical connections and/or cause-effect relationships between the CRDS and the following systems: CCWS: must be shut down to prevent condensation on CRDM stators	

001	K1.09	Knowledge of the physical connections and/or cause-effect relationships between the CRDS and the following systems: CCWS must be cut in before energizing CRDS	
001	K2.08	Knowledge of bus power supplies to the following: Motors.....	
001	K3.01	Knowledge of the effect that a loss or malfunction of the CRDS will have on the following: CVCS	
001	K3.03	Knowledge of the effect that a loss or malfunction of the CRDS will have on the following: CCW	
001	K4.11	Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Resetting of CRDM circuit breakers	
001	K4.15	Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Operation of latching controls for groups and individual rods	
001	K5.71	Knowledge of the following operational implications as they apply to the CRDS: Reason for maintaining cross-tie breaker between rod drive M/G sets; reliability of control rod drive trip breakers during operation of one M/G set	
001	K5.76	Knowledge of the following operational implications as they apply to the CRDS: Effects on power of inserting axial shaping rods	
001	K5.79	Knowledge of the following operational implications as they apply to the CRDS: Effects of positioning of axial shape rods on SDM	
002	A1.12	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCS controls including: Radioactivity level when vending CRDS	
002	A4.01	Ability to manually operate and/or monitor in the control room: RCS leakage calculation program using the computer	
002	K4.09	Knowledge of RCS design feature(s) and/or interlock(s) which provide for the following: Operation of loop isolation valves.	
002	K5.03	Knowledge of the operational implications of the following concepts as they apply to the RCS: Difference in pressure-temperature relationship between the water/steam system and the water/nitrogen system.	
002	K5.06	Knowledge of the operational implications of the following concepts as they apply to the RCS: Pressure, temperature, and volume relationships of nitrogen gas in association with water	
002	K5.16	Knowledge of the operational implications of the following concepts as they apply to the RCS: Reason for automatic features of the Feedwater control system during total loss of reactor coolant flow	
003	K2.03	Knowledge of bus power supplies to the following: RCP lube oil pumps	
003	K3.05	Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: ICS	
003	K4.11	Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following: Isolation valve interlocks	
004	A4.22	Ability to manually operate and/or monitor in the control room: Boronometer chart recorder	

004	K1.03	Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: Operation, function and control of T/G	
004	K1.09	Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: Relationship between CVCS and RPIS	
004	K1.22	Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: BWST	
004	K1.25	Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: Interface between HPI flow path and excess letdown flow path	
004	K5.33	Knowledge of the operational implications of the following concepts as they apply to the CVCS: Use of a boronometer	
004	K6.11	Knowledge of the effect of a loss or malfunction on the following CVCS components: Recirculation valve on boric acid storage tank (why it is closed during functional test)	
004	K6.12	Knowledge of the effect of a loss or malfunction on the following CVCS components: Principle of recirculation valve: (permit emergency flow even if valve s blocked by crystallized boric acid)	
004	K6.14	Knowledge of the effect of a loss or malfunction on the following CVCS components: Recirculation path for charging pumps	
004	K6.19	Knowledge of the operational implications of the following concepts as they apply to the CVCS: Purpose of centrifugal pump miniflows (recirculation)	
004	K6.33	Knowledge of the operational implications of the following concepts as they apply to the CVCS: Principles of boronometer	
005	A4.05	Ability to manually operate and/or monitor in the control room: Position of RWST recirculation valve (locked when not in use, continuously monitored when in use).	
005	K1.03	Knowledge of the physical connections and/or cause-effect relationships between the RHRS and the following systems: Spent fuel pool cooling	
005	K6.02	Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: Packless valves	
007	A4.06	Ability to manually operate and/or monitor in the control room: Throttle valve	
007	A4.08	Ability to manually operate and/or monitor in the control room: Location and interpretation of radioactive gas recorder	
008	A3.09	Ability to monitor automatic operation of the CCWS, including: Normal CRDM temperatures	
008	A4.03	Ability to manually operate and/or monitor in the control room: Throttling of the CCW pump discharge valve	
008	A4.06	Ability to manually operate and/or monitor in the control room: Remote operation of hand-operated throttle valves to regulate CCW flow rate	
008	A4.09	Ability to manually operate and/or monitor in the control room: CCW temperature control valve	

008	A4.11	Ability to manually operate and/or monitor in the control room: CCW pump recirculation valve and its three-way control switch	
008	K3.02	Knowledge of the effect that a loss or malfunction of the CCWS will have on the following: CRDS	
008	K4.04	Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Weir design aspect of the surge tank	
008	K4.06	Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Auxiliary building CCWS isolation	
008	K4.07	Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Operation of the CCW swing-bus power supply and its associated breakers and controls	
011	A2.08	Ability to (a) predict the impacts of the following malfunctions or operations on the PZR LCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of Loss of level compensation	
011	K1.05	Knowledge of the physical connections and/or cause-effect relationships between the PZR LCS and the fol-lowing systems: Reactor regulating system	
011	K5.02	Knowledge of the operational implications of the following concepts as they apply to the PZR LCS Principle of operation for the charging pump electric pneurnatic flow control valve	
013	K4.06	Knowledge of ESFAS design feature(s) and/or intelock(s) which provide for the following Recirculation actuation system reset	
013	K4.14	Knowledge of ESFAS design feature(s) and/or intelock(s) which provide for the following Upper head injection accumulator isolation	
013	K4.17	Knowledge of ESFAS design feature(s) and/or intelock(s) which provide for the following Reason for stopping air coolers on train being tested	
013	K4.18	Knowledge of ESFAS design feature(s) and/or intelock(s) which provide for the following Reason for jumping containment high-high-pressure signal to containment spray pump on train being tested	
013	K4.19	Knowledge of ESFAS design feature(s) and/or intelock(s) which provide for the following Reason for opening breaker on high-head injection pump	
013	K4.20	Knowledge of ESFAS design feature(s) and/or intelock(s) which provide for the following Reason for stopping CCW pump on train being tested	
013	K4.21	Knowledge of ESFAS design feature(s) and/or intelock(s) which provide for the following Reason for starting an additional service water booster pump for train not being tested and stopping the pump on train under test	
013	K4.24	Knowledge of ESFAS design feature(s) and/or intelock(s) which provide for the following Reason for disabling of BIT so it will not function during ESF sequencer test	

014	A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RPIS controls, including: Metroscope reed switch display	
014	A2.07	Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of reed switch	
014	A4.03	Ability to manually operate and/or monitor in the control room: Primary coil voltage measurement	
014	K2.01	Knowledge of bus power supplies to the following: Reed switches	
014	K2.02	Knowledge of bus power supplies to the following: Metroscope	
014	K4.01	Knowledge of RPIS design feature(s) and/or interlock(s) which provide for the following: Upper electrical limit	
014	K4.02	Knowledge of RPIS design feature(s) and/or interlock(s) which provide for the following: Lower electrical limit	
014	K4.04	Knowledge of RPIS design feature(s) and/or interlock(s) which provide for the following: Zone reference lights	
014	K6.03	Knowledge of the affect if a loss or malfunction on the following will have on the RPIS: Metroscope	
015	A3.06	Ability to monitor automatic operation of the NIS, including: Interpretation of in-core flux density maps from in-core detectors	
015	K1.05	Knowledge of the physical connections and/or cause-effect relationships between the NIS and the following systems: ICS	
015	K3.04	Knowledge of the effect that a loss or malfunction of the NIS will have on the following: ICS.	
015	K4.04	Knowledge of NIS design feature(s) and/or interlock(s) provide for the following: Slow response time of SPNDs	
022	A2.03	Ability to (a) predict the impacts of the following malfunctions or operationson the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Fan motor thermal overload/high-speed operation	
022	A2.06	Ability to (a) predict the impacts of the following malfunctions or operationson the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of CCS pump	
022	A4.02	Ability to manually operate and/or monitor in the control room: CCS pumps	
022	K1.02	Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: SEC/remote monitoring systems	
022	K1.03	Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: Auxiliary steam	
022	K1.04	Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: Chilled water	

022	K2.02	Knowledge of power supplies to the following: Chillers	
022	K2.03	Knowledge of power supplies to the following: MOVs	
022	K4.02	Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Correlation of fan speed and flowpath changes with containment pressure	
022	K4.03	Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Automatic containment isolation	
022	K4.06	Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Containment pipe chase cooling	
022	K6.04	Knowledge of the effect of a loss or malfunction of the following will have on the CCS components: Pumps	
022	K6.07	Knowledge of the effect of a loss or malfunction of the following will have on the CCS components: Computers and calculators	
026	A2.02	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: Failure of automatic recirculation transfer	
026	A2.09	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: Radiation hazard potential of BWST	
026	A3.02	Ability to monitor automatic operation of the CSS, including: Verification that cooling water is supplied to the containment spray heat echanger	
026	A4.02	Ability to manually operate and/or monitor in the control room: The remote location and use of spool pieces and other equipment to set up portable recirculation pump for additive tank, including power supply	
026	A4.03	Ability to manually operate and/or monitor in the control room: The remote location and use of the special tank needed for draining CSS	
026	A4.04	Ability to manually operate and/or monitor in the control room: The remote sampling of the NaOH tank and RWST/BWST for chemical analysis	
026	K4.08	Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: Automatic swapover to containment sump suction for recirculation phase after LOCA (RWST low-low level alarm)	
028	A4.01	Ability to manually operate and/or monitor in the control room: HRPS controls	
028	K1.01	Knowledge of the physical connections and/or cause-effect relationships between the HRPS and the following systems: Containment annulus ventilation system (including pressure limits)	
029	A4.01	Ability to manually operate and/or monitor in the control room: Containment purge flow rate	
029	A4.03	Ability to manually operate and/or monitor in the control room: Inlet filtration and heating system	

029	K2.05	Knowledge of bus power supplies to the following: Supply air heaters	
029	K4.03	Knowledge of design feature(s) and/or interlock(s) which provide for the following: Automatic purge isolation	
029	K4.05	Knowledge of design feature(s) and/or interlock(s) which provide for the following: Temperature limits on dampers	
029	K6.04	Knowledge of the effect of a loss or malfunction on the following will have on the Containment Purge System: Pumps	
033	A4.01	Ability to manually operate and/or monitor in the control room: SFPCS pumps	
033	A4.02	Ability to manually operate and/or monitor in the control room: SFPCS valves	
033	A4.03	Ability to manually operate and/or monitor in the control room: Support systems for fill and transfer of SFPCS water	
033	K1.02	Knowledge of the physical connections and/or cause-effect relationships between the Spent Fuel Pool Cooling System and the following systems: RHRS	
033	K1.03	Knowledge of the physical connections and/or cause-effect relationships between the Spent Fuel Pool Cooling System and the following systems: SIS	
033	K1.04	Knowledge of the physical connections and/or cause-effect relationships between the Spent Fuel Pool Cooling System and the following systems: BWST	
033	K1.07	Knowledge of the physical connections and/or cause-effect relationships between the Spent Fuel Pool Cooling System and the following systems: Emergency makeup water systems	
035	A3.02	Ability to monitor automatic operation of the S/G including: MAD valves	
035	A4.07	Ability to manually operate and/or monitor in the control room: Adjustment of cooling water flow rate from blowdown heat exchanger	
035	A4.09	Ability to manually operate and/or monitor in the control room: Reason for using timed flow in filling top of S/G while going into wet lay-up	
035	K1.05	Knowledge of the physical connections and/or cause-effect relationships between the S/GS and the following systems: Nitrogen	
035	K4.09	Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the following: Maintenance of hydrostatic pressure by throttling AFW control valve	
035	K5.04	Knowledge of operational implications of the following concepts as the apply to the S/GS: Purpose of using nitrogen blanket in S/G	
035	K5.05	Knowledge of operational implications of the following concepts as the apply to the S/GS: Relationship between AFW pump speed and discharge pressure during hydrotest	
039	A4.02	Ability to manually operate and/or monitor in the control room: Remote operators to auxiliary steam	
039	A4.03	Ability to manually operate and/or monitor in the control room: MFW pump turbines	
039	K2.02	Knowledge of bus power supplies to the following: Moisture separator reheater valves	

039	K4.02	Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: Utilization of T-ave. program control when steam dumping hrough atmospheric relief/dump valves, including T-ave. limits	
039	K4.08	Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: Interlocks on MSIV and bypass valves	
041	A4.01	Ability to manually operate and/or monitor in the control room: ICS voltage inverter	
041	A4.07	Ability to manually operate and/or monitor in the control room: Remote gagging of stuck open-relief valves	
041	K2.01	Knowledge of bus power supplies to the following: ICS, normal and alternate power supply	
041	K2.02	Knowledge of bus power supplies to the following: ICS inverter breakers	
041	K4.01	Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following: RRG/ICS system	
041	K4.06	Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following: MFW and AFW systems	
041	K4.08	Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following: Control rod index	
041	K4.15	Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following: Measured variable readings on ICS hand-automatic stations and required action if reading is out of the acceptable band	
041	K6.04	Knowledge of the effect of a loss or malfunction on the following will have on the SDS: Main feed pumps, including effect on capacity of internal wear	
045	A2.02	Ability to (a) predict the impacts of the following malfunctions or operation on the MT/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Generator stator cooling water screen becoming clogged	
045	A4.04	Ability to manually operate and/or monitor in the control room: Exhaust hood spray system for temperature control	
045	K1.12	Knowledge of the physical connections and/or cause-effect relationships between the MT/G system and the following systems: Load control system in "following mode"	
045	K1.14	Knowledge of the physical connections and/or cause-effect relationships between the MT/G system and the following systems: Bearing lift oil pump	
045	K4.04	Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the following: Turbine load-following mode of operation	
045	K4.08	Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the following: The reactor bailey station and reactor diamond station in integrated control circuitry	
045	K4.35	Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the following: Operation of reactor in the load-following mode above 15% power	
045	K4.44	Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the following: Impulse pressure mode control of steam dumps	

045	K4.45	Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the following: Operation of low-pressure steam dump to prevent T/G overspeed	
045	K5.21	Knowledge of the operational implications of the following concepts as the apply to the MT/B System: Purpose of turbine lube oil lift pump (to hold T/G off main bearing at low rotation speeds)	
045	K6.01	Knowledge of the effect of a loss or malfunction on the following will have on the MT/G system components: Generator stator cooling (turbine building CCW)	
045	K6.06	Knowledge of the effect of a loss or malfunction on the following will have on the MT/G system components: Generator amplidyne balance system	
055	A3.01	Ability to monitor automatic operation of the CARS, including: Air removal pump	
055	A3.03	Ability to monitor automatic operation of the CARS, including: Automatic diversion of CARS exhaust	
055	A4.01	Ability to manually operate and monitor in the control room: Sealing steam	
055	A4.02	Ability to manually operate and monitor in the control room: Vacuum pumps	
055	A4.03	Ability to manually operate and monitor in the control room: Steam to CARS	
055	K1.07	Knowledge of the physical connections and/or cause effect relationships between the CARS and the following systems: WGDS	
055	K1.08	Knowledge of the physical connections and/or cause effect relationships between the CARS and the following systems: Containment	
055	K1.09	Knowledge of the physical connections and/or cause effect relationships between the CARS and the following systems: Auxiliary steam	
055	K2.01	Knowledge of bus power supplies to the following: Vacuum pump(s)	
055	K3.04	Knowledge of the effect that a loss or malfunction of the CARS will have on the following: MFW pumps (steam driven)	
055	K6.02	Knowledge of the effect of a loss or malfunction of the following will have on the CARS components: Vacuum pumps	
056	A3.10	Ability to monitor automatic operation of the Condensate System including: Upper surge tank flow meter	
056	A4.02	Ability to manually operate and monitor in the control room: Condensate demineralizer bypass valve and precoat by pass	
056	A4.04	Ability to manually operate and monitor in the control room: Cleanup Valve	
056	A4.05	Ability to manually operate and monitor in the control room: Valve between upper surge tank and hotwell	
056	A4.06	Ability to manually operate and monitor in the control room: Condensate demineralizer bypass valve controller	
056	A4.07	Ability to manually operate and monitor in the control room: Hotwell pumps	
056	A4.09	Ability to manually operate and monitor in the control room: Demineralizer flow control valve	

056	A4.10	Ability to manually operate and monitor in the control room: Low-pressure and high-pressure cleanup valves	
056	A4.11	Ability to manually operate and monitor in the control room: Setpoints on polish demineralizer bypass valve controllers	
056	A4.14	Ability to manually operate and monitor in the control room: Auxiliary oil pumps for booster pumps	
056	K1.11	Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: Stator cooling	
056	K3.07	Knowledge of the effect that a loss or malfunction of the Condensate System will have on the following: Stator coolant	
056	K4.09	Knowledge of Condensate System design feature(s) and/or interlock(s) which provide for the following: Feedwater pump turbine windmill protection	
056	K4.18	Knowledge of Condensate System design feature(s) and/or interlock(s) which provide for the following: Interlocks between booster pumps and auxiliary oil pumps.	
056	K5.14	Knowledge of the operational implications of the following concepts as the apply to the Condensate system: Purpose of valve between upper surge tank and hotwell	
059	A1.07	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: Feed Pump speed, including normal control speed for ICS	
059	A2.07	Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Tripping of MFW pump turbine	
059	A2.09	Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Overspeed on turning gear	
059	A3.01	Ability to monitor automatic operation of the MFW, including: Valve timer display	
059	A3.04	Ability to monitor automatic operation of the MFW, including: Turbine driven feed pump	
059	A3.07	Ability to monitor automatic operation of the MFW, including: ICS	
059	A4.01	Ability to manually operate and monitor in the control room: MFW turbine trip indication	
059	A4.02	Ability to manually operate and monitor in the control room: Null out MVW pump D/P differences	
059	A4.04	Ability to manually operate and monitor in the control room: Reset MFW overspeed trip	
059	A4.05	Ability to manually operate and monitor in the control room: MFW pump oil cooler, cooling water outlet valve controller	
059	A4.06	Ability to manually operate and monitor in the control room: MFW pump turbine reset switch	
059	A4.07	Ability to manually operate and monitor in the control room: Valve timer reset pushbutton	

059	A4.09	Ability to manually operate and monitor in the control room: Remote determination of operating feedwater pump turning gear	
059	A4.10	Ability to manually operate and monitor in the control room: ICS	
059	K1.07	Knowledge of the physical connections and/or cause-effect relationships between the MFW and the following systems: ICS	
059	K4.05	Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Control of speed of MFW pump turbine	
059	K4.06	Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Comparison of actual D/P, between main steam and MFW pump discharge pressure, to programmed D/P when placing MFW pump in automatic mode	
059	K4.10	Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Bearing oil signal to the turning gear start sequence	
059	K4.11	Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Porting Oil	
059	K5.03	Knowledge of the operational implications of the following concepts as the apply to the MFW: Reason for maintenance of minimum D/P between main steam and MFW pump discharge pressure	
059	K5.05	Knowledge of the operational implications of the following concepts as the apply to the MFW: Reason for balancing MFW pump loads	
059	K5.07	Knowledge of the operational implications of the following concepts as the apply to the MFW: Relationship between feedwater pump speed and feedwater regulating valve position	
059	K5.11	Knowledge of the operational implications of the following concepts as the apply to the MFW: Definition of turbine windmilling	
059	K5.12	Knowledge of the operational implications of the following concepts as the apply to the MFW: Increased MFW pump discharge with increased turbine speed	
059	K5.14	Knowledge of the operational implications of the following concepts as the apply to the MFW: Quadrant power tilt	
059	K6.09	Knowledge of the effect of a loss or malfunction of the following will have on the MFW components: MFW pump speed and flow regulating valves (reason for adjusting position of both)	
061	A1.03	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AFW controls including: Interactions when multi unit systems are cross tied	
061	A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the AFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of air to steam supply valve	
061	A3.04	Ability to monitor automatic operation of the AFW, including: Automatic AFW isolation	

061	K1.09	Knowledge of the physical connections and/or cause-effect relationships between the AFW and the following systems: PRMS	
061	K1.10	Knowledge of the physical connections and/or cause-effect relationships between the AFW and the following systems: Diesel fuel oil	
061	K2.03	Knowledge of bus power supplies to the following: AFW diesel driven pump	
061	K4.05	Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Prevention of MFW swapover to AFW suction pressure is low	
061	K4.09	Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Crossties between multi-unit station	
061	K4.11	Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Automatic level control	
061	K5.04	Knowledge of the operational implications of the following concepts as the apply to the AFW: Reason for warming up turbine prior to turbine startup	
062	K1.01	Knowledge of the physical connections and/or cause-effect relationships between the ac distribution system and the following systems: CO2 deluge	
062	K4.06	Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: One-line diagram of 6.9kV distribution, including sources of normal and alternative power	
064	A3.08	Ability to monitor automatic operation of the ED/G system, including: Consequences of automatic transfer to automatic position after the ED/G is stopped	
064	A3.09	Ability to monitor automatic operation of the ED/G system, including: Functions (modes) of automatic transfer switch (to a startup bank)	
064	A3.11	Ability to monitor automatic operation of the ED/G system, including: Function of ED/G megawatt load controller	
064	A4.04	Ability to manually operate and/or monitor in the control room: Remote operation of the air compressor switch (different modes)	
068	A4.01	Ability to manually operate and/or monitor in the control room: Control board for boron recovery	
071	A1.05	Ability to predict and/or monitor changes in parameters(to prevent exceeding design limits) associated with Waste Gas Disposal System operating the controls including: Decay tank pressure vs. liquid levels	
071	A1.07	Ability to predict and/or monitor changes in parameters(to prevent exceeding design limits) associated with Waste Gas Disposal System operating the controls including: Surge tank pressure and level	
071	A4.01	Ability to manually operate and/or monitor in the control room: Valve to put the holdup tank into service; indications of valve positions and tank pressure	
071	A4.02	Ability to manually operate and/or monitor in the control room: Waste-gas compressor, including control switch, unloading valve, and drain valve	

071	A4.03	Ability to manually operate and/or monitor in the control room: Valves and indications for sealing water to the gas compressor shaft	
071	A4.04	Ability to manually operate and/or monitor in the control room: Radwaste liquid transfer pumps	
071	A4.05	Ability to manually operate and/or monitor in the control room: Gas decay tanks, including valves, indicators, and sample line	
071	A4.07	Ability to manually operate and/or monitor in the control room: Waste gas release flow meter	
071	A4.08	Ability to manually operate and/or monitor in the control room: Nitrogen gas addition	
071	A4.10	Ability to manually operate and/or monitor in the control room: WGDS sampling	
071	A4.11	Ability to manually operate and/or monitor in the control room: WGDS startup and shutdown	
071	A4.12	Ability to manually operate and/or monitor in the control room: Air purge of WGDS release radiation monitors	
071	A4.15	Ability to manually operate and/or monitor in the control room: Procedure for putting the waste gas compressor inservice and for removing it from service	
071	A4.16	Ability to manually operate and/or monitor in the control room: Waste gas decay tank shifts	
071	A4.17	Ability to manually operate and/or monitor in the control room: Stopping transfer of radioactive liquids to WGDS decay tank	
071	A4.18	Ability to manually operate and/or monitor in the control room: Operation of radwaste liquid transfer pumps	
071	A4.19	Ability to manually operate and/or monitor in the control room: Bringing an empty WDGS decay tank on line and shutting down a full tank	
071	A4.20	Ability to manually operate and/or monitor in the control room: Placing WGDS gas compressors in automatic operation	
071	A4.21	Ability to manually operate and/or monitor in the control room: Valve lineup for returning gas to the CVCS holdup tank from a waste gas decay tank	
071	A4.22	Ability to manually operate and/or monitor in the control room: Use of recycle gas header	
071	A4.23	Ability to manually operate and/or monitor in the control room: Procedure for regulating pressure in CVCS holdup tanks	
071	A4.27	Ability to manually operate and/or monitor in the control room: Opening and closing of the decay tank discharge control valve	
071	A4.28	Ability to manually operate and/or monitor in the control room: Nitrogen additions to the decay tank, and knowledge of limits	
071	A4.29	Ability to manually operate and/or monitor in the control room: Sampling oxygen, hydrogen and nitrogen concentrations in WDGS decay tank; knowledge of limits	
071	A4.30	Ability to manually operate and/or monitor in the control room: Water drainage from the WGOS decay tanks	
071	K4.03	Knowledge of design feature(s) and/or interlock(s) which provide for the following: Tank loop seals	

073	K4.02	Knowledge of PRM system design feature(s) and/or interlocks which provide for the following: Letdown isolation on high-RCS activity	
075	A1.05	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the circulating water system controls including: Lube oil temperature and pressure	
075	A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the circulating water system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effects of extremes in ambient temperature on cooling tower operation	
075	A2.09	Ability to (a) predict the impacts of the following malfunctions or operations on the circulating water system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Operation of amertap ball collector flaps and screens in normal, backwash, and emergency backwash modes	
075	A2.10	Ability to (a) predict the impacts of the following malfunctions or operations on the circulating water system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Automatic startup mode of water box priming pumps relative to specified minimum vacuum	
075	A3.06	Ability to monitor automatic operation of the circulating water system, including: Normal and abnormal collector flap differential pressures and setpoints	
075	A3.07	Ability to monitor automatic operation of the circulating water system, including: Makeup flow control valve controller and indicator..	
075	A4.04	Ability to manually operate and/or monitor in the control room: Air eductor system	
075	A4.06	Ability to manually operate and/or monitor in the control room: Water box vacuum priming isolation valves, control switches, and indicators	
075	A4.07	Ability to manually operate and/or monitor in the control room: Vacuum priming tank/priming compressor controller	
075	A4.08	Ability to manually operate and/or monitor in the control room: Gland seal water supply system	
075	A4.13	Ability to manually operate and/or monitor in the control room: Cooling tower operations	
075	A4.14	Ability to manually operate and/or monitor in the control room: Lube oil pumps for circulating water pump	
075	A4.20	Ability to manually operate and/or monitor in the control room: Blowout preventers	
075	K1.06	Knowledge of the physical connections and/or cause-effect relationships between the circulating water system and the following systems: Cooling towers	
075	K1.07	Knowledge of the physical connections and/or cause-effect relationships between the circulating water system and the following systems: Recirculation spray system	

075	K2.04	Knowledge of bus power supplies to the following: Lube oil pumps	
075	K3.05	Knowledge of the effect that a loss or malfunctions of the circulating water system will have on the following: Recirculation spray system	
075	K4.03	Knowledge of circulating water system design feature(s) and interlock(s) which provide for the following: Interlocks between circulating water system pumps and cooling tower pumps	
075	K4.04	Knowledge of circulating water system design feature(s) and interlock(s) which provide for the following: Automatic pickup of backup lube oil pumps (ac and dc)	
075	K4.05	Knowledge of circulating water system design feature(s) and interlock(s) which provide for the following: Operation of condenser tube cleaning system	
075	K4.07	Knowledge of circulating water system design feature(s) and interlock(s) which provide for the following: Relationship between water box inlet valve position and circulating pump logic (including switching time required to close waterbox inlet valve switch)	
075	K5.05	Knowledge of the operational implications of the following concepts as they apply to the circulating water system: Principle of operation of the cooling towers	
075	K5.06	Knowledge of the operational implications of the following concepts as they apply to the circulating water system: Principle of cooling by evaporation	
076	A1.02	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including: Reactor and turbine building closed cooling water temperatures.	
076	K1.03	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Relationship of SWS to raw water filtration (RWF) system and location of SWS supply pump to RWF system	
076	K1.04	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Relationship of domestic water to lube water for SWS pumps	
076	K1.06	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Switch gear room coolers	
076	K1.07	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Secondary closed cooling water	
076	K1.09	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Reactor building closed cooling water	
076	K1.10	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Turbine building closed cooling water	
076	K1.21	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Auxiliary backup SWS	

076	K1.23	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Spent fuel pool makeup	
076	K1.25	Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: Heat sink pond makeup	
076	K2.03	Knowledge of bus power supplies to the following: Secondary closed cooling water	
076	K2.04	Knowledge of bus power supplies to the following: Reactor building closed cooling water	
076	K2.05	Knowledge of bus power supplies to the following: Turbine building closed cooling water	
076	K3.02	Knowledge of the effect that a loss or malfunction of the SWS will have on the following: Secondary closed cooling water	
076	K3.03	Knowledge of the effect that a loss or malfunction of the SWS will have on the following: Reactor building closed cooling water	
076	K3.04	Knowledge of the effect that a loss or malfunction of the SWS will have on the following: Turbine building closed cooling water	
076	K4.03	Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Automatic opening features associated with SWS isolation valves to CCW heat exchanges	
076	K4.04	Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: River intake water level recorders	
076	K6.08	Knowledge of the effects of a loss or malfunction of the following will have on the SWS components: Cooling towers	
079	K1.02	Knowledge of the physical connections and/or cause-effect relationships between the SAS and the following systems: Cooling water to compressor	
079	K3.01	Knowledge of the effect that a loss or malfunction of the SAS will have on the following: Ventilation system	
086	K1.01	Knowledge of the physical connections and/or cause-effect relationships between the Fire Protection System and the following systems: High-pressure service water	
086	K4.06	Knowledge of design feature(s) and/or interlock(s) which provide for the following: CO2	
086	K5.01	Knowledge of the operational implication of the following concepts as they apply to the Fire Protection System: Effect of CO2 on fire	
103	A4.06	Ability to manually operate and/or monitor in the control room: Operation of the containment personnel airlock door	
103	A4.07	Ability to manually operate and/or monitor in the control room: Use of the air lock rate test panel	
103	A4.09	Ability to manually operate and/or monitor in the control room: Containment vacuum system	
103	K1.03	Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: Shield building vent system	

103	K1.06	Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: Subsurface drain system	
103	K1.07	Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: Containment vacuum system	
103	K4.01	Knowledge of containment system design feature(s) and/or interlock(s) which provide for the following: Vacuum breaker protection	