Facility:		Comanche	e Pe	ak I	NRC	;				Da	ate	of E	xam	ı: 04	/16/20	07			
						R) K/	A C	ateg	ory	Poi	nts				SRC)-Only	Poir	nts
Tie	r	Group	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A	2	G'	ł	Total
1. E		1	2	2	1				4	5			4	18	;	3	3		6
Emerge & Abno		2	1	3	2				1	1			1	9	2	2	2		4
Plar Evolut		Tier Totals	3	5	3				5	6			5	27	ę	5	5		10
2. Pla	ant	1	4	1	2	2	0	3	4	4	1	3	4	28		2	3		5
Syste	ms	2	1	1	0	1	2	1	0	0	1	1	2	10	0	1	2		3
		Tier Totals	5	2	2	3	2	4	4	4	2	4	6	38	:	3	5		8
3. Gene		nowledge ar ategories	nd A	bilit	ies		1 2		22		3		4	10	1	2	3	4	- 7
	2. 3.	The poir in the tal specified and the Systems	nt to ble. d in SRC s/eve	tal fo The the f D-on plutions that	or ea e fin table ily e ons at do	ach al p e ba xam with o no	to topics from every applicable K/A category are sampled within ad SRO-only outlines (i.e., except for one category in Tier 3 of the "Tier Totals" in each K/A category shall not be less than two). In group and tier in the proposed outline must match that specified point total for each group and tier may deviate by ± 1 from that based on NRC revisions. The final RO exam must total 75 points am must total 25 points.										oecified that points vstems		
	4.	be adde inapprop Select to or evolution	d. R priat	efer e K/ s fro	to E A st m a	ES-4 ater s m	401, nen any	Atta ts. sys	achr tem:	men s an	t 2, d ev	for g	guida tions	ance reg	gardin sible;	g elim samp	ninatio ole eve	n of ery sy	/stem
	5.	Absent a or highe portions	a pla r sh	ant s all b	pec e se	ific elect	orior	ity,	only	' tho	se k	٢As	hav	ing an i	mporta	ance i	rating	(IR) (of 2.5
	6.	Select S	RO	topi	cs fo	or T	iers	1 a	nd 2	froi	m th	ie sł	nade	ed syste	ms ar	nd K/A	catego	gories	S.
	7.*	The gen Catalog,																	٨
	8.	On the for topics' in each system above. L	npo sterr	rtan n an	ce ra d ca	ating iteg	gs (I ory.	R) f Ente	or th er th	ne a ie gi	pplio roup	cabl and	e lic d tie	ense lev r totals	vel, ar	nd the	point	total	s (#) for
	9.	For Tier descripti that are	ons	, IRs	s, ar	nd p	oint	tota											

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
015 / 17 / Reactor Coolant Pump Malfunctions / 4						x	AA2.11	Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): When to jog RCPs during ICC	3.8	76
022 / Loss of Reactor Coolant Makeup / 2	x						2.4.4	Emergency Procedures/E-Plan: Ability to recognize abnormal indications for system operating parameters which are entry level conditions for abnormal and emergency operating procedures.	4.3	77
027 / Pressurizer Pressure Control System Malfunction / 3						х	AA2.06	Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Conditions requiring plant shutdown	3.9	78
055 / Station Blackout / 6						x	EA2.02	Ability to determine or interpret the following as they apply to a Station Blackout: RCS core cooling through natural circulation cooling to S/G cooling	4.6	79
057 / Loss of Vital AC Electrical Instrument Bus / 6	x						2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	80
E05 / Loss of Secondary Heat Sink / 4	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	81
007 / Reactor Trip / 1						х	EA2.06	Ability to determine or interpret the following as they apply to a reactor trip: Occurrence of a reactor trip	4.3	39
008 / Pressurizer Vapor Space Accident / 3					х		AA1.03	Ability to operate and / or monitor the following as they apply to the Pressurizer Vapor Space Accident: Turbine bypass in manual control to maintain header pressure	2.8	40
009 / Small Break LOCA / 3	х						2.1.27	Conduct of Operations: Knowledge of system purpose and or function.	2.8	41
011 / Large Break LOCA / 3	х						2.1.2	Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.	3.0	42
015 / 17 / Reactor Coolant Pump Malfunctions / 4			x				AK2.10	Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: RCP indicators and controls	2.8	43
022 / Loss of Reactor Coolant Makeup / 2		x					AK1.03	Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Relationship between charging flow and PZR level	3.0	44

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
025 / Loss of Residual Heat Removal System / 4		x					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	45
026 / Loss of Component Cooling Water / 8						x	AA2.04	Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The normal values and upper limits for the temperatures of the components cooled by CCW	2.5	46
027 / Pressurizer Pressure Control System Malfunction / 3	х						2.1.27	Conduct of Operations: Knowledge of system purpose and or function.	2.8	47
029 / Anticipated Transient Without Scram (ATWS) / 1			х				EK2.06	Knowledge of the interrelations between the and the following an ATWS: Breakers, relays, and disconnects	2.9	48
055 / Station Blackout / 6				х			EK3.02	Knowledge of the reasons for the following responses as the 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					х		AA1.05	Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Initiation (manual) of safety injection process	3.8	50
057 / Loss of Vital AC Electrical Instrument Bus / 6					х		AA1.04	Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: RWST and VCT valves	3.5	51
058 / Loss of DC Power / 6					х		AA1.02	Ability to operate and / or monitor the following as they apply to the Loss of DC Power: Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector	3.1	52
062 / Loss of Nuclear Service. Water / 4	х						2.4.50	Emergency Procedures / Plan Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	53
065 / Loss of Instrument Air / 8						x	AA2.08	Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Failure modes of air-operated equipment	2.9	54
cE05 / Loss of Secondary Heat Sink / 4						x	EA2.1	Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.4	55

K/A Category Point Totals:

18/<mark>6</mark>

Comanche Peak 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)	lmp.	Q#
								Ability to determine and interpret the following as they		
E12 / Uncontrolled Depressurization of all Steam Generators / 4						х	EA2.1	apply to (Uncontrolled Depressurization of all Steam Generators) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.2	56

8

Group Point Total:

2

7

2

1

4

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s)	Imp.	Q#
028 / Pressurizer Level Control Malfunction / 2						x	AA2.10	Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: Whether the automatic mode for PZR level control is functioning improperly, necessity of shift to manual modes	3.4	82
037 / Steam Generator Tube Leak / 4	x						2.2.22	Equipment Control Knowledge of limiting conditions for operations and safety limits.	4.1	83
076 / High Reactor Coolant Activity / 9						x	AA2.05	Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: CVCS letdown flow rate indication	2.5	84
E15 / Containment Flooding / 5	x						2.1.14	Conduct of Operations: Knowledge of system status criteria which require the notification of plant personnel.	3.3	85
024 / Emergency Boration / 1	х						2.4.6	Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.	3.1	57
028 / Pressurizer Level Control Malfunction / 2			x				AK2.02	Knowledge of the interrelations between the Pressurizer Level Control Malfunctions and the following: Sensors and detectors	2.6	58
032 / Loss of Source Range Nuclear Instrumentation / 7			x				AK2.01	Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: Power supplies, including proper switch positions	2.7	59
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	60
068 / Control Room Evacuation / 8				x			AK3.10	Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: Maintenance of PZR level, using pumps and heaters	3.9	61
E06 / Degraded Core Cooling / 4				x			EK3.4	Knowledge of the reasons for the following responses as they apply to the (Degraded Core Cooling) 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.	3.5	62
E08 / Pressurized Thermal Shock / 4			x				EK2.2	Knowledge of the interrelations between the (Pressurized Thermal Shock) 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	63

E/APE # / Name Safety Function	G	K1	K2	K3	A1	A2	Number	K/A Topic(s) Imp	. Q#
E14 / High Containment Pressure / 5		x					EK1.2	Knowledge of the operational implications of the following concepts as they apply to the (High Containment Pressure) Normal, abnormal and emergency operating procedures associated with (High Containment Pressure).3.2	64
E16 / High Containment Radiation / 9					x		EA1.2	Ability to operate and / or monitor the following as they apply to the (High Containment Radiation) Operating behavior characteristics of the facility.	65
K/A Category Point Total:	K/A Category Point Total: 3 1 3 2 1 3 Group Point Total:			9/ <mark>4</mark>					

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
003 Reactor Coolant Pump									x			A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Problems with RCP seals, especially rates of seal leak-off	3.9	86
004 Chemical and Volume Control	X											2.4.6	Emergency Procedures / Plan Knowledge symptom based EOP mitigation strategies.	4.0	87
007 Pressurizer Relief/Quench Tank	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	88
039 Main and Reheat Steam	x											2.1.14	Conduct of Operations: Knowledge of system status criteria which require notification of plant personnel.	3.3	89
103 Containment									x			A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the containment system-and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations Necessary plant conditions for work in containment	3.2	90
003 Reactor Coolant Pump											х	A4.08	Ability to manually operate and/or monitor in the control room: RCP cooling water supplies	3.2	1
004 Chemical and Volume Control		x										K1.02	Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: PZR and RCS temperature and pressure relationships	3.5	2
005 Residual Heat Removal									x			A2.02	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: Pressure transient protection during cold shutdown	3.5	3
005 Residual Heat Removal				х								K3.07	Knowledge of the effect that a loss or malfunction of the RHRS has on the following: Refueling operations	3.2	4
006 Emergency Core Cooling									х			A2.03	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: System leakage		5

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				A1.03	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Monitoring quench tank temperature	2.6	6
007 Pressurizer Relief/Quench Tank											х	A4.09	Ability to manually operate and/or monitor in the control room: Relationships between PZR level and changing levels of the PRT and bleed holdup tank	2.5	7
008 Component Cooling Water		х										K1.05	Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: Sources of makeup water.	3.0	8
010 Pressurizer Pressure Control							х					K6.01	Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: Pressure detection systems	2.7	9
010 Pressurizer Pressure Control								х				A1.08	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including: Spray nozzle DT	3.2	10
012 Reactor Protection										х		A3.05	Ability to monitor automatic operation of the RPS, including: Single and multiple channel trip indicators	3.6	11
013 Engineered Safety Features Actuation			х									K2.01	Knowledge of bus power supplies to the following: ESFAS/safeguards equipment control	3.6	12
013 Engineered Safety Features Actuation									x			A2.06	Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; Inadvertent ESFAS actuation	3.7	13
022 Containment Cooling		х										K1.02	Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: SEC/remote monitoring systems	3.7	14
022 Containment Cooling								х				A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Containment temperature	3.6	15
026 Containment Spray											х	A4.01	Ability to manually operate and/or monitor in the control room: CSS controls	4.5	16

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number	K/A Topics	Imp.	Q#
026 Containment Spray					x							K4.04	Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: Reduction of temperature and pressure in containment after a LOCA by condensing steam, to reduce radiological hazard, and protect equipment from corrosion damage (spray)	3.7	17
039 Main and Reheat Steam		x										K1.05	Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: T/G	2.5	18
059 Main Feedwater								x				A1.03	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: Power level restrictions for operation of MFW pumps and valves.	2.7	19
061 Auxiliary/Emergency Feedwater							х					K6.02	Knowledge of the effect of a loss or malfunction of the following will have on AFW components: Pump	2.6	20
061 Auxiliary/Emergency Feedwater					х							K4.02	Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: AFW automatic start upon loss of MFW pump, S/G level blackout, or safety injection	4.5	21
062 AC Electrical Distribution	х											2.1.14	Conduct of Operations: Knowledge of system statu criteria which require notification of plant personne	³ 2.5	22
063 DC Electrical Distribution	х											2.4.10	Emergency Procedures / Plan Knowledge of annunciator response procedures.	3.0	23
064 Emergency Diesel Generator							х					K6.07	Knowledge of the effect of a loss or malfunction of the following will have on ED/G system: Air received	rs 2.7	24
073 Process Radiation Monitoring									x			A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; an (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Detector failure	2.7	25
076 Service Water	х											2.4.20	Knowledge of operational implications of EOP warnings, cautions, and notes.	3.3	26
078 Instrument Air				х								K3.02	Knowledge of the effect that a loss or malfunction of the IAS will have on the following: Systems having pneumatic valves and controls		27
103 Containment	х											2.1.32	Conduct of Operations: Ability to explain and apply all system limits and precautions.	3.4	28
K/A Category Point Totals:	7	4	1	2	2	0	3	4	6	1	3	Group F	Point Total:		28/ <mark>5</mark>

System #/Name	G	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	Number		K/A Topics	Imp.	Q#
028 Hydrogen Recombiner and Purge Control	x											2.1.14		of Operations: Knowledge of system status which require the notification of plant el.	3.3	91
075 Circulating Water	х											2.1.2		of Operations: Knowledge of operator bilities during all modes of plant operation.	4.0	92
041 Steam Dump/Turbine Bypass Control									x			A2.02	malfunct on those or mitiga	(a) predict the impacts of the following ions or operations on the SDS; and (b) based predictions use procedures to correct, control the the consequences of those malfunctions tions: Steam valve stuck open	3.6	93
015 Nuclear Instrumentation										х		A3.03	Ability to monitor automatic operation of the NIS, including: Verification of proper functioning/operability Knowledge of bus power supplies to the following:		3.9	29
027 Containment Iodine Removal			х									K2.01	Knowledge of bus power supplies to the following: Fans		3.1	30
033 Spent Fuel Pool Cooling					х							K4.03	Knowledge of design feature(s) and/or interlock(s) which provide for the following: Anti-siphon devices		2.6	31
035 Steam Generator							х					K6.01	Knowledge of the effect of a loss or malfunction on the following will have on the S/GS: MSIVs		3.2	32
041 Steam Dump/Turbine Bypass Control		x										K1.05	cause-e	Ige of the Physical connections and/or ffect relationships between the SDS and the g systems: RCS	3.5	33
045 Main Turbine Generator	x											2.4.49	without I	ncy Procedures / Plan Ability to perform reference to procedures those actions that mmediate operation of system components trols.	4.0	34
055 Condenser Air Removal	x											2.4.50	alarm se	ncy Procedures / Plan Ability to verify system etpoints and operate controls identified in the sponse manual.	3.3	35
071 Waste Gas Disposal											х	A4.14		manually operate and/or monitor in the oom: WGDS status alarms	2.8	36
072 Area Radiation Monitoring						x						K5.02	Knowledge of the operational implications of the		2.5	37
086 Fire Protection						x						K5.03	following	Ige of the operational implication of the g concepts as they apply to the Fire on System: Effect of water spray on electrical ents	3.1	38
K/A Category Point Totals:	4	1	1	0	1	2	1	0	1	1	1	Group Poir	nt Total:			10/ <mark>3</mark>

Generic Knowledge and Abilities Outline (Tier 3)

Form ES-401-3

Facility: Coma	anche Pe	ak NRC	Date of Exam:		1/2	/2007		
Category	K/A #		Topic		R	0	SRO	-Only
Category			•		IR	Q#	IR	Q#
	2.1.32	Ability to expression of the second s	plain and apply all syste	m limits and			3.8	94
1.	2.1.11		of less than one hour te action statements for s				3.8	95
Conduct of	2.1.9		ect personnel activities i		2.5	66		
Operations	2.1.10		of conditions and limitat	ions in the	2.7	67		
	Subtot					2		2
	2.2.31		of procedures and limita nitial core loading.	tions			2.9	96
2	2.2.11	olling			3.4	97		
2. Equipment	2.2.3		Knowledge of the desigr		3.1	68		
Control	2.2.25	Knowledge	of bases in technical sp conditions for operations	ecifications	2.5	69		
	Subtot	al				2		2
	2.3.3	systems that	of SRO responsibilities t t are outside the control sal and handling system	room (e.g.,			2.9	98
3. Radiation	2.3.10	Ability to pe	rform procedures to red evels of radiation and gu	uce	2.9	70		
Control	2.3.4	Knowledge contamination	of radiation exposure lin on control, including per cess of those authorized	missible	2.5	71		
	Subtot	al				2		1
	2.4.22		of the bases for prioritizi iring abnormal/emergen				4.0	99
4.	2.4.7	Knowledge strategies.	of event based EOP mit	igation			3.8	100
Emergency	2.4.24		of loss of cooling water		3.3	72		
Procedures /	2.4.14	Knowledge flowchart us	of general guidelines for se.	r EOP	3.0	73		
Plan	2.4.10	-	of annunciator response	-	3.0	74		
	2.4.43		of emergency communid techniques.	cations	2.8	75		
	Subtot	al				4		2
Tier 3 Point Tota	al					10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
2 / 1	025 / A4.01	Q #15 - The subject K/A isn't relevant at the facility (No ice condenser). Randomly selected 022 A1.01.
2 / 1	G2.4.30	Q #23 - The subject K/A isn't relevant at the RO level (<2.5). Randomly selected G2.4.10.
2 / 1	G2.4.30	Q #26 - The subject K/A isn't relevant at the RO level (<2.5). Randomly selected G2.4.20.
2/2	055 / A3.03	Q #35 - The subject K/A isn't relevant at the facility (No automatic diversion of CARS exhaust). Randomly selected 055 G2.4.50.
2/2	071 / A4.03	Q #36 - The subject K/A not available for operation in the Control Room (seal water to waste gas compressors). Randomly selected 071 A4.14.
1/2	068 AK3.11	Q #61 – Unable to create adequate question without intimate procedural knowledge (Tech Spec limits and Tables for quantity of boric acid during Control Room evacuation). Randomly selected AK3.10.
1 / 1	022 G2.1.27	Q #77 - No SRO tie. Impossible to prepare a psychometrically sound SRO item with a link to 10CFR55.43. Randomly selected G2.4.4.
1 / 1	057 G2.1.28	Q #80 - No SRO tie. Impossible to prepare a psychometrically sound SRO item with a link to 10CFR55.43. Randomly selected G2.1.33.
1 / 1	E05 G2.1.28	Q #81 - No SRO tie. Impossible to prepare a psychometrically sound SRO item with a link to 10CFR55.43. Randomly selected G2.4.49.
1/2	005 / AA2.02	Q #82 - The subject K/A isn't relevant at the facility (No jog and run rod speed difference). Randomly selected 028 AA2.10.
1/2	060 G2.2.22	Q #83 - No Relation between topic and event that would match KA. Impossible to prepare a psychometrically sound SRO item with a link to 10CFR55.43. Randomly selected Topic 037 with same selected generic KA.
2/2	079 A2.01	Q #93 - The subject K/A isn't relevant at the facility (No IAS to SAS cross connect). Randomly selected 041 A2.02.