

Final Submittal

(Blue Paper)

MCGUIRE MARCH 2007 EXAM

EXAM NOS. 05000369, 370/2007301

MARCH 19 - 22, 2007

MARCH 29, 2007 - WRITTEN

FINAL SAMPLE PLANS / OUTLINES

Facility:		McGuire											Date of Exam:		3/19/2007		
Tier	Group	RO K/A Category Points											SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total	
1. Emergency & Abnormal Plant Evolutions	1	4	1	4				5	2			2	18	3	3	6	
	2	1	2	2				1	1			2	9	2	2	4	
	Tier Totals	5	3	6				6	3			4	27	5	5	10	
2. Plant Systems	1	4	3	3	1	1	1	4	1	3	3	4	28	3	2	5	
	2	1	0	1	2	2	1	1	2	0	0	0	10	0	2	3	
	Tier Totals	5	3	4	3	3	2	5	3	3	3	4	38	5	3	8	
3. Generic Knowledge and Abilities Categories					1	2	3	4				10	1	2	3	4	7
					2	3	2	3					2	1	2	2	
Note:	1.	Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).															
	2.	The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.															
	3.	Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding elimination of inappropriate K/A statements.															
	4.	Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.															
	5.	Absent a plant specific priority, only those KAs having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.															
	6.	Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.															
	7.*	The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.															
	8.	On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. 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															

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2007 NRC Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp	Q#
007 / Reactor Trip / 1	X						2.1.33	Conduct of Operations: Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	76
009 / Small Break LOCA / 3						X	EA2.07	Ability to determine or interpret the following as they apply to a small break LOCA: CCWS surge tank vent isolation valve indication	3.1	77
026 / Loss of Component Cooling Water / 8						X	AA2.03	Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition	2.9	78
027 / Pressurizer Pressure Control System Malfunction / 3						X	AA2.12	Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: PZR level	3.8	79
029 / Anticipated Transient Without Scram (ATWS) / 1	X						2.1.23	Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.0	80
055 / Station Blackout / 6	X						2.1.20	Conduct of Operations: Ability to execute procedure steps.	4.2	81
007 / Reactor Trip / 1		X					EK1.04	Knowledge of the operational implications of the following concepts as they apply to the reactor trip: Decrease in reactor power following reactor trip (prompt drop and subsequent decay)	3.6	39
008 / Pressurizer Vapor Space Accident / 3	X						2.2.22	Equipment Control Knowledge of limiting conditions for operations and safety limits.	3.4	40
009 / Small Break LOCA / 3			X				EK2.03	Knowledge of the interrelations between the small break LOCA and the following: S/Gs	3.0	41
011 / Large Break LOCA / 3						X	EA2.13	Ability to determine or interpret the following as they apply to a Large Break LOCA: Difference between overcooling and LOCA indications	3.7	42
015 / 17 / Reactor Coolant Pump Malfunctions / 4					X		AA1.05	Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): RCS flow	3.8	43
025 / Loss of Residual Heat Removal System / 4		X					AK1.01	Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation	3.9	44

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2007 NRC Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp	Q#
026 / Loss of Component Cooling Water / 8				X			AK3.01	Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: The conditions that will initiate the automatic opening and closing of the SWS isolation valves to the CCW/nuclear service water coolers	3.2	45
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	46
038 / Steam Generator Tube Rupture / 3					X		EA1.16	Ability to operate and monitor the following as they apply to a SGTR:: S/G atmospheric relief valve and secondary PORV controllers and indicators	4.4	47
040 / Steam Line Rupture / 4		X					AK1.06	Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture:: High-energy steam line break considerations	3.7	48
055 / Station Blackout / 6				X			EK3.02	Knowledge of the reasons for the following responses as they apply to the Station Blackout: Actions contained in EOP for loss of offsite and onsite power	4.3	49
056 / Loss of Off-site Power / 6					X		AA1.04	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Adjustment of speed of ED/G to maintain frequency and voltage levels	3.2	50
057 / Loss of Vital AC Electrical Instrument Bus / 6						X	AA2.06	Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: AC instrument bus alarms for the inverter and alternate power source	3.2	51
058 / Loss of DC Power / 6	X						2.4.50	Emergency Procedures / Plan Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	52
062 / Loss of Nuclear Service. Water / 4					X		AA1.06	Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water: Control of flow rates to components cooled by the SWS	2.9	53
065 / Loss of Instrument Air / 8				X			AK3.08	Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Actions contained in EOP for loss of instrument air	3.7	54

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 2007 NRC Written Examination Outline
 Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp	Q#
E04 / LOCA Outside Containment / 3				X			EK3.3	Knowledge of the reasons for the following responses as they apply to the (LOCA Outside Containment) Manipulation of controls required to obtain desired operating results during abnormal and emergency situations.	3.8	55
E12 / Uncontrolled Depressurization of all Steam Generators / 4					X		EA1.2	Ability to operate and / or monitor the following as they apply to the (Uncontrolled Depressurization of all Steam Generators) Operating behavior characteristics of the facility.	3.6	56
K/A Category Point Totals:	5	4	1	4	5	5	Group Point Total:			24

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp	Q#
005 / Inoperable/Stuck Control Rod / 1	X						2.4.4	Emergency Procedures / Plan Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	82
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	4.1	83
061 / Area Radiation Monitoring (ARM) System Alarms / 7						X	AA2.05	Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Need for area evacuation; check against existing limits	4.2	84
069 / Loss of Containment Integrity / 5	X						2.1.14	Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.	3.3	85
003 / Dropped Control Rod / 1				X			AK3.07	Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod: Tech-Spec limits for T-ave	3.8	57
028 / Pressurizer Level Control Malfunction / 2						X	AA2.01	Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: PZR level indicators and alarms	3.4	58
032 / Loss of Source Range Nuclear Instrumentation / 7					X		AA1.01	Ability to operate and / or monitor the following as they apply to the Loss of Source Range Nuclear Instrumentation: Manual restoration of power	3.1	59
036 / Fuel Handling Incidents / 8		X					AK1.03	Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents: Indications of approaching criticality	4.0	60
059 / Accidental Liquid RadWaste Release / 9			X				AK2.01	Knowledge of the interrelations between the Accidental Liquid Radwaste Release and the following: Radioactive-liquid monitors	2.7	61
060 / Accidental Gaseous RadWaste Release / 9				X			AK3.03	Knowledge of the reasons for the following responses as they apply to the Accidental Gaseous Radwaste: Actions contained in EOP for accidental gaseous-waste release	3.8	62
067 / Plant Fire On-site / 8	X						2.1.23	Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	63
E08 / Pressurized Thermal Shock / 4	X						2.1.27	Conduct of Operations: Knowledge of system purpose and or function.	2.8	64

ES-401

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Form ES-401-2

2007 NRC Written Examination Outline
 Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp	Q#
E10 / Natural Circulation with Steam Void in Vessel with/without RVLIS / 4			X				EK2.2	Knowledge of the interrelations between the (Natural Circulation with Steam Void in Vessel with/without RVLIS) 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.	3.6	65
K/A Category Point Total:	4	1	2	2	1	3	Group Point Total:			13

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2007 NRC Written Examination Outline
Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp	Q#
010 Pressurizer Pressure Control									X			A2.03	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: PORV failures	4.2	86
025 Ice Condenser									X			A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the ice condenser system; correct, control, or mitigate the consequences of those malfunctions or operations: Containment isolation	3.2	87
061 Auxillary/Emergency Feedwater	X											2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	4.0	88
073 Process Radiation Monitoring	X											2.4.4	Emergency Procedures / Plan Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	89
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	3.1	90
003 Reactor Coolant Pump											X	A4.05	Ability to manually operate and/or monitor in the control room: RCP seal leakage detection instrumentation	3.1	1
003 Reactor Coolant Pump		X										K1.01	Knowledge of the physical connections and/or cause-effect relationships between the RCPS and the following systems: RCP lube oil	2.6	2
004 Chemical and Volume Control			X									K2.02	Knowledge of bus power supplies to the following: Makeup pumps	2.9	3
005 Residual Heat Removal								X				A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including: Heatup/cooldown rates	3.5	4
006 Emergency Core Cooling						X						K5.08	Knowledge of the operational implications of the following concepts as they apply to ECCS: Operation of pumps in parallel	2.9	5
006 Emergency Core Cooling		X										K1.10	Knowledge of the physical connections and/or cause effect relationships between the ECCS and the following systems: Safety injection tank heating system	2.6	6

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2007 NRC Written Examination Outline
Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp	Q#
007 Pressurizer Relief/Quench Tank								X				A1.02	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank pressure	2.7	7
007 Pressurizer Relief/Quench Tank				X								K3.01	Knowledge of the effect that a loss or malfunction of the PRTS will have on the following: Containment	3.3	8
008 Component Cooling Water		X										K1.01	Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: SWS	3.1	9
010 Pressurizer Pressure Control			X									K2.01	Knowledge of bus power supplies to the following: PZR heaters	3.0	10
012 Reactor Protection											X	A4.04	Ability to manually operate and/or monitor in the control room: Bistable, trips, reset and test switches	3.3	11
013 Engineered Safety Features Actuation	X											2.1.33	Conduct of Operations: Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	12
013 Engineered Safety Features Actuation				X								K3.02	Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: RCS	4.3	13
022 Containment Cooling					X							K4.05	Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Containment cooling after LOCA destroys ventilation ducts	2.6	14
025 Ice Condenser		X										K1.02	Knowledge of the physical connections and/or cause-effect relationships between the ice condenser system and the following systems: Refrigerant systems	2.7	15
026 Containment Spray				X								K3.02	Knowledge of the effect that a loss or malfunction of the CSS will have on the following: Recirculation spray system	4.2	16
039 Main and Reheat Steam									X			A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Flow paths of steam during a LOCA	3.1	17
059 Main Feedwater								X				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	2.5	18

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2007 NRC Written Examination Outline
Plant Systems – Tier 2 Group 1

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp	Q#
059 Main Feedwater										X		A3.02	Ability to monitor automatic operation of the MFW, including: Programmed levels of the S/G	2.9	19
061 Auxillary/Emergency Feedwater	X											2.1.32	Conduct of Operations: Ability to explain and apply all system limits and precautions.	3.4	20
061 Auxillary/Emergency Feedwater							X					K6.02	Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps	2.6	21
062 AC Electrical Distribution			X									K2.01	Knowledge of bus power supplies to the following: Major system loads	3.3	22
063 DC Electrical Distribution										X		A3.01	Ability to monitor automatic operation of the dc electrical system, including: Meters, annunciators, dials, recorders, and indicating lights	2.7	23
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.	4.0	24
073 Process Radiation Monitoring											X	A4.03	Ability to manually operate and/or monitor in the control room: Check source for operability demonstration	3.1	25
076 Service Water								X				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.	2.6	26
078 Instrument Air	X											2.1.32	Conduct of Operations: Ability to explain and apply all system limits and precautions.	3.4	27
103 Containment										X		A3.01	Ability to monitor automatic operation of the containment system, including: Containment isolation	3.9	28
K/A Category Point Totals:	6	4	3	3	1	1	1	4	4	3	3	Group Point Total:		33	

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2007 NRC Written Examination Outline
Plant Systems – Tier 2 Group 2

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp	Q#
017 In-core Temperature Monitor									X			A2.01	Ability to (a) predict the impacts of the following malfunctions or operation on the ITM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Thermocouple open and short circuits	3.5	91
034 Fuel Handling Equipment	X											2.2.22	Equipment Control Knowledge of limiting conditions for operations and safety limits.	4.1	92
045 Main Turbine Generator									X			A2.11	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: Control problems in primary, e.g., axial flux imbalance; need to reduce load on secondary	2.9	93
002 Reactor Coolant							X					K6.07	Knowledge of the effect or a loss or malfunction on the following RCS components: Pumps	2.5	29
015 Nuclear Instrumentation						X						K5.07	Knowledge of the operational implications of the following concepts as they apply to the NIS: Effects of burning on axial flux density	2.7	30
027 Containment Iodine Removal		X										K1.01	Knowledge of the physical connections and/or cause-effect relationships between the CIRS and the following systems: CSS	3.4	31
028 Hydrogen Recombiner and Purge Control								X				A1.01	Ability to predict and/or monitor changes in parameter (to prevent exceeding design limits) associated with operating the HRPS controls including: Hydrogen concentration	3.4	32
035 Steam Generator						X						K5.01	Knowledge of operational implications of the following concepts as they apply to the S/GS: Effect of secondary parameters, pressure, and temperature on reactivity	3.4	33
045 Main Turbine Generator									X			A2.17	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: Malfunction of electrohydraulic control	2.7	34
055 Condenser Air Removal				X								K3.01	Knowledge of the effect that a loss or malfunction of the CARS will have on the following: Main condenser	2.5	35
071 Waste Gas Disposal					X							K4.05	Knowledge of design feature(s) and/or interlock(s) which provide for the following: Point of release	2.7	36

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2007 NRC Written Examination Outline
Plant Systems – Tier 2 Group 2

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp	Q#
079 Station Air									X			A2.01	Ability to (a) predict the impacts of the following malfunctions or operation on the Service Air system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Cross-connection with IAS	2.9	37
086 Fire Protection							X					K4.02	Knowledge of design features and/or interlocks which provide for the following: Maintenance of Fire Header pressure	3.0	38
K/A Category Point Totals:	1	1	0	1	2	2	1	1	4	0	0	Group Point Total:			13

Facility:	McGuire		Date of Exam:	3/19/2007			
Category	K/A #	Topic	RO		SRO-Only		
			IR	Q#	IR	Q#	
1. Conduct of Operations	2.1.4	Knowledge of shift staffing requirements.			3.4	94	
	2.1.20	Ability to execute procedure steps.			4.2	95	
	2.1.10	Knowledge of conditions and limitations in the facility license.	2.7	66			
	2.1.8	Ability to coordinate personnel activities outside the control room.	3.8	67			
	Subtotal			2		2	
2. Equipment Control	2.2.11	Knowledge of the process for controlling temporary changes.			3.4	96	
	2.2.30	Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area, communication with fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation.	3.5	68			
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	69			
	2.2.3	(multi-unit) Knowledge of the design, procedural, and operational differences between units.	3.1	70			
	Subtotal			3		1	
3. Radiation Control	2.3.3	Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems).			2.9	97	
	2.3.9	Knowledge of the process for performing a containment purge.			3.4	98	
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	71			
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	72			
	Subtotal			2		2	
4. Emergency Procedures / Plan	2.4.27	Knowledge of fire in the plant procedure.			3.5	99	
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.			3.6	100	
	2.4.24	Knowledge of loss of cooling water procedures.	3.3	73			
	2.4.32	Knowledge of operator response to loss of all annunciators.	3.3	74			
	2.4.18	Knowledge of the specific bases for EOPs.	2.7	75			
	Subtotal			3		2	
Tier 3 Point Total				10		7	

Tier / Group	Randomly Selected K/A	Reason for Rejection
1 / 1	055 G2.1.27	#81 - Topic not suitable for SRO level test item for any of the 10CFR55.43(b) requirements. Randomly selected G2.1.20 to replace
1 / 1	011 EA2.09	#42 - Natural Circulation will not exist during a LBLOCA, making topic implausible. Randomly selected EA2.13 from 011 topic to replace
2 / 1	005 A1.06	#4 – Test not performed at facility. Randomly selected A1.01 from 005 topic area.
2 / 2	086 K6.04	#38 – Unable to develop test item for material presented in topic. NRC presented K4.02 as alternate
1 / 1	038 EA1.20	#47 – Unable to develop discriminating item directly related to topic. NRC presented EA1.16 as alternate
1 / 1	040 AK1.07	#48 – Unable to develop a test item directly tied to the event. NRC presented AK1.06 as alternate
1 / 1	062 AA1.05	#53 – Unable to develop a test item directly tied to the topic. NRC presented AA1.06 as alternate