

*75 day  
submittal*

# **INITIAL SUBMITTAL**

**CATAWBA EXAM  
50-413, 414/2001-301**

**APRIL 2 - 6 & 16 - 20, 2001**

**INITIAL SUBMITTAL**

**INITIAL OUTLINE SUBMITTALS  
NRC SUBMITTED/WRITTEN OUTLINES**

Facility: Catawba		Week of Examination: April, 2001
Examination Level: RO		Operating Test #1, #2, #3
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	2.1.21 3.1/3.2	Obtain and Verify a Procedure
	2.1.25 2.8/3.1	Perform a Manual Shutdown Margin Calculation
A.2	2.2.13 3.6/3.8	Perform a Review of a R&R Procedure
A.3	2.3.4 2.5/3.1	Calculate the Maximum Permissible Stay Time Within Duke Power Administrative Limits
A.4	2.4.27 3.0/3.5	Perform the RO Actions for a Fire in the Plant

Facility: Catawba		Week of Examination: April, 2001
Examination Level: SRO		Operating Test #1, #2, #3
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	2.1.21 3.1/3.2	Obtain and Verify a Procedure
	2.1.26 2.2/2.6	Determine Amount of Boration Required to Cooldown from Mode 3 to Mode 5.
A.2	2.2.24 2.6/3.8	Determine Operability and Make TSAIL Entry
A.3	2.3.6 2.1/3.1	Review and Authorize a Gaseous Waste Release Form
A.4	2.4.41 2.3/4.1	Classify an Event and Complete the Emergency Notification Form

Facility: Catawba		Date of Examination: April, 2001	
Exam Level: <del>RO</del> <del>SRO(I)</del> <del>SRO(U)</del>		Operating Test No.: 1, 2, 3	
B.1 Control Room Systems			
System / JPM Title		Type Code*	Safety Function
a. 064/Restore Power to 1ETA and Manually Shutdown the Diesel Generator (DG-005)		D, S, A	VI
b. 005/Loss of ND (Leak) (Not from bank)		S, L, A	IV
c. 028/ Verify Proper VX System Operation (CSF-002)		D,S	V
d. 004/ Borate the Reactor Coolant System to Clear Rod Insertion Limit Alarm (New)		N,C	I
e. 002/ Establish NC System Bleed and Feed (NC-046)		D, S, A	III
f. 015/ Take Power Range Drawer Out of Service (ENB-002)		D, C	VII
g. 006/ Transfer ECCS to Cold Leg Recirc (NI-088)		D, S, A	III
B.2 Facility Walk-Through			
a. 013/Transfer HVAC controls to Local Following Control Room Evacuation (RSS-003)		P, R	II
b. 063/ Shutdown Battery Charger 1ECA (EPL-016)		P	VI
c. 022/ Restore Containment Cooling (RN-001)		P	V
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

Facility: Catawba

Date of Examination: April, 2001

Exam Level: RO/SRO(I)/SRO(II)

Operating Test No.: 1, 2, 3

## B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. 008/ Loss of KC in Mode 5 ( )	S, L	VIII
b. 003/ Start a Reactor Coolant Pump (NCP-080)	S,	IV
c. 012/ Perform Immediate Actions for ATWS (IRX-015)	D, C, A	VII
d. 062/ Re-energize 2ETA from Unit 1 (New)	N, C	VI
e. Verify Proper Safety Injection Flow (NI-107)	D, S, A	II
f. 004/ Emergency Borate the Reactor Coolant System (NV-017)	D, S, A	I
g. 026/ Align Containment Spray System to Sump (NS-101)	D, S	V

## B.2 Facility Walk-Through

a. 028/ Start the Hydrogen Recombiner (VX-020)	D, P, R, A	V
b. 064/ Place the SSF Diesel in Operation (AD-003)	D, P	VI
c. 061/ Local Reset of CAPT (CA-091)	D, P, R	IV

\* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

<b>Facility:</b> <u>Catawba</u>	<b>Scenario No.:</b> <u>NRC 1</u>	<b>Op-Test No.:</b> _____	
Examiners: _____ _____	Applicants: _____ _____		
<p><b>Objectives:</b> To evaluate the applicants' ability to reduce power using NOPs while maintaining Tave matched to Tref, and to use AOPs to respond to instrument failures in a power range NI and a pressurizer level channel, and further complicated by the loss letdown with turbine runback. The candidates will then be evaluated using the EOPs to respond to a small S/G tube leak that increases in size until the reactor trips, when the tube ruptures. Mitigation will further be complicated by the S/G PORV on the ruptured generator that opens and fails to reseal, and loss of the A ND and NV pumps.</p>			
<p><b>Initial Conditions:</b> 100% Power, MOL with equilibrium Xe conditions          Prevent A NV pump from starting (auto and manual)          DG 1A inoperable - control power fuses removed          ND pump 1A inoperable</p>			
<p><b>Turnover:</b> 100% Power, MOL with equilibrium Xenon, 801 ppm Boron          Reduce load to 75%          1A ND pump tagged out for an oil change          1A D/G in maintenance mode</p>			
Event No.	Malf. No.	Event Type*	Event Description
1		R-BOP	Boration for load decrease
2		N-RO	Decrease turbine load
3		I-RO	N-43 fails HIGH
4		I-BOP	Pressurizer Level Channel II fails LOW
5		C-BOP	Loss of letdown - establish excess letdown
6		C-RO	Turbine runback
7		M	B3 Steam Generator Tube Leak followed by SGTR after reactor trip
8		C-BOP	1A NV pump fails to start
9		C-BOP	S/G PORV on B S/G leaks by seat - just prior to commencing the NC system cooldown in E-3 (upon reaching peak pressure)

<b>Simulation Facility:</b> <u>Catawba</u>		<b>Scenario No.:</b> <u>NRC-2</u>		<b>Op-Test No.:</b>	
Examiners: _____		Operators: _____			
_____		_____			
_____		_____			
<p><b>Objectives</b> To evaluate the applicants' ability to increase power using NOPs while maintaining Tave matched to Tref, and to use AOPs to respond to a failure of a steam flow transmitter, a VCT level transmitter and a spurious opening of a S/G PORV. The applicants will also be evaluated in their response to the rupture of the fuel oil day tank on the 1A EDG, which also causes an oil spill. The applicants will be evaluated using EOPs to respond to a loss of all AC power caused by the loss of offsite power and a failure of the DGs to power the safety busses.</p> <p><b>Initial Conditions</b> 50% power, BOC, equilibrium Xenon conditions, 1416 ppm Boron Prevent 1B EDG sequencer from operating S/G 1C steam flow channel I is OOC</p> <p><b>Turnover</b> Thunderstorms are in the area and the load dispatcher has directed that Unit 1 be rapidly ramped to 100% power due to grid supply problems. I&amp;E technicians are working on calibrating the channel I S/G 1C steam flow transmitter.</p>					
Event No	Malf No	Event Type*	Event Description		
1		N-RO	Increase power to 100%		
2		R-BOP	Dilute for power increase		
3		I-RO	S/G 1C steam flow transmitter channel II fails low		
4		I-BOP	VCT level transmitter fails high		
5		C-BOP	Loss of 1A EDG (oil spill)		
6		C-RO	S/G 1C PORV fails open		
7		M	Loss of all AC power, station blackout		
8		C-BOP	1B EDG sequencer fails to actuate		

Simulation Facility: CatawbaScenario No.: NRC-3

Op-Test No: \_\_\_\_\_

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_

**Objectives:** To evaluate the applicants' ability to reduce power using NOPs while maintaining Tave matched to Tref and to use AOPs to respond to instrument failures in the T-Ref program, a failure of the transmitter controlling reactor coolant pump seal injection flow and a failure of a main feedwater pump that results in a turbine runback with failure of automatic rod control. The applicants will be evaluated using EOPs to mitigate an ejected control rod that results in a small break LOCA. Mitigation efforts will be complicated by the failure of the reactor to trip and failure of the turbine to automatically trip. When the emergency diesel generators are secured in E-1, normal power will be lost to EETA.

**Initial Conditions:** 100% power, EOC, Equilibrium Xenon conditions

Block auto and manual reactor trip

Block auto turbine trip

Block auto safety injection

**Turnover:** 100% power, EOC, Equilibrium Xenon conditions  
 Reduce power to 0% in preparation for the next refueling outage  
 B diesel in maintenance mode for injector maintenance  
 B CA pump tagged out for an oil change  
 Channel 4 FWST level transmitter is inoperable  
 Thunderstorms in the area

Event No	Malf No.	Event Type*	Event Description
1		N-RO	Reduce turbine load
2		R-BOP	Borate NC system
3		I-RO	T-ref fails to 557° F
4		I-BOP	NCP seal injection transmitter failure
5		C-BOP	B Main feedwater pump trips
6		C-RO	Turbine runback to 65% power due to CF pump trip
7		C-RO	Rods fail to move in auto during load rejection
8		M	Small reactor coolant leak
9		M	Rod ejection
10		C-RO	ATWS
11		C-RO	Turbine fails to trip

(N)ormal,  
NUREG-1021

(R)eactivity,

(I)nstrument,  
Page 1

(C)omponent,

(M)ajor  
Revision 8



12		C-BOP	Failure of auto safety injection
13		C-BOP	Loss of normal power to IETA

<b>Simulation Facility:</b> <u>Catawba</u>	<b>Scenario No.:</b> <u>NRC-4</u>	<b>Op-Test No.:</b> _____	
Examiners: _____	Operators: _____		
<p><b>Objectives:</b> To evaluate the applicants' ability to reduce power using OPs while maintaining Tave matched to Tref, and to use the APs to respond to instrument failures of a low failure of turbine impulse pressure and failure of the letdown pressure transmitter. Additionally, the scenario will evaluate the applicants' ability to respond to component failures including tripping of the running component cooling water pump and a main steam isolation valve failing closed at power. The applicants' ability to use EOPs to mitigate a reactor coolant leak will be evaluated until the reactor is tripped due to the main steam isolation valve closing. A large break LOCA on a cold leg will be initiated upon the trip. Automatic Safety Injection will fail to actuate on both trains. Additionally, train B will not initiate manually. When FWST level reached 45%, 1A ND pump will trip.</p>			
<p><b>Initial Conditions:</b> 100% power, EOC with equilibrium Xenon conditions          Failure of automatic safety injection signal on both trains          Failure of manual safety injection signal on B train          1B Diesel in maintenance mode          B CA pump racked out for oil change          FWST level channel 4 failed to zero</p>			
<p><b>Turnover:</b> 100% Power, EOL with equilibrium Xenon condition          1B Diesel tagged for maintenance. Expected to return to service in 2 hours.          Reduce turbine load to 90% for control valve testing          There are thunderstorms in the area.          FWST level channel 4 is inoperable</p>			
Event No.	Malfunction No.	Event Type*	Event Description
1		N-RO	Reduce turbine load to 90%
2		R-BOP	Borate to match load reduction
3		I-RO	Turbine impulse pressure channel 1 fails to zero
4		C-BOP	Trip of running KC pump
5		I-BOP	Failure of letdown pressure controller
6		M	Leak in reactor coolant system
7		C-RO	Main Steam Isolation valve closes at power
8		M	Large LOCA
9		C-BOP	Failure of Safety Injection
10		C-BOP	Trip of 1A ND pump

**Catawba Sample Plan**

Facility: Catawba		Date of Exam: 5/19/00						Exam Level: RO							
Tier	Group	K/A Category Points											Point	Target	
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Total		
1 Emergency & Abnormal Plant Evolutions	1	1	5	3				4	2				1	16	16
	2	1	2	4				5	1				4	17	17
	3	0	1	0				1	1				0	3	3
	Tier Totals	2	8	7				10	4				5	36	36
2 Plant Systems	1	1	1	1	1	3	1	1	5	2	2	4	22	23	
	2	0	1	3	5	1	2	3	3	1	1	0	20	20	
	3	1	1	1	2	0	0	1	0	0	1	1	8	8	
	Tier Totals	2	3	5	8	4	3	5	8	3	4	5	50	51	
3	Generic Knowledge and Abilities					Cat 1	Cat 2	Cat 3	Cat 4						
						3	3	4	3				13	13	
<p><b>Note:</b></p> <ul style="list-style-type: none"> <li>* Attempt to distribute topics among all K/A categories; select at least one topic from every K/A category within each tier.</li> <li>* Actual point totals must match those specified in the table.</li> <li>* Select topics from many systems; avoid selecting more than two or three K/A topics from a system unless they relate to plant-specific priorities.</li> <li>* Systems /evolutions within each group are identified on the associated outline.</li> <li>* The shaded areas are not applicable to the category/tier.</li> <li>** Denotes plant specific, high priority K/As</li> </ul>															Totals:
															100

Catawba Sample Plan

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points	Question	
000005 Inoperable/Stuck Control Rod #				1.02			Ability to operate and/or monitor ...rod selection switches	3.7/3.5	1		
000015/17 RCP Malfunction / IV		2.07					Knowledge of the interrelationships between... RCP seals	2.9/2.9	1		
W/E08 Natural Circ. /IV		2.1					Knowledge of the interrelationships between... components and functions of control and safety systems including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.2/3.4	1		
000024 Emergency Boration #						4.1	Knowledge of EOP entry conditions and immediate action steps	4.3/4.6	1		
000026 Loss of Component Cooling Water / VIII				1.07			Ability to operate and/or monitor ... flow rates to the components and systems that are serviced by the CCWS; interactions among components	2.9/3.0	1		
000027 Pressurizer Pressure Control System Malfunction / III		2.03					Knowledge of the interrelationships between... controllers and positioners	2.6/2.8	1		
000040 Steam Line Rupture - Excessive Heat Transfer / IV				1.12			Ability to operate and/or monitor ... RCS pressure and temperature	4.2/4.2	1		
W/E08 RCS Overcooling - PTS / IV		1.1					Knowledge of the operational implications of the following concepts as they apply to the... components, capacity and function of emergency systems	3.5/3.6	1		
000051 Loss of Condenser Vacuum / IV					2.02		Ability to determine and interpret... conditions requiring a reactor or turbine trip	3.9/4.1	1		
000055 Station Blackout / VI				1.01			Ability to operate and/or monitor ... in-core thermocouple temperatures	3.7/3.9	1		
000057 Loss of Vital Ac. Elec. Inst. Bus. / VI							randomly deselected				
000062 Loss of Nuclear Service Water / IV					2.02		Ability to determine and interpret... the cause of possible SWS loss	2.9/3.6	1		
000067 Plant Fire On-site / IX			3.02				Knowledge of the reasons for the following responses ... steps called out in the site fire protection plan, FPS manual and fire zone manual	2.5/3.3	1		
000068 Control Room Evac. / VIII			3.12				Knowledge of the reasons for the following responses ... Required sequence of actions for emergency evacuation of the control room	4.1/4.5	1		
000069 (W/E14) Loss of CTMT Integrity / V		2.03					Knowledge of the interrelationships between... personnel access hatch and emergency access hatch	2.6*/2.9	1		
000074 (W/E06&E07) Inad. Core Cooling / IV			3.06				Knowledge of the reasons for the following responses ... securing RCPs	4.1/4.2	1		
000076 High Reactor Coolant Activity / IX		2.01					Knowledge of the interrelationships between... process radiation monitors	2.6/3.0	1		
<b>K/A Category Totals:</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>2</b>	<b>1</b>		<b>Group Point Total:</b>	<b>18</b>	<b>18</b>	<b>0</b>

Catawba Sample Plan

											Bank
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points	Question	
000001 Continuous Rod Withdrawal / I.						1.32	Ability to explain all system limits and precautions	3.4/3.8	1		
000003 Dropped Control Rod / I						4.1	Knowledge of EOP entry conditions and immediate action steps	4.3/4.6	1		
000007 Reactor Trip - Stabilization - Recovery / I							randomly deselected				
000008 Pressurizer Vapor Space Accident / III	1.01						Knowledge of the operational implications of the following concepts ... thermodynamics and flow characteristics of open or leaking valves	3.2/3.7	1		
000009 Small Break LOCA / III						3.9	Knowledge of process for performing a containment purge	2.5/3.9	1		
000011 Large Break LOCA / III			3.11				Knowledge of the reasons for the following responses ... PTS limits on RCS pressure and temperature	3.7/3.9	1		
W/E04 LOCA Outside Containment / III		2.1					Knowledge of the interrelationships between... components and functions of control and safety systems including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.5/3.9	1		
W/E03 LOCA Cooldown - Depress. / IV			3.4				Knowledge for the reasons for the following responses... RO or SRO function within the control room team as appropriate to the assigned position in such as way that procedures are adhered to and the limitations in the facilities license and amendments are not violated	3.5/3.9	1		
W/E11 Loss of Emergency Coolant Recirc / IV							randomly deselected				
W/E02 SI Termination / III					2.1		Ability to determine and interpret the following... facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.3/4.2	1		
000022 Loss of Reactor Coolant Makeup / II				1.09			Ability to operate and/or monitor ... RCP seal flows, temperatures, pressures and vibrations	3.2/3.3	1		
000026 Loss of RHR System / IV							randomly deselected				
000028 Anticipated Transient w/o Scram / I							randomly deselected				
000032 Loss of Source Range N1 / VII				1.01			Ability to operate and/or monitor ... manual restoration of power	3.1*/3.4*	1		
000033 Loss of Intermediate Range N1 / VII							randomly deselected				
000037 Steam Generator Tube Leak / III						4.34	Knowledge of RO tasks performed outside the main control room during emergency operations including system geography and system implications	3.8/3.8	1		
000038 Steam Generator Tube Rupture / III				1.38			Ability to operate and/or monitor ... PZR heaters	3.3/3.3	1		
000054 Loss of Main Feedwater / IV		3.03					Knowledge of the reasons for the following responses ... manual control of AFW flow control valves	3.8/4.1	1		
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / IV				1.1			Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features	4.1/4.0	1		
000056 Loss of DC Power / VI				1.01			Knowledge of the interrelationships between... cross-tie of the affected DC bus with the alternate supply	3.4*/3.5	1		
000060 Accidental Liquid Radwaste Rel. / IX							randomly deselected				
000060 Accidental Gaseous Radwaste Rel. / IX			3.02				Knowledge of the reasons for the following responses ... Isolation of auxiliary building ventilation	3.3*/3.5*	1		
000061 ARM System Alarms / VII							randomly deselected				
W/E16 High Containment Radiation / IX		2.1					Knowledge of the interrelationships between... components and functions of control and safety systems including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.0/3.3	1		
K/A Category Totals:	1	2	4	5	1	4		Group Point Total:	17	17	0



Catawba Sample Plan

System # / Name	K	K	K	K	K	K	A	A	A	A	G	K/A Topic(s)	Imp.	Points	Bank
															Question
001 Control Rod Drive											4.22	Knowledge of the bases for prioritizing safety functions during abnormal and emergency operations	3.0/4.0	1	
003 Reactor Coolant Pump					5.04							Knowledge of the following operational implications...effects of RCP shutdown on secondary parameters such as steam pressure, steam flow and feed flow	3.2/3.5	1	
004 Chemical Volume Control		2.02										Knowledge of bus power supplies to...makeup pumps	2.9/3.1	1	
013 Engineered Safety Features Actuation									3.02			Ability to monitor automatic operation of the...operation of actuated equipment	4.1/4.2	1	
016 Nuclear Instrumentation										2.2		Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels	4.0/3.5	1	
017 In-core Temperature Monitor								2.01				Ability to predict the impacts of the following malfunction or operation... and based on those predictions, use procedures to correct, control or mitigate the consequences of...core damage	3.6/4.1	1	
022 Containment Cooling										3.01		Knowledge of the effect that a loss or malfunction will have on...initiation of safeguards mode of operation	4.1/4.3	1	
025 Ice Condenser						5.01						Knowledge of the effect that a loss or malfunction will have on...upper and lower doors of the ice condenser	3.4/3.6*	1	
056 Condensate								2.04				Ability to predict the impacts of the following malfunction or operation... and based on those predictions, use procedures to correct, control or mitigate the consequences of... loss of condensate pumps	2.8/2.8*	1	
058 Main Feedwater										4.12		Ability to manually operate and/or monitor in the control room...initiation of automatic feedwater isolation	3.4/3.5	1	
061 Auxiliary/Emergency Feedwater					5.01							Knowledge of the following operational implications...relationship between AFW flow and RCS heat transfer	3.8/3.9	1	
068 Liquid Rad Waste								2.03				Ability to predict the impacts of the following malfunction or operation... and based on those predictions, use procedures to correct, control or mitigate the consequences of...insufficient sampling frequency of the boric acid in the evaporator bottoms	2.5/2.6*	1	
071 Waste Gas Disposal				4.04								Knowledge of design feature(s) and/or interlock(s) which provide for...isolation of waste gas release tanks	2.9/3.4	1	
072 Area Radiation Monitoring										2.28		Knowledge of new and spent fuel movement procedures	2.6/3.5	1	
003 Reactor Coolant Pump												Knowledge of physical connections and/or cause and effect relationships...MFV	2.6/2.6	1	
072 Area Radiation Monitoring										4.01		Ability to manually operate and/or monitor in the control room...alarm and interlocks setpoint checks and adjustments	3.0/3.3	1	
<b>K/A Category Totals:</b>															
	1	1	1	1	3	1	1	6	2	2	4		23	23	9

Catawba Sample Plan

System # / Name	K	1	K	2	K	3	K	4	K	5	K	6	A	1	A	2	A	3	A	4	G	K/A Topic(s)	Imp.	Points	Question	
002 Reactor Coolant														2.01								Ability to predict the impacts of the following malfunction or operation...and based on those predictions, use procedures to correct, control or mitigate the consequences of...loss of coolant inventory	4.3/4.6	1		
010 Pressurizer Pressure Control							4.02															Knowledge of design feature(s) and/or interlock(s) which provide for...prevention of uncovering PZR heaters	3.0/3.4	1		
011 Pressurizer Level Control						3.03																Knowledge of the effect that a loss or malfunction ...will have on ...PZR PCS	3.2/3.7	1		
012 Reactor Protection														2.07								Ability to predict the impacts of the following malfunction or operation...and based on those predictions, use procedures to correct, control or mitigate the consequences of...loss of DC control power	3.2/3.7	1		
014 Rod Position Indication							4.02															Knowledge of design feature(s) and/or interlock(s) which provide for...lower electrical limit	2.5*/2.7*	1		
016 Non-nuclear Instrumentation							4.01															Knowledge of design feature(s) and/or interlock(s) which provide for...reading of NNIS channels outside control room	2.6*/2.9*	1		
026 Containment Spray							4.07															Knowledge of design feature(s) and/or interlock(s) which provide for...adequate level in containment sump for suction (interlock)	3.6*/4.1*	1		
029 Containment Purge												6.01										Knowledge of the effect that a loss or malfunction will have on ...Hydrogen recombiners	2.6/3.1	1		
033 Spent Fuel Pool Cooling													1.01									Ability to manually operate and/or monitor in the control room...spent fuel pool water level	2.7/3.3	1		
035 Steam Generator												6.03										Knowledge of the effect that a loss or malfunction will have on ...S/G level detector	2.6/3.0	1		
039 Main and Reheat Steam																			4.01			Ability to manually operate and/or monitor in the control room...main steam supply valves	2.9*/2.6*	1		
055 Condenser Air Removal							3.01															Knowledge of the effect that a loss or malfunction ...will have on ...main condenser	2.5/2.7	1		
062 AC Electrical Distribution															2.01							Knowledge of bus power supplies to...major system loads	3.3/3.4	1		
063 DC Electrical																				3.03		Ability to monitor automatic operation of the...meters, annunciators, dials, recorders and indicating lights	2.7/3.1	1		
064 Emergency Diesel Generator													1.08									Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the...minimum load on EDG to prevent a reverse power trip	3.1/3.4	1		
073 Process Radiation Monitoring													1.01									Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the...radiation levels	3.2/3.5	1		
075 Circulating Water							4.01															Knowledge of design feature(s) and/or interlock(s) which provide for...heat sink	2.5/2.8	1		
079 Station Air															2.01							Ability to predict the impacts of the following malfunction or operation...and based on those predictions, use procedures to correct, control or mitigate the consequences of...cross-connection with IAS	2.9/3.2	1		
<b>K/A Category Totals:</b>			0	1	3	5	1	2	3	3	1	1	1	8									<b>Group Point Total:</b>	20	20	0





Catawba Sample Plan

Category	K/A #	Topic	Imp.	Points	Question
Conduct of Operations	1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation	3.7/4.4	1	
	1.24	Ability to obtain and interpret station electrical and mechanical drawings	2.8/3.1	1	
	1.31	Ability to locate control room switches, controls and indications to determine if they are correctly reflecting the desired plant lineup	4.2/3.9	1	
				3	3
Equipment Control	2.22	Knowledge of limiting conditions of operations and safety limits	3.4/4.1	1	
	2.23	Ability to track limiting conditions for operations	2.6/3.8	1	
	2.34	Knowledge of process for determining the internal and external effects on core reactivity	2.8/3.2*	1	
			3	3	
Radiation Control	3.2	Knowledge of facility ALARA program	2.5/2.9	1	
	3.4	Knowledge of radiation exposure limits and contamination control including permissible levels in excess of those authorized	2.5/3.1	1	
	3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure	2.9/3.3	1	
	3.11	Ability to control radiation releases	2.7/3.2	1	
			4	4	
Emergency Procedures and Plan	4.17	knowledge of EOP terms and definitions	3.1/3.8	1	
	4.19	Knowledge of EOP layout, symbols and icons	2.7/3.7	1	
	4.15	Knowledge of communications procedures associated with EOP implementation	3.0/3.5	1	
				3	3
<b>Tier 3 Point Total</b>			<b>13</b>	<b>13</b>	<b>0</b>

**Catawba Sample Plan**

Facility: Catawba		Date of Exam: 5/19/00						Exam Level: SRO							
Tier	Group	K/A Category Points											Point	Target	
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Total		
1 Emergency & Abnormal Plant Evolutions	1	3	5	4				4	5				3	24	24
	2	1	3	3				6	1				2	16	16
	3	0	1	0				1	1				0	3	3
	<b>Tier Totals</b>	4	9	7				11	7				5	43	43
2 Plant Systems	1	0	1	0	3	2	1	0	3	3	2	3	18	19	
	2	0	2	2	3	0	2	3	3	0	2	0	17	17	
	3	1	0	1	1	0	0	0	0	0	0	1	4	4	
	<b>Tier Totals</b>	1	3	3	7	2	3	3	6	3	4	4	39	40	
3 Generic Knowledge and Abilities	<b>Cat 1</b>					<b>Cat 2</b>		<b>Cat 3</b>		<b>Cat 4</b>					
	5					4		4		4			17	17	

Catawba Sample Plan

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points	Question	
000001 Continuous Rod Withdrawal / I						1.32	Ability to explain all system limits and precautions	3.4/3.8	1		
000003 Dropped Control Rod / I						4.1	Knowledge of EOP entry conditions and immediate action steps	4.3/4.8	1		
000005 Inoperable/Stuck Control Rod / I				1.02			Ability to operate and/or monitor ...rod selection switches	3.7/3.5	1		
000011 Large Break LOCA / II			3.11				Knowledge of the reasons for the following responses ... PTS limits on RCS pressure and temperature	3.7/3.9	1		
W/E04 LOCA Outside Containment / III		2.1					Knowledge of the interrelationships between...components and functions of control and safety systems including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.5/3.9	1		
W/E02 SI Termination / III					2.1		Ability to determine and interpret the following... facility conditions and selection of appropriate procedures during abnormal and emergency operations	3.3/4.2	1		
000015/17 RCP Malfunction / IV		2.07					Knowledge of the interrelationships between...RCP seals	2.9/2.9	1		
W/E09 Natural Circ. /IV		2.1					Knowledge of the interrelationships between...components and functions of control and safety systems including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.2/3.4	1		
000024 Emergency Boration / I						4.1	Knowledge of EOP entry conditions and immediate action steps	4.3/4.8	1		
000026 Loss of Component Cooling Water / VIII				1.07			Ability to operate and/or monitor ... flow rates to the components and systems that are serviced by the CCWS; interactions among components	2.9/3.0	1		
000040 Steam Line Rupture - Excessive Heat Transfer / IV				1.12			Ability to operate and/or monitor ... RCS pressure and temperature	4.2/4.2	1		
W/E06 RCS Overcooling - PTS / IV		1.1					Knowledge of the operational implications of the following concepts as they apply to the...components, capacity and function of emergency systems	3.5/3.8	1		
000051 Loss of Condenser Vacuum / IV					2.02		Ability to determine and interpret... conditions requiring a reactor or turbine trip	3.9/4.1	1		
000055 Station Blackout / VI				1.01			Ability to operate and/or monitor ... in-core thermocouple temperatures	3.7/3.9	1		
000062 Loss of Nuclear Service Water / IV					2.02		Ability to determine and interpret... the cause of possible NWS loss	2.9/3.8	1		
000067 Plant Fire On-site / IX			3.02				Knowledge of the reasons for the following responses ... steps called out in the site fire protection plan, FPS manual and fire zone manual	2.5/3.3	1		
000068 Control Room Evac. / VIII			3.12				Knowledge of the reasons for the following responses ... Required sequence of actions for emergency evacuation of the control room	4.1/4.5	1		
000069 (W/E14) Loss of CTMT Integrity / V		2.03					Knowledge of the interrelationships between...personal access hatch and emergency access hatch	2.8/2.9	1		
000074 (W/E06&E07) Inad. Core Cooling / IV			3.08				Knowledge of the reasons for the following responses ... securing RCPs	4.1/4.2	1		
000076 High Reactor Coolant Activity / IX		2.01					Knowledge of the interrelationships between...process radiation monitors	2.6/3.0	1		
<b>K/A Category Totals:</b>	<b>3</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>3</b>		<b>Group Point Total:</b>	<b>24</b>	<b>24</b>	<b>0</b>

Catawba Sample Plan

										Bank	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points	Question	
000006 Pressurizer Vapor Space Accident / III	1.01						Knowledge of the operational implications of the following concepts ...thermodynamics and flow characteristics of open or leaking valves	3.2/3.7	1		
000009 Small Break LOCA / III						3.90	Knowledge of process for performing a containment purge	2.5/3.9	1		
WE03 LOCA Cooldown - Depress. / IV			3.40				function within the control room team as appropriate to the assigned position in such as way that procedures are adhered to and the limitations in the facilities license and amendments are not violated	3.5/3.9	1		
000022 Loss of Reactor Coolant Makeup / II				1.09			Ability to operate and/or monitor ... RCP seal flows, temperatures, pressures and vibrations	3.2/3.3	1		
000027 Pressurizer Pressure Control System Malfunction / III		2.03					Knowledge of the interrelationships between...controllers and positioners	2.6/2.8	1		
000032 Loss of Source Range NI / VII				1.01			Ability to operate and/or monitor ...manual restoration of power	3.1*/3.4*	1		
000033 Loss of Intermediate Range NI / VII							randomly deselected				
000037 Steam Generator Tube Leak / III						4.3	Knowledge of RO tasks performed outside the main control room during emergency operations including system geography and system implications	3.8/3.8	1		
000038 Steam Generator Tube Rupture / III				1.38			Ability to operate and/or monitor ...PZR heaters	3.3/3.3	1		
000054 Loss of Main Feedwater / IV			3.03				Knowledge of the reasons for the following responses ... manual control of AFW flow control valves	3.8/4.1	1		
WE05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / IV				1.1			Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features	4.1/4.0	1		
000058 Loss of DC Power / VI				1.01			Knowledge of the interrelationships between...cross-tie of the affected DC bus with the alternate supply	3.4*/3.5	1		
000060 Accidental Gaseous Radwaste Rel. / IX			3.02				Knowledge of the reasons for the following responses ... Isolation of auxiliary building ventilation	3.3*/3.5*	1		
000081 ARM System Alarms / VII							randomly deselected				
WE16 High Containment Radiation / IX			2.1				Knowledge of the interrelationships between...components and functions of control and safety systems including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.0/3.3	1		
000088 Loss of Instrument Air / VIII							randomly deselected				
<b>K/A Category Totals:</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>8</b>	<b>1</b>	<b>2</b>		<b>Group Point Total:</b>	<b>18</b>	<b>18</b>	<b>0</b>



Catawba Sample Plan

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Points	Bank														
															Question														
001 Control Rod Drive											4.22	Knowledge of the bases for prioritizing safety functions during abnormal and emergency operations	3.0/4.0	1															
003 Reactor Coolant Pump					5.04							Knowledge of the following operational implications...effects of RCP shutdown on secondary parameters such as steam pressure, steam flow and feed flow	3.2/3.5	1															
004 Chemical Volume Control		2.02										Knowledge of bus power supplies to...makeup pumps	2.9/3.1	1															
013 Engineered Safety Features Actuation									3.02			Ability to monitor automatic operation of the...operation of actuated equipment	4.1/4.2	1															
014 Rod Position Indication				4.02								Knowledge of design feature(s) and/or interlock(s) which provide for...lower electrical limit	2.5*2.7*	1															
018 Nuclear Instrumentation											2.20	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels	4.0/3.5	1															
017 In-core Temperature Monitor							2.01					Ability to predict the impacts of the following malfunction or operation... and based on those predictions, use procedures to correct, control or mitigate the consequences of...core damage	3.6/4.1	1															
022 Containment Cooling									3.01			Knowledge of the effect that a loss or malfunction will have on ...initiation of safeguards mode of operation	4.1/4.3	1															
025 Ice Condenser					6.01							Knowledge of the effect that a loss or malfunction will have on ...upper and lower doors of the ice condenser	3.4*3.8*	1															
028 Containment Spray				4.07								Knowledge of design feature(s) and/or interlock(s) which provide for...adequate level in containment sump for suction (interlock)	3.6*4.1*	1															
048 Condensate							2.04					Ability to predict the impacts of the following malfunction or operation... and based on those predictions, use procedures to correct, control or mitigate the consequences of...loss of condensate pumps	2.6/2.8*	1															
059 Main Feedwater											4.12	Ability to manually operate and/or monitor in the control room...initiation of automatic feedwater isolation	3.4/3.5	1															
061 Auxiliary/Emergency Feedwater					5.01							Knowledge of the following operational implications...relationship between APW flow and RCS heat transfer	3.6/3.9	1															
063 DC Electrical									3.03			Ability to monitor automatic operation of the...meters, annunciators, dials, recorders and indicating lights	2.7/3.1	1															
068 Liquid Rad Waste								2.03				Ability to predict the impacts of the following malfunction or operation... and based on those predictions, use procedures to correct, control or mitigate the consequences of...loss of liquid rad waste pumps	2.5*2.8*	1															
071 Waste Gas Disposal				4.04								Knowledge of design feature(s) and/or interlock(s) which provide for...isolation of waste gas release tanks	2.9/3.4	1															
072 Area Radiation Monitoring											2.28	Knowledge of new and spent fuel movement procedures	2.6/3.5	1															
<b>K/A Category Totals:</b>															<b>0</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>Group Point Total:</b>	<b>19</b>	<b>19</b>	<b>0</b>

Catawba Sample Plan

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Points	Question	
002 Reactor Coolant								2.01				Ability to predict the impacts of the following malfunction or operation... and based on those predictions, use procedures to correct, control or mitigate the consequences of...loss of coolant inventory	4.3/4.6	1		
006 Emergency Core Cooling																
010 Pressurizer Pressure Control				4.02								Knowledge of design feature(s) and/or interlock(s) which provide for...prevention of uncovering PZR heaters	3.0/3.4	1		
011 Pressurizer Level Control			3.03									Knowledge of the effect that a loss or malfunction ...will have on ...PZR PCS	3.2/3.7	1		
012 Reactor Protection								2.07				Ability to predict the impacts of the following malfunction or operation...and based on those predictions, use procedures to correct, control or mitigate the consequences of...loss of DC control power	3.2/3.7	1		
016 Non-nuclear Instrumentation				4.01								Knowledge of design feature(s) and/or interlock(s) which provide for...reading of NRS channels outside control room	2.8*/2.8*	1		
027 Containment Iodine Removal									4.03			Ability to manually operate and/or monitor in the control room...CIRS fans	3.3/3.2	1		
028 Hydrogen Recombiner and Purge Control		2.01										Knowledge of bus power supplies to...Hydrogen recombiners	2.5*/2.5*	1		
029 Containment Purge						8.01						Knowledge of the effect that a loss or malfunction will have on ...Hydrogen recombiners	2.6/3.1	1		
033 Spent Fuel Pool Cooling							1.01					Ability to manually operate and/or monitor in the control room...spent fuel pool water level	2.7/3.3	1		
034 Fuel Handling Equipment																
038 Steam Generator						6.03						Knowledge of the effect that a loss or malfunction will have on ...SAG level detector	2.6/3.0	1		
039 Main and Reheat Steam									4.01			Ability to manually operate and/or monitor in the control room...main steam supply valves	2.8*/2.8*	1		
065 Condenser Air Removal			3.01									Knowledge of the effect that a loss or malfunction ...will have on ...main condenser	2.5/2.7	1		
062 AC Electrical Distribution		2.01										Knowledge of bus power supplies to...major system loads	3.3/3.4	1		
064 Emergency Diesel Generator							1.08					Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the...minimum load on EDG to prevent a reverse power trip	3.1/3.4	1		
073 Process Radiation Monitoring							1.01					Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the...radiation levels	3.2/3.5	1		
076 Circulating Water				4.01								Knowledge of design feature(s) and/or interlock(s) which provide for...heat sink	2.5/2.6	1		
079 Station Air								2.01				Ability to predict the impacts of the following malfunction or operation... and based on those predictions, use procedures to correct, control or mitigate the consequences of...cross-connection with IAS	2.9/3.2	1		
086 Fire Protection																
189 Containment																
<b>K/A Category Totals:</b>	0	2	2	3	0	2	3	3	0	2	0		<b>Group Point Total:</b>	17	17	0





Catawba Sample Plan

Category	K/A #	Topic	Imp.	Points	Question
Conduct of Operations	1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation	3.7/4.4	1	
	1.24	Ability to obtain and interpret station electrical and mechanical drawings	2.6/3.1	1	
	1.31	Ability to locate control room switches, controls and indications to determine if they are correctly reflecting the desired plant lineup	4.2/3.9	1	
	<b>Total</b>				
Equipment Control	2.22	Knowledge of limiting conditions of operations and safety limits	3.4/4.1	1	
	2.23	Ability to track limiting conditions for operations	2.6/3.8	1	
	2.34	Knowledge of process for determining the internal and external effects on core reactivity	2.8/3.2*	1	
	<b>Total</b>				
Radiation Control	3.2	Knowledge of facility ALARA program	2.5/2.9	1	
	3.4	Knowledge of radiation exposure limits and contamination control including permissible levels in excess of those authorized	2.5/3.1	1	
	3.1	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure	2.9/3.3	1	
	3.11	Ability to control radiation releases	2.7/3.2	1	
<b>Total</b>					<b>4</b>
Emergency Procedures and Plan	4.17	knowledge of EOP terms and definitions	3.1/3.8	1	
	4.19	Knowledge of EOP layout, symbols and icons	2.7/3.7	1	
	4.15	Knowledge of communications procedures associated with EOP implementation	3.0/3.5	1	
	<b>Total</b>				
<b>Tier 3 Point Total</b>			<b>17</b>	<b>17</b>	<b>0</b>