

Draft Submittal

**ROBINSON AUG/SEPT 2004
EXAM NO. 05000261/2004-301**

AUG. 27 - SEPT. 3, 2004

Written Exam Sample outlines

Robinson
2004 NRC Initial License Written 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 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 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 and plant specific suppression profile report are written directly from the data tables created by the software. Electronic copies of the data tables are on file.

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, Attachment 2 are included in the generation process.
- The Robinson plant suppression profile lists all suppressed topics, either at the Topic level (System/EPE) or at the statement level. These items were suppressed prior to the electronic 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, and Tier 3 generic items (All). 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 automatically placed on the rejected items page and the replacement item identified as an 'ADDED' item. The software tracks whether items are added manually or by random generation, and a report of outline modification may be generated.
- Disposition of any item randomly selected but not included in the outline is documented and included.

DRAFT

Facility:		HB Robinson											Date of Exam:		8/27/2004				
Tier	Group	RO K/A Category Points											SRO-Only Points						
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	K	A	A 2	G *	Total	
1. Emergency & Abnormal Plant Evolutions	1	0	0	4				7	6			1	18			3	4	7	
	2	2	2	2				1	1			1	9			3	2	5	
	Tier Totals	2	2	6				8	7			2	27			6	6	12	
2. Plant Systems	1	3	4	4	1	1	1	5	3	0	4	2	28			2	2	4	
	2	1	0	0	1	1	1	1	2	2	1	0	10			1	1	2	
	Tier Totals	4	4	4	2	2	2	6	5	2	5	2	38			3	3	6	
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4	7
					2		3		2		3				2	3	1	1	
Note:	1.	Ensure that at least two topics from every K/A category are sampled within each tier of the RO outline (i.e., the "Tier Totals" in each K/A category shall not be less than two). Refer to Section D.1.c for additional guidance regarding SRO sampling.																	
	2.	The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.																	
	3.	Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system or evolution unless they relate to plant-specific priorities.																	
	4.	Systems/evolutions within each group are identified on the associated outline.																	
	5.	The shaded areas are not applicable to the category/tier.																	
	6.*	The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.																	
	7.	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; summarize all the SRO-only knowledge and non-A2 ability categories in the columns labeled "K" and "A". Use duplicate pages for RO and SRO-only exams.																	
	8.	For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Form ES-401-3.																	
	9.	Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.																	

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
009 / Small Break LOCA / 3						X	EA2.04	Ability to determine or interpret the following as they apply to a small break LOCA: PZR level	4.0	76
027 / Pressurizer Pressure Control System Malfunction / 3	X						2.4.49	Emergency Procedures / Plan Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	77
029 / ATWS / 1						X	EA2.09	Ability to determine or interpret the following as they apply to a ATWS: Occurrence of a main turbine/reactor trip	4.5	78
056 / Loss of Off-site 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	79
062 / Loss of Nuclear Svc. Water / 4						X	AA2.02	Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The cause of possible CCW loss	3.6	80
E04 / LOCA Outside Containment / 3	X						2.1.28	Conduct of Operations: Knowledge of the purpose and function of major system components and controls.	3.3	81
E05 / Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	X						2.1.27	Conduct of Operations: Knowledge of system purpose and or function.	2.9	82
007 / Reactor Trip - Stabilization - Recovery / 1	X						2.2.22	Equipment Control Knowledge of limiting conditions for operations and safety limits.	3.4	39
008 / Pressurizer Vapor Space Accident / 3						X	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	3.6	40
009 / Small Break LOCA / 3					X		EA1.17	Ability to operate and monitor the following as they apply to a small break LOCA: PRT	3.4	41
011 / Large Break LOCA / 3				X			EK3.03	Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: Starting auxiliary feed pumps and flow, ED/G, and service water pumps	4.1	42
015 / 17 / RCP Malfunctions / 4					X		AA1.22	Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): RCP seal failure/malfunction	4.0	43
025 / Loss of RHR System / 4					X		AA1.20	Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: HPI pump control switch, indicators, ammeter running lights, and flow meter	2.6	44
026 / Loss of Component Cooling Water / 8						X	AA2.02	Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The cause of possible CCW loss	2.9	45

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
027 / Pressurizer Pressure Control System Malfunction / 3						X	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	3.1	46
029 / ATWS / 1					X		EA1.09	Ability to operate and monitor the following as they apply to a ATWS: Manual rod control	4.0	47
038 / Steam Gen. Tube Rupture / 3					X		EA1.19	Ability to operate and monitor the following as they apply to a SGTR: MFW System status indicator	3.4	48
040 / Steam Line Rupture - Excessive Heat Transfer / 4					X		AA1.13	Ability to operate and / or monitor the following as they apply to the Steam Line Rupture: Steam line isolation valve indications	4.2	49
054 / Loss of Main Feedwater / 4						X	AA2.08	Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW): Steam flow-feed trend recorder	2.9	50
056 / Loss of Off-site Power / 6						X	AA2.56	Ability to determine and interpret the following as they apply to the Loss of Offsite Power: RCS T-ave	3.6	51
057 / Loss of Vital AC Inst. Bus / 6						X	AA2.17	Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: System and component status, using local or remote controls	3.1	52
058 / Loss of DC Power / 6				X			AK3.02	Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of dc power	4.0	53
062 / Loss of Nuclear Svc. Water / 4					X		AA1.07	Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water: Flow rates to the components and systems that are serviced by the CCWS; interactions among the components	2.9	54
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	55
E05 / Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4				X			EK3.4	Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink) RO or SRO function as a within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.7	56
K/A Category Point Totals:	5	0	0	4	7	9	Group Point Total:			25

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
036 / Fuel Handling Accident / 8	X						2.4.6	Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.	4.0	83
E06 / Inad. Core Cooling / 4						X	EA2.1	Ability to determine and interpret the following as they apply to the (Degraded Core Cooling) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.2	84
E03 / Post-LOCA Cooldown/Depressurization. / 4	X						2.4.31	Emergency Procedures / Plan Knowledge of annunciators, alarms, and indications, and use of the response instructions	3.4	85
E14 / Loss of CTMT Integrity / 5						X	EA2.1	Ability to determine and interpret the following as they apply to the (High Containment Pressure) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.8	86
E16 / High Containment Radiation / 9						X	EA2.1	Ability to determine and interpret the following as they apply to the (High Containment Radiation) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.3	87
001 / Continuous Rod Withdrawal / 1			X				AK2.01	Knowledge of the interrelations between the Continuous Rod Withdrawal and the following: Rod bank step counters	2.9	57
003 / Dropped Control Rod / 1		X					AK1.21	Knowledge of the operational implications of the following concepts as they apply to Dropped Control Rod: Delta flux (ΔI)	2.7	58
005 / Inoperable/Stuck Control Rod / 1				X			AK3.02	Knowledge of the reasons for the following responses as they apply to the Inoperable / Stuck Control Rod: Rod insertion limits	3.6	59
024 / Emergency Boration / 1						X	AA2.04	Ability to determine and interpret the following as they apply to the Emergency Boration: Availability of BWST	3.4	60
028 / Pressurizer Level Malfunction / 2	X						2.1.23	Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	61
068 / Control Room Evac. / 8					X		AA1.02	Ability to operate and / or monitor the following as they apply to the Control Room Evacuation: AFW emergency pump	4.3	62
E02 / Rediagnosis & SI Termination / 3		X					EK1.2	Knowledge of the operational implications of the following concepts as they apply to the (SI Termination) Normal, abnormal and emergency operating procedures associated with (SI Termination).	3.4	63

HB Robinson
 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#
E06 / Inad. Core Cooling / 4			X				EK2.1	Knowledge of the interrelations between the (Degraded Core Cooling) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.6	64
E13 / Steam Generator Over-pressure / 4				X			EK3.1	Knowledge of the reasons for the following responses as they apply to the (Steam Generator Overpressure) 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.	2.9	65
K/A Category Point Total:	3	2	2	2	1	4	Group Point Total:			14

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
006 Emergency Core Cooling									X			A2.05	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: Improper amperage to the pump motor	3.5	88
012 Reactor Protection	X											2.4.31	Emergency Procedures / Plan Knowledge of annunciators alarms and indications, and use of the response instructions.	3.4	89
022 Containment Cooling									X			A2.03	Ability to (a) predict the impacts of the following malfunctions or operations on 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	3.0	90
061 Auxillary/Emergency Feedwater	X											2.1.14	Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.	3.3	91
003 Reactor Coolant Pump				X								K3.03	Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: Feedwater and emergency feedwater	2.8	1
003 Reactor Coolant Pump											X	A4.07	Ability to manually operate and/or monitor in the control room: RCP seal bypass	2.6	2
004 Chemical and Volume Control			X									K2.03	Knowledge of bus power supplies to the following: Charging Pumps	3.3	3
005 Residual Heat Removal									X			A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR valve malfunction	2.9	4
005 Residual Heat Removal		X										K1.01	Knowledge of the physical connections and/or cause-effect relationships between the RHRS and the following systems: CCWS	3.2	5
006 Emergency Core Cooling								X				A1.06	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: Subcooling margin	3.6	6
007 Pressurizer Relief/Quench Tank											X	A4.10	Ability to manually operate and/or monitor in the control room: Recognition of leaking PORV/code safety	3.6	7
008 Component Cooling Water			X									K2.02	Knowledge of bus power supplies to the following: CCW pump, including emergency backup	3.0	8

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
008 Component Cooling Water									X			A2.03	Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: High/low CCW temperature	3.0	9
010 Pressurizer Pressure Control								X				A1.04	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including: Effects of temperature change during solid operation	3.6	10
012 Reactor Protection				X								K3.02	Knowledge of the effect that a loss or malfunction of the RPS will have on the following: T/G	3.1	11
013 Engineered Safety Features Actuation				X								K3.03	Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Containment	4.3	12
022 Containment Cooling								X				A1.04	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Cooling water flow	3.2	13
026 Containment Spray								X				A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment pressure	3.9	14
039 Main and Reheat Steam								X				A1.06	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: Main steam pressure	3.0	15
039 Main and Reheat Steam		X										K1.09	Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: RMS	2.7	16
056 Condensate		X										K1.03	Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: MFW	2.6	17
059 Main Feedwater				X								K3.04	Knowledge of the effect that a loss or malfunction of the MFW will have on the following: RCS	3.6	18
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	19
062 AC Electrical Distribution					X							K4.02	Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: Circuit breaker automatic trips	2.5	20
063 DC Electrical Distribution			X									K2.01	Knowledge of bus power supplies to the following: Major dc loads	2.9	21

Sys	System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
029	064 Emergency Diesel Generator									X			A2.13	Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Consequences of opening auxiliary feeder bus (ED/G sub supply)	2.6	22
034	073 Process Radiation Monitoring						X						K5.02	Knowledge of the operational implications as they apply to concepts as they apply to the PRM system: Radiation intensity changes with source distance	2.5	23
	073 Process Radiation Monitoring											X	A4.02	Ability to manually operate and/or monitor in the control room Radiation monitoring system control panel	3.7	24
002	076 Service Water	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	25
014	078 Instrument Air			X									K2.02	Knowledge of bus power supplies to the following Emergency air compressor	3.3	26
015	078 Instrument Air											X	A4.01	Ability to manually operate and/or monitor in the control room: Pressure gauges	3.1	27
	103 Containment	X											2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	3.0	28
016	K/A Category Point Totals:	4	3	4	4	1	1	1	5	5	0	4	Group Point Total:			32

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