Facility: Cooper Nuclear Station Date of Examination: 2/28/11

Examination Level: RO [X] SRO [ ] Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	S,N,P	Document the Reactivation of Reactor Operator License
Conduct of Operations	D,C	SKL0345032R02-J-Perform RO (SRO) Review of Daily Logs
Equipment Control	N,R	Initiate a procedure revision request
Radiation Control	D,R	Radiation Protection Table Top Scenario
Emergency Procedure/Plan		N/A

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, then all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Cooper Nuclear Station Date of Examination: 2/28/11

Examination Level: RO ☐ SRO ☒ Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N,C	Assess Non-Scheduled Call-Out – Staffing
Conduct of Operations	D,C	Determine if Mode Change is Allowed
Equipment Control	N,C	Authorize Emergency Maintenance Work Orders
Radiation Control	P,S,D	Authorize Very High Rad Area Access
Emergency Procedure/Plan	D,S	Reportable Occurrence to NRC

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, then all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Cooper Nuclear Station Date of Examination: 2/28/11

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test No.: _____

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. SKL0342XXXR00-J-Respond to a Trip of a RR Pump	S,D,E	1
b. Perform quick restart of RFPT B (Hard Card) (Alt. Path)	A,D,P	2
c. SKL034-21-XXX R00 Restart Reactor Building Ventilation	S,N	8
d. SKL034-20-107 Lowering DEH pressure setpoint	S,L,D	3
e. SKL0342XXXXR00-J-Respond to a HPCI System Automatic Initiation (Alternte Path)	A,N,En	4
f. SKL03420XXR00-J-Monitor SGT System Following Automatic Initiation(Alt Path)	A,S,N	9
g. Align RPS to Alternate Power from the Control Room	N,En	6
h. SKL03420XXXR00-J-Verify Group 1 Isolation (Alt Path)	A,N,S	5
In-Plant Systems @ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. SKL03410106R00- J - Emergency Shutdown a Diesel Generator (Alternate Path)	A,N,En	6
j. SKL0341058R10-J-Startup the RPS Motor Generator Set	D	7
k. SKL0341085R04-J-Place standby CRD Flow Control Valve in Service When In service Valve Fails Closed	D,R	1

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: Cooper Nuclear Station Date of Examination: 2/28/11

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test No.: _____

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. SKL0342XXXR00-J-Respond to a Trip of a RR Pump	S,D,E	1
b. Perform quick restart of RFPT B (Hard Card) (Alt. Path)	A,D,P	2
c. N/A		
d. SKL034-20-107 Lowering DEH pressure setpoint	S,L,D	3
e. SKL0342XXXXR00-J-Respond to a HPCI System Automatic Initiation (Alternte Path)	A,N,En	4
f. SKL03420XXR00-J-Monitor SGT System Following Automatic Initiation(Alt Path)	A,S,N	9
g. Align RPS to Alternate Power from the Control Room	N,En	6
h. SKL03420XXXR00-J-Verify Group 1 Isolation (Alt Path)	A,N,S	5
In-Plant Systems @ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. SKL03410106R00- J - Emergency Shutdown a Diesel Generator (Alternate Path)	A,N,En	6
j. SKL0341058R10-J-Startup the RPS Motor Generator Set	D	7
k. SKL0341085R04-J-Place standby CRD Flow Control Valve in Service When In service Valve Fails Closed	D,R	1

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: Cooper Nuclear Station Date of Exam: 2/28/2011 Operating Test No.:

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO 1,3,5	RX					4,5								2	1		
	NOR			1										1	1		
	I/C			5,6,7		2								4	4		
	MAJ			8		8								2	2		
	TS													0	0		
RO 7	RX		2											1	1		
	NOR						1							1	1		
	I/C		3,6,7			4,5,6,7								7	4		
	MAJ		8				8							2	2		
	TS													0	0		
RO 2,4,6	RX		2											1	1		
	NOR						1							1	1		
	I/C		3,6,7			4,5,6,7				2,6,7				10	4		
	MAJ		8				8			8				3	2		
	TS													0	0		
SRO-I 1,2,3	RX	2			5				5					3		1	
	NOR								1					1		1	
	I/C	3,4,5,6			2,4,5				3,4					9		4	
	MAJ	8			8				6					3		2	
	TS	3,5			3									3		2	

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO additionally serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Cooper Nuclear Station Date of Exam: 2/28/2011 Operating Test No.:

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
SRO-I 4	RX	2				4,5								3		1	
	NOR													0		1	
	I/C	3,4,5,6				2								5		4	
	MAJ	8				8								2		2	
	TS	3,5												2		2	

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO additionally serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: Cooper Nuclear Station Scenario No.: NRC 1 Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is operating at approximately 80% power in single valve control with the Main Turbine Governor Valves. After turnover, the crew is to placed the governor valves into Sequential GV control and continue the power ascension to 100% at XXXXX Rate.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	Place MT Gov Valves into sequential valve control
2	N/A	R	Raise Power with Flow
3	3	I	APRM A fails upscale
4	4	C	SRV Fails Open
5	5	N,C	HPCI Aux Oil Pump failure
6	6	C	RR pump trip
7	N/A	C	Operation in the Exclusion Region and THI - Manual Scram
8	8	M	Earthquake; Suppression Pool Rupture: ED on Low SP/L

*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Scenario Objective

Evaluate the crew's ability to perform normal operations and raise power during non-emergency operations
Evaluate the crew's response to a lowering Suppression Pool Level and their ability to emergency depressurize the Reactor to suppress the steam in the torus before level gets too low and its energy is released into the Reactor Building.

Scenario Summary

Initial Conditions:
- The plant is operating at approximately 80% power
- No equipment out of service.
- It is a red light day because record grid loads are expected.

Events:
- Shift Main Turbine Governor Valves to Single Valve Control
- Raise power to 100%
- APRM "A" fails upscale
- SRV Partial opening
- HPCI Aux Oil Pump failure
- RR Pump Trip
- Thermal Hydraulic Instability - Manual Scram;
- Earthquake; Suppression Pool leak: ED on low SP/L

Scenario Sequence

- Normal evolution - Place MT into Sequential Gov. Valve Control
- Reactivity manipulation - Raise Power with RR Flow
- Instrument Failure - APRM "A" fails upscale
- Component Failure before the EOPs - SRV Partial opening
- Component Failure before the EOPs - HPCI Aux Oil Pump failure
- Component Failure before the EOPs - RR Pump Trip
- Thermal Hydraulic Instability - Manual Scram;
- Major Event - Earthquake;
- Component Failure after the EOPs - Suppression Pool leak, below the water line: Emergency Depressurization on low Suppression Pool Level.

Event One: Place MT Gov Valves into sequential valve control

Malfunction Required:
No malfunction required; this is a normal manipulation for the BOP.

Objective:
Evaluate the crew's ability to select the Digital Electro Hydraulic Controller and perform the required manipulations on the touch screen to shift the main turbine valve governor control to a Sequential alignment.

Success Path:
The Operator, in accordance with Procedure 2.2.77.1, performs the steps necessary to make the Turbine Governor Valves transition smoothly from single valve control to sequential valve control which causes turbine efficiency improvement (MWatts increase).

Event Two: Raise Power to 100%

Malfunction Required:
No malfunction required, this is a normal manipulation for the BOP.

Objective:
Evaluate the RO ability to adjust Reactor Recirculation Pump flows to make power increase from ~80% to ~100%, by alternately raising flow on one RR Pump, letting the plant respond then making a similar adjustment on the other pump's controller.

Success Path:
Both Reactor Recirculation Pump's speeds are raised from ~65 to ~80, maintaining them within the required 5% allowed by Tech Specs, and it is done in accordance with Procedure 2.1.10.

Event Three: APRM A fails upscale

Malfunction Required:
Malfunction NM09A APRM Signal Failure Channel A; Event 4 Final value 100.

Objective:
Evaluate the crew's response to APRM "A" fails upscale resulting in a half scram.
Evaluate the RO bypassing the failed APRM and resetting the half scram in accordance with the annunciator card.
Evaluate the CRS addressing Technical Specifications and TRM for the failed APRM.

Success Path:
APRM A is bypassed, the half scram is reset. The CRS initiates a potential LCO on APRM A in accordance with Technical Specifications 3.3.1.1 (RPS Instrumentation)

Table 3.3.1.1-1 Function 2 and TRM 3.3.1 (Rod Block Instrumentation) Table 3.3.1-1 Function 3.

Event Four: SRV Fails Open

Malfunction Required:
AD06b set at 50% to start the relief valve leaking then it is modified to 20% to minimize the heat addition to the torus.

Objective:
Evaluate the crew's performance of Abnormal Procedure 2.4SRV for a leaking SRV which has the Operator cycle the leaking valve to reseat it.
Evaluate the CRS addressing Technical Specification 3.6.2.1 for Suppression Pool Average Temperature, if the SRV is not closed within a short period of time.

Success Path:
The Operator notices and responds to the leaking SRV in accordance with Annunciator Procedures and 2.4SRV. The SRV will be cycled open then taken back to the closed position to reseat the valve. Once the valve has been cycled the tail pipe temperature starts lowering and the heat addition into the Torus is secured. The CRS determines that Technical Specification 3.6.2.1 for Suppression Pool Average Temperature applies or not.

Event Five: HPCI Aux Oil Pump failure

Malfunction Required:
HP12 Active set at 100%, at the start of the scenario. This failure will not start until the HPCI Aux Oil Pump is started.

Objective:
Evaluate the crew's response to an oil leak in the HPCI control oil system while performing the section of the Operating Procedure for the HPCI system 2.2.33 to start the Aux Oil Pump for maintenance. During this event the Operator will be required to secure the pump.
Evaluate the CRS's ability to determine that HPCI is Inoperable.

Success Path:
The HPCI system is declared Inoperable per TS 3.5.1. Condition "C" 14 day LCO. RCIC is checked to be operable within 1 hour and the Aux Oil Pump is secured to prevent operation.

Event Six: RR Pump Trip

Malfunction Required:
RR05a Trip RR MG Set field breaker.

Objective:
Evaluate the crew's response in accordance with Abnormal Procedure 2.4RR and determine Operation in the Exclusion Region of the Power to Flow Map.
Evaluate the CRS addressing Tech Specs for operation in the stability exclusion region.

Success Path:
The Operator determines the Recirc Pump tripped and enters Abn Procedure 2.4RR and notes operation in the Stability Exclusion Region of the Power to Flow Map and makes preparations to exit the region. CRS will declare the pump not in operation in accordance with Tech Specs 3.4.1 Condition "A".

Event Seven: Thermal Hydraulic Instability - Manual Scram

Malfunction Required:
CR04b Core Thermal Hydraulic Instability Out of Phase 20%
RR05a RR Pump Field Breaker Trip
IOR ZAIRRFCDEMD(2) = 60% to generate a runback on the other Recirc pump.

Objective:
Evaluate the crew's recognition of abnormal neutron flux oscillations are occurring while operating in the Stability Exclusion Region and Scrams the reactor.

Success Path:
The Operator scrams the plant, in accordance with 2.4RR when core thermal instability is noticed.

Event Ten: Earthquake; Suppression Pool leak: ED on low SP/L

Malfunction Required:
HV02b Major Earthquake set to 25%
PC08 Suppression Pool Water Leak 25% level lowers at -0.2"/min

Objective:
Evaluate the crew's response to a major earthquake in accordance with Emergency Procedure 5.1Quake.
Evaluate the crew's ability to monitor and control the consequences of an Unisolable leak in the torus below the normal water level.
Evaluate the crew's ability to anticipate emergency depressurization and transfer as much energy to the condenser prior to emergency depressurizing the Reactor.

Success Path:
The crew emergency depressurizes the reactor when suppression pool level lowers to 9.6'.

Scenario Termination:

When the reactor is depressurized (50 psig above Torus pressure) and level is being maintained between +3" to +54" and the lead examiner has seen enough the scenario may be terminated.

Facility: Cooper Nuclear Station Scenario No.: NRC 2 Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is operating at approximately 100% power. After turnover, the crew is to secure DG#1 following its monthly load test.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	DG-1 Monthly Surveillance
2	2	I	LPRM Fails Upscale
3	3	I	Turbine Building Vent Radiation Monitor fails
4	4	C	FWH-5B Low Level, Loss of FW heating
5	5	C	DEH Leak Requiring Manual Scram
6	6	C	Loss of Startup Transformer
7	7	C	DG-1/2 Fails to Auto Start
8	8	M	Small Break LOCA, Containment Sprays

*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Scenario Objective

Evaluate the crew's ability to perform normal surveillances and to respond to instrument and component failures during non-emergency conditions
Evaluate the crew's response to a rising reactor power level and a lowering Turbine High Pressure Fluid Reservoir.
Evaluate the crew's response to a small break LOCA which causes Drywell temperatures and pressures to rise and before 280°F in the Drywell the crew initiates Drywell Sprays to maintain temperature below 280°F.

Scenario Summary

Initial Conditions:

- The plant is operating at approximately 100% power
- No equipment out of service.
- 6.1DG.101 is in progress.

Events:

- DG-1 Monthly Surveillance
- LPRM Fails Upscale
- Turbine Building Vent Radiation Monitor fails
- FWH-5B Low Level Loss of FW heating
- DEH Leak Requiring Manual Scram
- Loss of Startup Transformer
- DG-1/2 Fails to Auto Start
- Small break LOCA
- Containment Spray

Scenario Sequence

- Normal activity - DG-1 Monthly Surveillance
- Instrument Failure - LPRM Fails Upscale
- Instrument Failure - Turbine Building Vent Radiation Monitor fails
- Component Failure before EOPs - FWH-5B Low Level Loss of FW heating
- Component Failure before EOPs - DEH Leak Requiring Manual Scram
- Component Failure after EOPs - Loss of Startup Transformer
- Component Failure after EOPs - DG-1/2 Fails to Auto Start
- Major Failure – Small break LOCA, with raising DW temperature and pressure
- Accident mitigation strategy - Containment Sprays

Event One: DG-1 Monthly Surveillance

Malfunction Required:
No malfunction required; this is a normal manipulation for the BOP.

Objective:
Evaluate the crew during normal surveillance activities.
Evaluate the BOP Operator unloading and securing DG1 in accordance with 6.1DG.101, 31 day load test.

Success Path:
The #1 DG is unloaded from 3500 KW and the engine is secured in accordance with the steps in the surveillance. Time compression for hold points between load changes is needed.

Event Two: LPRM Fails Upscale

Malfunction Required:
Malfunction NM082813c LPRM 28-13C failure set to 100%.

Objective:
Evaluate the crew's response to a failed Local Power Range Monitor (LPRM).
Evaluate the At the Controls (ATC) Operator's actions to determine which LPRM and APRM is affected and bypass the failed LPRM.
Evaluate the CRS addressing Technical Specifications for the failed LPRM.

Success Path:
LPRM 28-13C is bypassed, and the CRS initiates a potential LCO on APRM A in accordance with Technical Specifications 3.3.1.1 (RPS Instrumentation) Table 3.3.1.1-1 Function 2 and TRM 3.3.1 (Rod Block Instrumentation) Table 3.3.1-1 Function 3.

Event Three: Turbine Building Vent Radiation Monitor fails

Malfunction Required:
RM02J Gas Radiation Monitor Turbine Building Normal Range Kaman RMV-RM-20A in at 100% fails the instrument upscale.

Objective:
Evaluate the crew's response to the failure of the normal range KAMAN and takes appropriate action in accordance with the Annunciator Procedure.
Evaluate the CRS addressing Technical Specifications, TRM and ODAM.

Success Path:
Alternate sampling of this release path is requested of Radiation Protection to be installed to provide compensatory actions in accordance with TRM T3.3.3; ODAM

D3.2.1, 3.2.2, and 3.2.3

Event Four: FWH-5B High Level Trip

Malfunction Required:
FW20b 1B-5 FW heater level controller failure high. 20%

Objective:
Evaluate the crew's response to Annunciator A-2/C-5 HEATER LOW LEVEL.
Evaluate the BOP Operator's entry into Abnormal Procedure 2.4EX-STM.
Evaluate the ATC Operator lowering power in response to a lowering feedwater temperature.

Success Path:
Reactor Power has been lowered to the value less than it was prior to the feedwater heater level problem.

Event Five: DEH Leak Requiring Manual Scram

Malfunction Required:
TC10 Turbine High Press Fluid leak set at 15%.
TC09d Governor Valve #4 Failure to 0% over 2.5 minutes.

Objective:
Evaluate the crew's response to a lowering Turbine High Pressure Fluid reservoir level and Fluid leak on the #4 Turbine Governor Valve.
Evaluate the pre-staging and conservative decision making prior to the need to Scram the Reactor prior to losing Turbine High Pressure Fluid Pumps and control of Turbine GVs, Stop Valves and Bypass Valves.

Success Path:
Reactor is scrammed and pressure control is transferred to HPCI and SRVs.

Event Six: Loss of Startup Transformer

Malfunction Required:
ED05 Loss of Power (Startup Transformer).

Objective:
Evaluate the crew's response to the loss of the Startup Transformer during the Scram recovery.
Evaluate the BOP's ability to enter Emergency Procedure 5.3EM-PWR and ensure that

the Critical Busses are powered by an emergency power source.
Evaluate the crew's ability to shift RPV level control to the High Pressure ECCS and RCIC systems due to a loss of all Condensate and Booster pumps.

Success Path:
Critical Busses are supplied by the Emergency Transformer.
RPV Level is being controlled within the +3 to 54 inch range with RCIC, CRD and HPCI.

Event Seven: DG-1/2 Fails to Auto Start

Malfunction Required:
DG06A Diesel Generator #1 Fails to Auto Start
DG06B Diesel Generator #2 Fails to Auto Start

Objective:
Evaluate the crew recognition that both Diesels failed to auto start when required and to perform the necessary steps to start both Diesel and make them available to load.

Success Path:
Both Diesel Generators are started.

Event Eight: LOCA Containment Sprays

Malfunction Required:
RR20A Coolant Leakage Inside Primary Containment

Objective:
Evaluate the crew response to a slow increase in Drywell Temperature and pressure and to vent Primary Containment in an attempt to control the pressure rise.
Evaluate the crew's ability to spray the Drywell in accordance with the EOPs to control pressure and temperature, as the LOCA gradually worsens.

Success Path:
Torus and Drywell Sprays are initiated prior to DW temperature reaching 280°F.

Scenario Termination:

When Reactor water level is being controlled between +3 and +54 inches and Drywell Sprays are controlling Drywell Pressure between 2 and 10 psig.

Facility: Cooper Nuclear Station Scenario No.: NRC 3 Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is operating at approximately 1.5% power. After turnover, the crew is to shift CRD Pumps.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N	Shift CRD Pumps
2	2	C	REC Pump B trip
3	3	I	IRM fails downscale
4	4	C	Rod Drop
5	5	C	ATWS non-EOP Rod driving
6	6	M	RCIC Steam Line Leak
7	7	C	Group 6 Failure
8	8		ED on Secondary Containment 2 Areas

*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Scenario Objective

Evaluate the Crew's ability to operate at low power levels.
Evaluate the Crew's response to a rod drop accident and fuel failure.
Evaluate the crew's actions when RCIC develops a steam line leak that will not fully isolate and when two areas in Secondary Containment exceed their Max Safe values the RPV is Emergency Depressurized to limit the release of highly radioactive steam through the RCIC steam line break.

Scenario Summary

Initial Conditions:

- The plant is operating at approximately 1.5% power
- IRM G is fully withdrawn and will not drive in It has been declared inoperable.
- Shift CRD Pumps following turnover.

Events:

- Shift CRD Pumps
- REC Pump B trip
- IRM fails downscale
- Rod Drop
- ATWS non-EOP Rod driving
- RCIC Steam Line Leak
- Group 6 Failure
- ED on Secondary Containment 2 Areas

Scenario Sequence

- Normal activity – Shift CRD Pumps "B" to "A"
- Component Failure before EOPs – REC Pump "B" Trip
- Instrument Failure – IRM "C" Failure
- Component Failure before EOPs – Rod Drops causing fuel failure
- Major Event – ATWS
- Component Failure after EOPs – RCIC Steam Line Leak
- Component Failure after EOPs – Group 6 Failure to isolate containment.
- Accident mitigation strategy – Emergency Depressurize the RPV

Event One: Shift CRD Pumps

Malfunction Required:
No malfunction required; this is a normal manipulation for the RO.

Objective:
Evaluate the crew during normal equipment shifting.
Evaluate the Reactor Operator shifting from the "B" CRD Pump running to the "A" CRD Pump running and securing the "B" Pump.

Success Path:
The "A" CRD Pump is running and the "B" CRD Pump is secured. All CRD parameters indicated on Panel 9-5 restored to within their normal band.

Event Two: REC Pump B trip

Malfunction Required:
SW11B – REC Pump Trip 1B.

Objective:
Evaluate the crew's response to the tripping of one of the three Reactor Equipment Cooling Pumps and takes appropriate action in accordance with the Annunciator Procedure to restart another pump prior to receiving an REC Isolation.
Evaluate the CRS addressing Technical Specifications.

Success Path:
The BOP Operator either responds quickly enough (within 1 minute) to the tripping of the pump and starts an additional REC Pump in accordance with the Annunciator Card. Or, the REC system isolation is reset following the restart of the third REC Pump and system flows and pressures are returned to normal.
The SRO will address Tech Specs and determine that LCO 3.7.3 Condition B, a 30 day LCO on one sub system.

Event Three: IRM fails downscale

Malfunction Required:
Malfunction NM13C – IRM INOP Channel-C.

Objective:
Evaluate the crew's response to a failed Intermediate Range Monitor (IRM).
Evaluate the At the Controls (ATC) Operator's actions to determine the cause of the ½ Scram, and bypasses the failed IRM. This allows resetting the half-scram.
Evaluate the CRS addressing Technical Specifications for the failed IRM.

Success Path:

IRM - C is bypassed, and the CRS initiates an LCO on IRM C in accordance with Technical Specifications 3.3.1.1 (RPS Instrumentation) Table 3.3.1.1-1 Function 1. Also TRM T3.3.1 Function 2 potential LCO with these two INOP IRMS there remains the minimum number required of 6.

Event Four: Rod Drop

Malfunction Required:
CR023431 Increased Rod Worth on rod 34-31 set at 25%
RD133431 Rod Uncoupled
RD123431 Rod Stuck
CR01 Fuel Failure at 5%

Objective:
Evaluate the crew's response to a reactivity addition and rise in reactor power.
Evaluate the crew's entry into Abnormal Procedure 2.4RX-PWR.
Evaluate the crew's entry into Abnormal Procedure 5.1FUEL.
Evaluate the crew's entry into Abnormal Procedure 5.1RAD.

Success Path:
The Reactor is scrammed and actions are in place to drive the control rods into the core to achieve a shutdown reactor.

Event Five: ATWS non-EOP Rod driving

Malfunction Required:
RD02A ATWS North Bank set at 100%
RD02B ATWS South Bank set at 75%

Objective:
Evaluate the crew's response to minimal control rod insertion on a reactor scram signal.
Evaluate the RO's ability to perform 2.4CRD and drive control rods using RMCS.
Evaluate the CRS implementing strategy for reactivity controls outside the EOPs.
Evaluate the crew's teamwork in installing jumpers and controlling Reactor Pressure and level.

Success Path:
Control Rods are inserted using RMCS.

Event Six: RCIC Steam Line Leak

Malfunction Required:
RC06 RCIC Steam Line Break in at 100%
RC12A RCIC Steam Isolation Valve Leakage RCIC-MO-15 in at 100%
OR RC06A RCIC-MO-16 Control Power De-energized

Objective:
Evaluate the crew's response to a failure of RCIC to fully isolate during a RCIC Steam Line Break.
Evaluate the BOP's ability to monitor and report Secondary Containment Temperatures and Radiation Levels to the CRS.
Evaluate the crew's ability to continue Control Rod insertion in accordance with 2.4CRD and Emergency Depressurize the RPV when 2 Areas in Secondary Containment exceed Max Safe values.

Success Path:
RPV Level is being controlled within the +3 to 54 inch range with CRD and HPCI and Condensate. The Reactor is depressurized to <50 psig above Torus Pressure when two areas in Secondary Containment reach and exceed Max Safe values.

Event Seven: Group 6 Failure

Malfunction Required:
RP15 Group 6 failure

Objective:
Evaluate the crew recognition that the Group 6 isolation group valves have failed to isolate when Secondary Containment Vent Exhaust Rad Monitors exceed their setpoints.
Evaluate the crew's ability to insert a Group 6 isolation to initiate SBGTs and isolate normal ventilation to prevent releases from the reactor building.

Success Path:
All valves in the Group 6 isolation set are closed and SGTs are started to support reactor building atmosphere control.

Event Eight: ED on Secondary Containment 2 Areas

Malfunction Required:
None

Objective:
Evaluate the crew response to a slow increase in Reactor Building Temperatures and

Radiation levels to the point where the RPV must be Emergency Depressurized. Evaluate the crew's ability to manually open 6 SRVs and reduce RPV Pressure to less than 50 psig above Torus pressure, in accordance with the EOPs.

Success Path:
RPV is depressurized to 50 psig above Torus pressure.

Scenario Termination:

When Reactor water level is being controlled between +3 and +54 inches and the RPV has been Emergency Depressurized and All but one Control Rod have been inserted.

Facility: Cooper Nuclear Station Date of Exam: 2-28-2011

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	3	3	N/A			3	4	N/A		3	20	3		4		7		
	2	1	1	1				1	1			2	7	2		1		3		
	Tier Totals	5	4	4				4	5			5	27	6		4		10		
2. Plant Systems	1	2	2	2	3	2	2	2	3	3	3	2	26	2		3		5		
	2	1	1	2	1	1	1	1	1	1	1	1	12	1	1	1		3		
	Tier Totals	3	3	4	4	3	3	3	4	4	4	3	38	4		4		8		
3. Generic Knowledge and Abilities Categories		1		2		3		4						1	2	3	4			
		3		2		2		3					10	2	2	1	2	7		

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/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the 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 K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401	BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 RO						Form ES-401-1		
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		AA2.05 Ability to determine and/or interpret Jet pump operability as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION:	3.1	53
295003 Partial or Complete Loss of AC / 6			X				AK3.06 Knowledge of the reasons for Containment isolation as they apply to PARTIAL OR COMPLETE LOSS OF A.C.POWER	3.7	46
295004 Partial or Total Loss of DC Pwr / 6						X	2.1.27 Knowledge of system purpose and/or function.	3.9	56
295005 Main Turbine Generator Trip / 3		X					AK2.01 Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and RPS	3.8	43
295006 SCRAM / 1						X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm.	4.1	54
295016 Control Room Abandonment / 7				X			AA1.02 Ability to operate and/or monitor the reactor/turbine pressure regulating system as they apply to CONTROL ROOM ABANDONMENT:	2.9	49
295018 Partial or Total Loss of CCW / 8		X					AK2.01 Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER and system loads	3.3	42
295019 Partial or Total Loss of Inst. Air / 8		X					AK2.01 Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR and CRD hydraulics	3.8	44
295021 Loss of Shutdown Cooling / 4			X				AK3.03 Knowledge of the reasons for increasing drywell cooling as they apply to LOSS OF SHUTDOWN COOLING	2.9	45
295023 Refueling Acc / 8	X						AK1.03 Knowledge of the operational implications of inadvertent criticality as they apply to REFUELING ACCIDENTS	3.7	41
295024 High Drywell Pressure / 5	X						EK1.01 Knowledge of the operational implications of drywell integrity as they apply to HIGH DRYWELL PRESSURE	4.1	40
295025 High Reactor Pressure / 3					X		EA2.03 Ability to determine and/or interpret Suppression pool temperature as they apply to HIGH REACTOR PRESSURE:	3.9	57
295026 Suppression Pool High Water Temp. / 5					X		EA2.02 Ability to determine and/or interpret Suppression pool level as they apply to SUPPRESSION POOL HI WTR TEMPERATURE:	3.8	51
~~295027 High Containment Temperature / 5~~									
295028 High Drywell Temperature / 5	X						EK1.01 Knowledge of the operational implications of the reactor water level measurement as they apply to HIGH DRYWELL TEMPERATURE	3.5	39
295030 Low Suppression Pool Wtr Lvl / 5				X			EA1.05 Ability to operate and/or monitor HPCI as they apply to LOW SUPPRESSION POOL WATER LEVEL:	3.5	50
295031 Reactor Low Water Level / 2	X						EK1.03 Knowledge of the operational implications of water level effects on reactor power as they apply to REACTOR LOW WATER LEVEL:	3.7	58
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			X				EK3.03 Knowledge of the reasons for lowering reactor water level as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN:	4.1	47
295038 High Off-site Release Rate / 9						X	2.2.44 Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	55
600000 Plant Fire On Site / 8					X		AA2.05 Ability to determine and interpret Ventilation alignment necessary to secure affected area as they apply to PLANT FIRE ON SITE:	2.9	52
700000 Generator Voltage and Electric Grid Disturbances / 6				X			AA1.01 Ability to operate and/or monitor Grid frequency and voltage as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES:	3.6	48
K/A Category Totals:	4	3	3	3	4	3	Group Point Total:		20

ES-401	BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 RO							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3		X					AK2.08 Knowledge of the interrelations between LOSS OF MAIN CONDENSER VACUUM and the Condenser circulating water system	3.1	60
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2									
295009 Low Reactor Water Level / 2									
295010 High Drywell Pressure / 5									
295011 High Containment Temp / 5									
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temp. / 5									
295014 Inadvertent Reactivity Addition / 1									
295015 Incomplete SCRAM / 1			X				AK3.01 Knowledge of the reasons for bypassing rod insertion blocks as they apply to INCOMPLETE SCRAM	3.4	61
295017 High Off-site Release Rate / 9									
295020 Inadvertent Cont. Isolation / 5 & 7	X						AK1.04 Knowledge of the operational implications of Bottom head thermal stratification as they apply to INADVERTENT CONTAINMENT ISOLATION:	2.5	59
295022 Loss of CRD Pumps / 1					X		AA2.01 Ability to determine and/or interpret accumulator pressure as they apply to LOSS OF CRD PUMPS:	3.5	63
295029 High Suppression Pool Wtr Lvl / 5						X	2.4.1 Knowledge of EOP entry conditions and immediate action steps.	4.6	65
295032 High Secondary Containment Area Temperature / 5				X			EA1.05 Ability to operate and/or monitor affected systems so as to isolate damaged portions as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE:	3.7	62
295033 High Secondary Containment Area Radiation Levels / 9						X	2.4.9 Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	3.8	64
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High CTMT Hydrogen Conc. / 5									
K/A Category Point Totals:	1	1	1	1	1	2	Group Point Total:		7

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 1 RO												Form ES-401-1	
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)	IR	#
203000 RHR/LPCI: Injection Mode					X							K5.02 Knowledge of the operational implications of core cooling methods as they apply to RHR/LPCI INJECTION MODE.	3.5	9
205000 Shutdown Cooling						X						K6.04 Knowledge of the effect that a loss or malfunction of reactor water level will have on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE):	3.6	11
206000 HPCI							X					A1.08 Ability to predict and/or monitor changes in parameters associated with operating the HIGH PRESSURE COOLANT INJECTION SYSTEM controls including system lineup	4.1	14
~~207000 Isolation (Emergency) Condenser~~														
~~207000 Isolation (Emergency) Condenser~~														
209001 LPCS				X								K4.01 Knowledge of LOW PRESSURE CORE SPRAY SYSTEM design feature(s) and/or interlocks which provide for prevention of over pressurization of core spray piping	3.2	7
~~209002 HPCS~~														
211000 SLC										X		A4.07 Ability to manually operate and/or monitor in the control room: Lights and alarms	3.6	23
212000 RPS								X				A2.08 Ability to (a) predict the impacts of Low reactor level on the REACTOR PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	4.1	15
215003 IRM					X							K5.01 Knowledge of the operational implications of detector operation as they apply to INTERMEDIATE RANGE MONITOR (IRM) SYSTEM:	2.6	10
215004 Source Range Monitor		X										K2.01 Knowledge of electrical power supplies to the SRM channels/detectors	2.6	4
215005 APRM / LPRM			X									K3.07 Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on the rod block monitor:	3.2	5
217000 RCIC			X									K3.02 Knowledge of the effect that a loss or malfunction of the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) will have on Reactor vessel pressure	3.6	6
217000 RCIC									X			A3.04 Ability to monitor automatic operations of the REACTOR CORE ISOL COOLING SYSTEM (RCIC) including, system flow.	3.6	18
218000 ADS											X	2.1.19 Ability to use plant computers to evaluate system or component status.	3.9	22
223002 PCIS/Nuclear Steam Supply Shutoff										X		A4.02 Ability to manually operate and/or monitor in the control room: Manually initiate the system	3.9	19
239002 SRVs											X	2.4.21 Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.0	21
239002 SRVs								X				A2.03 Ability to (a) predict the impacts of Stuck open SRV on the RELIEF/SAFETY VALVES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	4.1	26

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 1 RO												Form ES-401-1	
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)	IR	#
259002 Reactor Water Level Control										X		A4.07 Ability to manually operate and/or monitor in the control room: All individual component controllers when transferring from automatic to manual mode	3.8	20
261000 SGTS	X											K1.12 Knowledge of the physical connections and/or cause/effect relationships between STANDBY GAS TREATMENT SYSTEM and the primary containment purge system:	3.1	2
261000 SGTS								X				A2.04 Ability to (a) predict the impacts of High train moisture content on the STANDBY GAS TREATMENT SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	2.5	16
262001 AC Electrical Distribution		X										K2.01 Knowledge of electrical power supplies to the following: Off-site sources of power	3.3	3
262001 AC Electrical Distribution				X								K4.03 Knowledge of A.C. ELECTRICAL DISTRIBUTION design feature(s) and/or interlocks which provide for the interlocks between automatic bus transfer and breakers	3.1	25
262002 UPS (AC/DC)				X								K4.01 Knowledge of UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) design feature(s) and/or interlocks which provide for transfer from preferred power to alternate power supplies.	3.1	8
263000 DC Electrical Distribution	X											K1.03 Knowledge of the physical connections and/or cause/effect relationships between D.C. ELECTRICAL DISTRIBUTION and battery ventilation:	2.6	1
264000 EDGs							X					A1.04 Ability to predict and/or monitor changes in parameters associated with operating the EMERGENCY GENERATORS (DIESEL/JET) controls including crank case temperature and pressure	2.6	13
300000 Instrument Air									X			A3.02 Ability to monitor automatic operations of the INSTRUMENT AIR SYSTEM including air temperature	2.9	17
400000 Component Cooling Water						X						K6. 07 Knowledge of the effect that a loss or malfunction of Breakers, relays, and disconnects will have on the CCWS	2.7	12
400000 Component Cooling Water									X			A3.01 Ability to monitor automatic operations of the CCWS including: Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS	3.0	24
~~400000 Component Cooling Water~~								~~X~~				~~A2.04~~	~~2.9~~	~~16~~
K/A Category Point Totals:	2	2	2	3	2	2	2	3	3	3	2	Group Point Total:		26

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 2 RO												Form ES-401-1	
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)	IR	#
201001 CRD Hydraulic														
201002 RMCS														
201003 Control Rod and Drive Mechanism				X								K4.08 Knowledge of CONTROL ROD AND DRIVE MECHANISM design feature(s) and/or interlocks which provide for the following: Monitoring CRD mechanism temperature	2.6	30
~~201004 RSCS~~														
201005 RCIS														
201006 RWM														
202001 Recirculation														
202002 Recirculation Flow Control		X										K2.02 Knowledge of electrical power supplies to the following: Hydraulic power unit:	2.6	28
204000 RWCU														
214000 RPIS						X						K6.01 Knowledge of the effect that a loss or malfunction of the A.C. electrical power will have on the ROD POSITION INFORMATION SYSTEM:	2.5	32
215001 Traversing In-core Probe								X				A2.07 Ability to (a) predict the impacts of failure to retract during accident conditions on the TRAVERSING IN-CORE PROBE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations	3.4	34
215002 RBM														
216000 Nuclear Boiler Inst.			X									K3.29 Knowledge of the effect that a loss or malfunction of the NUCLEAR BOILER Instrumentation will have on Jet pump flow monitoring:	3.1	38
219000 RHR/LPCI: Torus/Pool Cooling Mode			X									K3.01 Knowledge of the effect that a loss or malfunction of the RHR/LPCI: TORUS / SUPPRESSION POOL COOLING MODE will have on Suppression pool temperature control	3.9	29
223001 Primary CTMT and Aux.														
226001 RHR/LPCI: CTMT Spray Mode														
230000 RHR/LPCI: Torus/Pool Spray Mode	X											K1.01 Knowledge of the physical connections and/or cause/effect relationships between RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE and the following: Suppression pool	3.6	27
233000 Fuel Pool Cooling/Cleanup					X							K5.07 Knowledge of the operational implications of the Maximum (abnormal) heat 102d load as they apply to FUEL POOL COOLING AND CLEAN-UP:	2.5	31
234000 Fuel Handling Equipment														
239001 Main and Reheat Steam														
239003 MSIV Leakage Control														
241000 Reactor/Turbine Pressure Regulator							X					A1.06 Ability to predict and/or monitor changes in parameters associated with operating the REACTOR/TURBINE PRESSURE REGULATING SYSTEM controls including: Main turbine steam flow 3.2	3.2	33
245000 Main Turbine Gen. / Aux.														
256000 Reactor Condensate									X			A3.05 Ability to monitor automatic operations of the REACTOR CONDENSATE SYSTEM including: Lights and alarms	3.0	35

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 2 RO												Form ES-401-1	
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)	IR	#
259001 Reactor Feedwater														
268000 Radwaste														
271000 Offgas														
272000 Radiation Monitoring														
286000 Fire Protection														
288000 Plant Ventilation														
290001 Secondary CTMT										X		A4.04 Ability to manually operate and/or monitor in the control room: Auxiliary building area temperature:	2.6	36
290003 Control Room HVAC											X	2.2.22 Knowledge of limiting conditions for operations and safety limits.	4.0	37
290002 Reactor Vessel Internals														
K/A Category Point Totals:	1	1	2	1	1	1	1	1	1	1	1	Group Point Total:		12

ES-401	BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 SRO								Form ES-401-1
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4									
295003 Partial or Complete Loss of AC / 6									
295004 Partial or Total Loss of DC Pwr / 6									
295005 Main Turbine Generator Trip / 3									
295006 SCRAM / 1									
295016 Control Room Abandonment / 7									
295018 Partial or Total Loss of CCW / 8									
295019 Partial or Total Loss of Inst. Air / 8									
295021 Loss of Shutdown Cooling / 4									
295023 Refueling Acc / 8					X		AA2.05 Ability to determine and/or interpret the entry conditions of emergency plan as they apply to REFUELING ACCIDENTS.	4.6	77
295024 High Drywell Pressure / 5						X	2.4.6 Knowledge of EOP mitigation strategies.	4.7	80
295025 High Reactor Pressure / 3					X		EA2.03 Ability to determine and/or interpret suppression pool temperature as they apply to HIGH REACTOR PRESSURE:	4.1	78
295026 Suppression Pool High Water Temp. / 5					X		EA2.03 Ability to determine and/or interpret the Reactor Pressure as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE	4.0	76
295027 High Containment Temperature / 5						X	2.1.27 Knowledge of system purpose and/or function	4.0	81
295028 High Drywell Temperature / 5									
295030 Low Suppression Pool Wtr Lvl / 5									
295031 Reactor Low Water Level / 2						X	2.4.3 Ability to identify post-accident instrumentation.	3.9	82
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1									
295038 High Off-site Release Rate / 9						X	2.2.42 Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	4.6	79
600000 Plant Fire On Site / 8									
700000 Generator Voltage and Electric Grid Disturbances / 6									
K/A Category Totals:					3	4	Group Point Total:		7

ES-401	BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 SRO							Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3									
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2									
295009 Low Reactor Water Level / 2									
295010 High Drywell Pressure / 5									
295011 High Containment Temp / 5									
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temp. / 5									
295014 Inadvertent Reactivity Addition / 1									
295015 Incomplete SCRAM / 1									
295017 High Off-site Release Rate / 9									
295020 Inadvertent Cont. Isolation / 5 & 7						X	2.2.22 Knowledge of limiting conditions for operations and safety limits.	4.7	84
295022 Loss of CRD Pumps / 1									
295029 High Suppression Pool Wtr Lvl / 5					X		EA2.01 Ability to determine and/or interpret Suppression pool water level as they apply to HIGH SUPPRESSION POOL WATER LEVEL. 3.9	3.9	85
295032 High Secondary Containment Area Temperature / 5									
295033 High Secondary Containment Area Radiation Levels / 9					X		EA2.01 Ability to determine and/or interpret Area radiation levels as they apply to HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS.	3.9	83
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High CTMT Hydrogen Conc. / 5									
K/A Category Point Totals:					2	1			3

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 1 SRO												Form ES-401-1	
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)	IR	#
203000 RHR/LPCI: Injection Mode														
205000 Shutdown Cooling								X				A2.09 Ability to (a) predict the impacts of Reactor low water level on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	3.8	86
206000 HPCI														
~~207000 Isolation (Emergency) Condenser~~														
209001 LPCS														
~~209002 HPCS~~														
211000 SLC														
212000 RPS								X				A2.19 Ability to (a) predict the impacts of Partial system activation (half-SCRAM) on the REACTOR PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations.	3.9	87
215003 IRM														
215004 Source Range Monitor														
215005 APRM / LPRM											X	2.4.20 Knowledge of the operational implications of EOP warnings, cautions, and notes.	4.3	90
217000 RCIC														
218000 ADS														
223002 PCIS/Nuclear Steam Supply Shutoff														
239002 SRVs														
259002 Reactor Water Level Control														
261000 SGTS														
262001 AC Electrical Distribution											X	2.2.7 Knowledge of the process for conducting special or infrequent tests.	3.6	89
262002 UPS (AC/DC)														
263000 DC Electrical Distribution														
264000 EDGs											X	2.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	4.2	88
K/A Category Point Totals:								2			3	Group Point Total:		5

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 2 SRO												Form ES-401-1	
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)	IR	#
201001 CRD Hydraulic														
201002 RMCS														
201003 Control Rod and Drive Mechanism														
~~201004 RSCS~~														
201005 RCIS														
201006 RWM														
202001 Recirculation														
202002 Recirculation Flow Control														
204000 RWCU														
214000 RPIS														
215001 Traversing In-core Probe														
215002 RBM														
216000 Nuclear Boiler Inst.														
219000 RHR/LPCI: Torus/Pool Cooling Mode								X				A2.16 Ability to (a) predict the impacts of high suppression pool level on the RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	3.2	93
223001 Primary CTMT and Aux.								X				A2.07 Ability to (a) predict the impacts of High drywell pressure on the PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	4.3	91
226001 RHR/LPCI: CTMT Spray Mode														
230000 RHR/LPCI: Torus/Pool Spray Mode														
233000 Fuel Pool Cooling/Cleanup														
234000 Fuel Handling Equipment														
239001 Main and Reheat Steam														
239003 MSIV Leakage Control														
241000 Reactor/Turbine Pressure Regulator														
245000 Main Turbine Gen. / Aux.														
256000 Reactor Condensate														
259001 Reactor Feedwater														
268000 Radwaste											X	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation. 4.4	4.4	92
271000 Offgas														
272000 Radiation Monitoring														
286000 Fire Protection														
288000 Plant Ventilation														

ES-401	BWR Examination Outline Plant Systems - Tier 2/Group 2 SRO												Form ES-401-1	
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)	IR	#
290001 Secondary CTMT														
K/A Category Point Totals:								2			1	Group Point Total:		3

Facility: Cooper Nuclear Station Date of Exam: 2-28-2011

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.5	2.1.5 Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.	2.9	66		
	2.1.17	2.1.17 Ability to make accurate, clear, and concise verbal reports.	3.9	67		
	2.1.27	2.1.27 Knowledge of system purpose and/or function.	3.9	75		
	2.1.4	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.			3.8	94
	2.1.32	Ability to explain and apply system limits and precautions.			4.0	99
	Subtotal			3		2
2. Equipment Control	2.2.14	2.2.14 Knowledge of the process for controlling equipment configuration or status.	3.9	69		
	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.			4.4	95
	2.2.43	Knowledge of the process used to track inoperable alarms.			3.3	98
	2.2.36	2.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	3.1	68		
	Subtotal			1		2
3. Radiation Control	2.3.11	2.3.11 Ability to control radiation releases.	3.8	70		
	2.3.4	2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	71		
	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.			3.8	96
	Subtotal			2		1
4. Emergency Procedures / Plan	2.4.43	2.4.43 Knowledge of emergency communications systems and techniques.	3.2	72		
	2.4.22	2.4.22 Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	3.6	73		
	2.4.32	2.4.32 Knowledge of operator response to loss of all annunciators.	3.6	74		
	2.4.28	Knowledge of procedures relating to a security event (non-safeguards information).			4.1	97
	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.			4.3	100
	Subtotal			3		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
2/1	207000.A3.02	Cooper does not have an isolation condenser
2/1	207000.K3.02	Cooper does not have an isolation condenser
2/1	209002.A2.08	Cooper does not have a high pressure core spray system
2/1	2.2.3	Cooper is not a multi-unit facility
2/2	201004.A2.01	Cooper no longer uses a Rod Sequence Control System
1/1	295027.EK1.02	Cooper has a Mark I containment design not a Mark III.
1/1	295038 Generic 2.2.36	This Generic K/A deals with the effects of maintenance on the status of LCOs – A psychometrically valid question could not be developed based on 10CFR55.41.
3	2.2.4	Cooper is not a multi-unit facility
2/2	2.4.45	Replaced Generic K/A with a randomly selected A2 K/A to fill all blocks on form 401-1.
2/1	400000.A2.04	Could not come up with a psychometrically valid question for this K/A, Also CCW was sampled three times in this group. Randomly selected another system.