

# Draft Submittal

(Pink Paper)

## **FARLEY EXAM 2000-301**

**50-348, 50-364/2000-301**

**MAY 8 - 18, 2000**

### 1. Draft Outlines

Written Exam Sample Outlines

Admin Topics Outline

Control Room Systems & Facility Walk-  
Through Test Outline

Scenario Outline

# **INITIAL SUBMITTAL**

**FARLEY EXAM 2000-301**

**50-348, 50-364/2000-301**

**MAY 8 - 18, 2000**

**DRAFT ADMINISTRATIVE  
TOPICS OUTLINES  
CONTROL ROOM SYSTEMS &  
FACILITY WALK-THROUGH TEST  
OUTLINES**

Facility: <u>Farley Nuclear Plant</u>		Date of Examination: <u>May, 2000</u>
Examination Level (Circle One): <b>RO / SRO</b>		Operating Test Number: <u>R</u>
Administrative Topic/Subject Description	Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions	
A.1	Plant Parameter Verification	JPM CRO-410A, Monitor a CSF Status Tree – 2.1.19 (3.0/3.0)
		NA
	Controlled Procedures	Question on procedure usage level – 2.1.20 (4.3/4.2)
		Question on working copies of procedures – 2.1.21 (3.1/3.2)
A.2	Refueling	Question on RO duties in the CR during fuel handling – 2.2.30 (3.5/3.3)
		Question on spent fuel movement procedures – 2.2.28 (2.6/3.5)
A.3	ALARA	Question on facility ALARA program – 2.3.2 (2.5/2.9)
		Question on radiation exposure limits – 2.3.4 (2.5/3.1)
A.4	Emergency Plan	JPM-CRO-(NEW)- Operate the NRC ENS – 2.4.43 (2.8/3.5)
		NA

Examiner: \_\_\_\_\_

Chief Examiner: \_\_\_\_\_

Facility: FarleyDate of Examination: May 2000Exam Level (circle one): **RO** / SRO(I) / SRO(U)Operating Test No.: R**B.1 Control Room Systems**

System / JPM Title	Type Code*	Safety Function
a. CVCS/CRO-139 Dilute the RCS using BTRS	D, S	1
b. CVCS/CRO-343C Establish Excess Letdown	D, S, A	2
c. ECCS/CRO-406E Verify Two Trains of ECCS Equipment	D, S, A	3
d. RHR/NRC-001 Shift RHR Trains for Cooldown in Mode 4	N, S, L	4P
e. Main Feedwater/CRO-358B Place a SGFP on Service	D, S	4S
f. EDG/CRO-359E Start the Station Blackout Diesel Generator	D, S, A	6
g. NI System/CRO-126B Intermediate Range Functional Check	D, S	7

**B.2 Facility Walk-Through**

a. Spent Fuel Pool Cooling/SO-128 Shift to "A" SFP Cooling Loop Using the Demineralizer	D,R	8
b. PRT/SO-065 PRT Cooldown Using Normal Method	D, R	5
c. Waste Gas Disposal Sys/SO-386Modified Conduct a Waste Gas Release	M, A,R	9

\* 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: <u>Farley Nuclear Plant</u>		Date of Examination: <u>May, 2000</u>
Examination Level (Circle One): <b>RO / SRO</b>		Operating Test Number: <u>S</u>
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Shutdown Safety Assessment.	JPM-CRO-(NEW)-Complete a Shutdown Safety Assessment - 2.1.25 (2.8/3.1) (Determine Time to Saturation)
		NA
	Shift Staffing	Question on shift staffing requirements - 2.1.4 (2.3/3.4)
		Question on procedures and directives related to shift staffing - 2.1.5 (2.3/3.4)
A.2	Refueling	JPM SO-138A, Transfer a New Fuel Assembly from the New Fuel Elevator to a Spent Fuel Rack - 2.2.27 (2.6/3.5)
		NA
A.3	Ctmt Purge	JPM CRO-355A, Perform Containment Vent Operation - 2.3.9 (2.5/3.4)
		NA
A.4	EALs and Classification	JPM SS-138C, Classify an Emergency Event and Make Initial Notifications – 2.4.41 (2.3/4.1)
		NA

Examiner: \_\_\_\_\_

Chief Examiner: \_\_\_\_\_

Facility: Farley Date of Examination: May 2000  
 Exam Level (circle one): RO / **SRO(I)** / SRO(U) Operating Test No.: S

## B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. CRDS/CRO-033B Modified Recover Misaligned Rod	M, S, A	1
b. ECCS/CRO-333D Cold Leg Recirc	D, S, A	2
c. Pressurizer Pressure Control/CRO-336D Restore Emergency Pwr to Pzr Heaters	D, S	3
d. RHR/CRO-066C Place RHR in Cooldown	D, S, L	4P
e. AFW/CRO-239 Shift AFW Pump Suction to SW	D, S	4S
f. AC Elect. Dis/CRO-254 Respond to Loss of Vital 120V AC Bus "A"	D, S	6
g. Reactor Protection System/CRO-406C Perform the required actions for a Reactor Trip and Safety Injection.	D, A, C	7

## B.2 Facility Walk-Through

a. CVCS/SO-556B Locally Isolate Letdown for a Loss of All AC	D, A, R	2
b. CCW/SO-605 Align Backup cooling to the Charging Pumps from Fire Protection.	D, R	8
c. EDG/SO-351Modified Manual Emerg Start of 4075 KW DG	M, A	6

\* 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

**INITIAL SUBMITTAL**

**FARLEY EXAM 2000-301**

**50-348, 50-364/2000-301**

**MAY 8 - 18, 2000**

**DRAFT SCENARIO OUTLINES**

Facility: Farley Scenario No.: 1 Op-Test No.: A

Examiners: \_\_\_\_\_ Operators: SRO-1 (SRO)  
 \_\_\_\_\_ SRO-2 (RO)  
 \_\_\_\_\_ SRO-3 (BOP)

Objective: Evaluate applicant response to a ruptured S/G coincident with a faulted S/G.

Initial Conditions: (IC-8) 100%, BOL, Equil Xenon, B Train on service

Turnover: Diesel Gen 1-2A OOS for brush repair (OOS 1 hr, ETR 4 hrs)  
1A MDAFWP OOS for bearing replacement (OOS 4 hr, ETR 12 hrs)  
1A S/G has 10 gpd tube leakage – steady for 2 weeks  
Thunderstorm warning in effect for southeast Alabama  
Operations Manager expects plant to remain at 100% for rest of shift

Event No.	Malf. No.	Event Type*	Event Description
0	IC-8	-----	100% BOL, Equil. Xenon, B Train on service.
0	PANELS/EPB/DF-08-1/CMF	-----	RACKOUT BREAKER; Rackout and tag 1-2A DG Unit 1 output.
0	PANELS/EPB/DF-08-2/CMF	-----	RACKOUT BREAKER; Rackout and tag 1-2A DG Unit 2 output.
0	NA	-----	1-2A DG Mode selector switch in Mode 3; Tag out 1-2A OOS
0	PANELS/MCB/1A MDAFW/CMF	-----	RACKOUT BREAKER; Rackout and tag 1A MDAFW Pump.
0	SYSTEMS/MECH/BOP/1A S/G	-----	Set tube leak = 10 gpd.
1	IMF/PRESS/TURBINE IMP PRESS/	I (RO)	Selected Turbine 1 <sup>st</sup> Stage Pressure SET = 0; Ramp 0s. Xmtr Fails LOW
2	IMF/MISC INST/ 1A SGFP/OUTPUT	C (BOP)	S/G Feed Pump 1A Auto output demand failed to 75 % of current speed.
3	IMF/PRESS/LTDN HX/ I/P	C (RO)	Letdown PCV (145) Fail I/P to demand closed (PCV 145 fails closed).
4	SYSTEM/MECH/S/G B	N/R (ALL)	1B SG Tube Leak, SET= 144 gpd; Ramp 0s Requiring Controlled Shutdown.
5	IMF/PRESS/S/G	I (BOP)	Selected 1B SG Steam Pressure SET=1200; Ramp 0s
6	SYSTEM/MECH/BOP/B S/G	M (ALL)	SET 1B SG Tube Rupture= 300GPM; Ramp=300s.
6A	IMF/PRESS/3371B	C (ALL)	Fail I/P to 100% 1B SG Atmospheric failed open (manual isolation valve stuck won't move).

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



## **OPERATING TEST "A"**

### **SCENARIO #1**

Initial conditions: 100%, BOL, Equil. Xenon, B Train on service.

1-2A Diesel generator is tagged out for brush repair.

1A MDAFW pump is tagged out for bearing replacement.

1A S/G has 10gpd tube leakage. Steady for 2 weeks.

Thunder Storm warning in effect for SE Ala.

Operations Manager instructions: remain at 100% .

Event 1, Selected impulse pressure transmitter fails low.

With rods in automatic this will cause rods to drive in. The RO will have to place rods in manual.

Event 2, 1A SGFP speed fails to 75% of required speed in Auto.( approx. 3200 rpm)

UO takes manual control of SGFP. Restores speed.

Event 3 Letdown PCV (PCV-145) fails closed. Letdown flow goes to zero. If valve does not work in manual then isolate letdown and go on excess letdown.

Event 4 Tube leak on "B" steam generator approx 144 gpd. > tech spec limits. Requires Plant ramp down.

Event 5 Controlling steam flow channel fails high. UO manual control of B S/G levels.

Event 6 300 gpm tube rupture on B S/G, with the B PORV stuck open. Manual valve will not close or is inaccessible. Will require entry into an ECP.

Facility: Farley Scenario No.: 2 Op-Test No.: A

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

Operators: SRO-3 (SRO)  
SRO-1 (RO)  
SRO-2 (BOP)

Objective: Evaluate applicant response to a feed line break inside containment coincident with a loss of heat sink.

Initial Conditions: (IC-14) 70% MOL, Xenon increasing, B train on service  
Power increase in progress

Turnover: Diesel Gen 1-2A OOS for brush repair (OOS 1 hr, ETR 4 hrs)  
1A MDAFWP OOS for bearing replacement (OOS 4 hr, ETR 12 hrs)  
1A S/G has 10 gpd tube leakage – steady for 2 weeks  
Thunderstorm warning in effect for southeast Alabama  
Operations Manager directs a power increase at 2 MW/min

Event No.	Malf. No.	Event Type*	Event Description
0	IC-14	----	70% MOL, Xenon building in, B train on service. Power increase in progress.
0	PANELS/EPB/DF-08-1/CMF	-----	RACKOUT BREAKER; Rackout and tag 1-2A D/G Unit 1 output.
0	PANELS/EPB/DF-08-2/CMF	-----	RACKOUT BREAKER; Rackout and tag 1-2A D/G Unit 2 output.
0	N/A	----	1-2A D/G mode selector switch in Mode 3; Tag 1-2A OOS
0	PANEL/MCB/1A MDAFW	----	RACKOUT BREAKER; Rackout and tag 1A MDAFW Pump.
0	SYSTEM/MECH/BOP/1A S/G	-----	Set tube leak = 10 gpd.
0	SYSTEM/MECH/ESF/AUX FW	C	Select TDAFWP set to Trip on Start
0	PANEL/MCB/RX TRIP BRKR /CMF	C (ALL)	Fail A and B reactor trip breakers closed ATWS
0	SYS/MECH/BOP/AUTO STOP OIL	C (BOP)	Select Turbine fails to trip automatically or manually
1	N/A	N/R	Increase Power to 100% at 2 MW/min
2	IMF/PRESS/PRZR	I(RO)	PT-444 Set=100%; Ramp 0s, :PRZR Pressure Xmtr PT-444 Fails HIGH
3	IMF/PRESS/FEED HEADER	I(BOP)	PT-508 Set= 500; Ramp 30s Feedwater Header Pressure fails Xmtr LOW
4	IMF/FLOW/CHARGING/AUTO	C(RO)	Set output to 0 ; 5s Charging Flow Control Fails LOW in Auto
5	IMF/MISC/SGFP SPEED CONTROL/1A SFGP/DRIVER	C (BOP)	Fail out put driver for 1A SGFP to minimum. Pump rolls to minimum speed. Then Trip SGFP.
6	SYSTEM/MECH/BOP/1A S/G	M (ALL)	Set= 100% 0s 1A Feedline Break Inside Containment
6A	PANELS/EPB//DG15/50G PANELS/EPB/1B D/G/	M (ALL)	50 G Loss of 4160v Bus 1G/Essential Engine Failure. (Loss of Secondary Heat Sink) (Insert at step 3.4 of EEP-2))

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

## **OPERATING TEST "A"**

### **SCENARIO #2**

Initial conditions: 70%, MOL, Xenon increasing, B Train on service.

1-2A Diesel generator is tagged out for brush repair.

1A MDAFW pump is tagged out for bearing replacement.

1A S/G has 10gpd tube leakage. Steady for 2 weeks.

Thunder Storm warning in effect for SE Ala.

Operations Manager directs a power increase at 2MW/min.

TDAFW pump set to trip on start.

Reactor Trip breakers fail to open. (ATWS).

Turbine fails to trip automatically or manually.

Event 1, Increase power to 100% at 2 MW/min.

Event 2, Pressurizer Pressure Transmitter PT-444 fails to 100% causing both spray valves to open and PORV 444B to open. The RO should close both spray valves and PORV 444B.

Event 3 Feed water Header Pressure PT-508 fails low SGFP speed will be affected UO required to take manual control.

Event 4 Charging FCV 122 fails closed in automatic. Requires RO to take manual control.

Event 5 SGFP speed fails low, then trips. UO and RO combat loss of one SGFP.

Event 6 "A" feed line break inside containment with an ATWS, subsequent loss of 1G 4160V bus, resulting in a loss of heat sink.

Facility: Farley Scenario No.: 3 Op-Test No.: A

Examiners: \_\_\_\_\_ Operators: SRO-2 (SRO)  
 \_\_\_\_\_ SRO-3 (RO)  
 \_\_\_\_\_ SRO-1 (BOP)

Objective: Evaluate applicants response to a steam space break.

Initial Conditions: (IC-32) 100%, MOL, Equil Xenon, B Train on Service

Turnover: Diesel Gen 1-2A OOS for Brush Repair (OOS 1hr, ETR 4 hrs)  
1A MDAFWP OOS for Bearing Replacement (OOS 4 hr, ETR 12 hrs)  
1A S/G has 10 gpd Tube Leakage – Steady for 2 weeks  
Thunderstorm Warning in Effect for Southeast Alabama  
Operations Manager Directions are for the Plant to Remain at 100% for Rest of Shift

Event No.	Malf. No.	Event Type*	Event Description
0	IC-32	-----	100% MOL, Equil. Xenon, B Train on service.
0	PANEL/EPB/DF08-1/CMF	-----	RACKOUT BREAKER; Rackout and Tag 1-2A D/G unit 1 output.
0	PANEL/EPB/DF08-2/CMF	-----	RACKOUT BREAKER; Rackout and Tag 1-2A D/G unit 2 output.
0	N/A	-----	1-2A D/G Mode selector switch in mode 3, tag 1-2A OOS.
0	PANEL/MCB/1AMDAFW/CMF	-----	RACKOUT BREAKER; Rackout and Tag 1A MDAFW Pump.
0	SYS/MECH/BOP/1A S/G	-----	Set tube leak =10 gpd.
0	PANEL/MCB/1A CCW/CMF	C	FAIL OPEN SI Contacts for B Train CCW. Pump Fails to Start
0	SYS/MECH/ESF/AFW/	C	Select TDAFWP set to Trip on Start.
0	PANEL/MCB/1C COND PUMP/CMF	C	Fail Auto start contact open on STBY condensate pump.
1	IMF/PRZR LEVEL CONTROL/ LT-459	I(RO)	Set = 0; 10s ramp. Selected PRZR Level Xmtr Fails LOW
2	SYS/MECH/BOP/HTR DRN TK/ V915A	C (BOP)	Heater Drain Tank 1A Dump Valve V915A Fails OPEN
3	IMF/FLOW/1A S/G FEED FLOW	I(BOP)	Set Selected xmtr to 0 ;ramp 10s; 1A SG FF Xmtr Fails LOW
4	N/A	N/R	Secondary Chem Parameter > Level 3 – Controlled Shutdown
5	IMF/MISC/SPEED CONTROL RODS/	C(RO)	Select Rods Fail to Move in Auto.
6	IMF/PRESS/PRZR PRESS CONTROL/ PCV 444-C/OUTPUT DEMAND	M (ALL)	Set output demand to 0; Ramp 0s. PRZR Spray Valve PCV-444C Fails OPEN
6A	SYS/MECH/RCS/PRZR/	M (ALL)	Select PRZR Steam Space Leak Set = 600 gpm; Ramp 300s. (Insert 60 seconds after plant tripped for event 6)

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

## **OPERATING TEST "A"**

### **SCENARIO #3**

Initial conditions: 100%, MOL, Equil. Xenon, B Train on service.

1-2A Diesel generator is tagged out for brush repair.

1A MDAFW pump is tagged out for bearing replacement.

1A S/G has 10gpd tube leakage. Steady for 2 weeks.

Thunder Storm warning in effect for SE Ala.

Operations Manager directions are to remain at 100% for the rest of the shift.

TDAFW pump set to trip on start.

Standby condensate pump will not auto start.

"A" CCW pump fails to start on the SI sequencer.

Event 1 Pressurizer level transmitter LT-459 fails low. .

Event 2 Heater Drain Tank dump valve fails open, should result in low SGFP suction pressure, standby condensate pump will not auto start. UO required to start.

Event 3 Controlling "A" S/G Feed Flow fails low. Requires manual control of A S/G FRV.

Event 4 High secondary chemistry requiring controlled plant shutdown.

Event 5 Control Rods fail to move in Auto. RO will be required to ramp with rods in manual.

Event 6 Pressurizer Spray Valve 444C fails open, requiring a Reactor Trip.

Event 6A Pressurizer Steam Space Break. 600 gpm.

Facility: Farley Scenario No.: 1 Op-Test No.: B

Examiners: \_\_\_\_\_ Operators: SRO-7 (SRO)  
 \_\_\_\_\_ SRO-8 (RO)  
 \_\_\_\_\_ RO-9 (BOP)

Objective: Evaluate applicants response to a Faulted S/G in containment.

Initial Conditions: (IC-16) 100%, MOL, Equil Xenon, A Train on service

Turnover: 1B Diesel Generator OOS-Voltage regulator problems. (OOS 1 hr; ETR 4 hr)  
1B MDAFWP-burned cable (OOS 4 hrs; ETR 24 hrs)  
1B Steam Generator has 15 gpd tube leak – unchanged for last week  
Tornado/high winds watch set in southern Alabama  
Operations Manager expects plant to remain at 100% for rest of shift

Event No.	Malf. No.	Event Type*	Event Description
0	IC-16	-----	100%, MOL, Equil. Xenon, A Train on service.
0	PANELS/EPB/DG08-1/CMF	-----	RACKOUT BREAKER; Rackout and tag 1B D/G output.
0	N/A	-----	1B mode selector switch in Mode 3, Tag out 1B D/G OOS
0	PANELS/MCB/1B MDAFW/CMF	-----	RACKOUT BREAKER; Rackout and tag 1B MDAFW pump.
0	SYS/MECH/BOP/1B S/G	-----	Set tube leak = 15 gpd.
0	PANELS/MCB/SI HANDSWITCH/CMF	C	Prevent Train A SI/Phase A Actuation.
0	PANELS/MCB/8820A/CMF	C	Fail phase A contact open, 8820A (Cont. spray discharge) fails to open
0	SYS/MECH/BOP/MFW	C	Select AUTO BLOCK on 1B SGFP. Fails to Trip on FW Isolation Signal
1	IMF/NI/CH4 B DRAWER/SUM AMP	I(RO)	Set summing amp to 200%; Ramp 0s. PR Channel N44 Fails HI
2	IMF/FLOW/1A S/G STM FLOW PROT.	I(BOP)	Set controlling Steam Flow Channel to 5e6; Ramp 10s. channel fails high.
3	SYS/MECH/ESF/CCW NON ESF/	C(RO)	Select Letdown Heat Exchanger Tube Leak. Set to 60%; Ramp 600s (Excess letdown required).
4	IMF/TEMP/GEN H2CONTROL/ I/P.	C(BOP)	Fail I/P demand to 0. Generator H <sub>2</sub> Temp. Control Fails Low, Causing High H <sub>2</sub> Temp.
5	N/A	N/R (ALL)	Controlled Load Reduction for High H <sub>2</sub> Temp
6	SYS/MECH/BOP/1A S/G	M(ALL)	Select 1A SG Steamline Break Inside Containment, set to 10e6; 30s ramp.

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

## **OPERATING TEST "B"**

### **SCENARIO #1**

Initial conditions: 100%, MOL, Equil. Xenon, A Train on service.

1B Diesel generator is tagged out for voltage regulator problem.

1B MDAFW pump is tagged out for a burned cable.

1B S/G has 15gpd tube leakage. Steady for 2 weeks.

Tornado/high winds watch set in southern Alabama.

Operations Manager directions are to remain at 100% for the rest of the shift.

Train "A" SI and Phase A isolation Blocked.

Containment Spray discharge valve fails to open automatically.

The 1B SGFP fails to trip on the feed water isolation signal.

Event 1 NI-44 fails high. Rods should step in (while in auto) RO shift rod control to manual.

Event 2 Controlling "A" S/G Feed Flow fails low. Requires manual control of A S/G FRV.

Event 3 Letdown Heat Exchanger Tube Leak. Requires going to excess letdown.

Event 4 Main Generator H2 temperature control valve closed, causing high temperatures requiring controlled plant load reduction..

Event 5 Controlled load reduction for high H2 temperature.

Event 6 1A S/G main steamline break in containment, with no "A" train SI, or Phase A isolation. Containment Spray valve 8820A also does not open.

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Facility: Farley Scenario No.: 2 Op-Test No.: BExaminers: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: SRO-8 (SRO)  
SRO-7 (RO)  
RO-9 (BOP)Objective: Evaluate applicant response to a SBLOCA coincident with a loss of all AC power.Initial Conditions: (IC-21) 55%, MOL, Increasing Xenon, A Train on service  
Power increase in progressTurnover: 1B Diesel Generator OOS-voltage regulator problem. (OOS 1 hr; ETR 4 hr)  
1B MDAFWP-burned cable (OOS 4 hrs; ETR 24 hrs)  
1B Steam Generator has 15 gpd tube leak – unchanged for last week  
Tornado/high winds watch set in southern Alabama  
Operations Manager directs a power increase at 2 MW/min to 75% power.

Event No.	Malf. No.	Event Type*	Event Description
0	IC-21	-----	55% MOL, Xenon building in, A Train on service.
0	PANELS/EPB/DG08-1/CMF	-----	RACKOUT BREAKER Rackout and tag 1B D/G output.
0	N/A	-----	1B mode selector switch in Mode 3, Tag out 1B D/G OOS.
0	PANELS/MCB/1B MDAFW/CMF	-----	RACKOUT BREAKER Rackout and tag 1B MDAFW pump.
0	SYS/MECH/BOP/1B S/G	-----	Set tube leak = 15 gpd.
0	PANEL/EPB/DF08-1CMF	C	Fail auto close contact. Breaker fails to close automatically.
1	NA	N/R (ALL)	Increase Power at 2 MW/min
2	IMF/PRESS/ S/G PROTECTION	I(BOP)	Select 200 psig ; 10s - Fail Selected Steam Pressure Xmtr Fails LOW
3	IMF/PRESS/ PRZR PRESS CONTROL	I(RO)	Select PT-444 Set = 2500 psig; 0s ramp. PRZR Pressure Xmtr PT-444 Fails HIGH
4	SYS/ESF/CCW TO RCPA	C(RO)	Select 1A RCP Thermal Barrier Leak. (Prevent surge tank valve from closing).
5	SYS/MECH/SGFP TURBINES/1B	C(BOP)	Trip the 1B SGFWP.
6	SYS/MECH/RCS/RCP A/	C(ALL)	Select 1A RCP #1 Seal Failure.
6A	SYS/MECH/RCS/RCP A SYS/MECH/RCS/A LOOP	M(ALL)	Select 1A RCP #2 and 3 Seal Failures [Insert When RCP Tripped] Select small pipe break set = 300 gpm.
6B	SYS/ELEC/SWITCHYARD	M(ALL)	Select Loss of all Off-site Power set =1; 3s (Insert at step 6 of EEP-0) (loss of all AC)

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



## **OPERATING TEST "B"**

### **SCENARIO #2**

Initial conditions: 55%, MOL, Increasing Xenon, A Train on service, power increase in progress.

1B Diesel generator is tagged out for Voltage regulator problems.

1B MDAFW pump is tagged out for a burned cable.

1B S/G has 15gpd tube leakage. Unchanged for the last week.

Tornado/high winds watch set in southern Alabama.

Operations Manager directs a power increase at 2 MW/min to 75% power.

1-2A D/G output breaker fails to close automatically.

Event 1 Begin ramp to 75% power at 2 MW/min.

Event 2 Controlling "C" S/G Steam Flow fails High. Requires manual control of "C" S/G FRV.

Event 3 Pressurizer Pressure Transmitter PT-444 fails high. PORV and sprays open, RO must close.

Event 4 1A RCP thermal barrier leak. (CCW surge tank vent valves fail to close).

Event 5 1A RCP #1 seal failure. This causes reactor to be tripped, and RCP to be secured.

Event 6 SBLOCA (300gpm), After SI an LOSP occurs, and 1-2A D/G output breaker fails to close. Loss of all AC, until the output breaker is manually closed.

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Facility: Farley Scenario No.: 3 Op-Test No.: B

Examiners: \_\_\_\_\_ Operators: SRO-7 (SRO)  
 \_\_\_\_\_ RO-9 (RO)  
 \_\_\_\_\_ SRO-8 (BOP)

Objective: Evaluate applicant response to a ATWTS followed by a SGTR.

Initial Conditions: (IC-9) 100%, EOL, Equil Xenon, A Train on service

Turnover: 1B Diesel Generator OOS-Voltage regulator problem. (OOS 1 hr; ETR 4 hr)  
1B MDAFWP-burned cable (OOS 4 hrs; ETR 24 hrs)  
1B Steam Generator has 15 gpd tube leak – unchanged for last week  
Tornado/high winds watch set in southern Alabama  
Operations manager expects plant to remain at 100% for rest of shift

Event No.	Malf. No.	Event Type*	Event Description
0	IC-9	-----	100%, EOL, Equil. Xenon, A Train on service.
0	PANELS/EPB/DG08-1/CMF	-----	RACKOUT BREAKER Rackout and tag 1B D/G output.
0	N/A	-----	1B mode selector switch in Mode 3, Tag out 1B D/G OOS.
0	PANELS/MCB/1B MDAFW/CMF	-----	RACKOUT BREAKER Rackout and tag 1B MDAFW pump.
0	SYS/MECH/BOP/1B S/G	-----	Set tube leak = 15 gpd.
0	PANEL/MCB/RXTRIPSWITCH/CMF	C	Fail A and B reactor trip breaker s closed. (ATWS).
1	IMF/PRESS/TURB IMP PROT/	I(RO)	Fail selected Turbine 1 <sup>st</sup> Stage Pressure. Set = 20%; 30s. Xmtr Fails LOW
2	IMF/LEVEL/1C LEVEL CONTROL/DRIVER/AUTO	C (BOP)	Set for 15% < actual, then CLEAR . Alternate until controller selected to manual. 1C SG Level Controller Unstable in Auto
3	IMF/STM HDR/ PT- 464	I(BOP)	Set =100 psig; 60s ramp. Steam Header Press Xmtr PT-464 Fails LOW
4	FUEL FAILURE	C(RO)	Set = (.3) Fuel Cladding Failure Releases Fission Products to RCS (Chemistry Reports DE I-131 is 111 µc/cc when asked.) When informed Operations Manager directs plant shutdown.
5	N/A	N/R (ALL)	Decrease Load for Controlled Shutdown
6	PANEL/MCB/1B MSIV/CMF	M (ALL)	Fail closed contact to close 1B S/G MSIV.
6A	SYS/MECH/BOP/1B S/G	M (ALL)	Set tube rupture for 400 gpm; 30s ramp. 1B SG Tube Rupture (Insert when Reactor Trip announced)

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

## **OPERATING TEST "B"**

### **SCENARIO #3**

Initial conditions: 100%, EOL, Equil. Xenon, A Train on service.

1B Diesel generator is tagged out for Voltage regulator problems.

1B MDAFW pump is tagged out for a burned cable.

1B S/G has 15gpd tube leakage. Unchanged for the last week.

Tornado/high winds watch set in southern Alabama.

Operations Manager direction are to remain at 100% power.

Reactor Trip Breakers fail to open. (ATWS).

Event 1 Selected Impulse Pressure fails low. (Rods in Auto begin to drive in).

Event 2 1C S/G feed regulating valve controller becomes unstable. Requires manual control of "C" S/G FRV.

Event 3 Steam Header Pressure PT-464 fails low giving SGFP speed control problems.

Event 4 Fuel Cladding Failure. Ops manager will direct a ramp down if needed.

Event 5 Ramp down a 2MW/min. to 75% power.

Event 6 "B" S/G MSIV fails closed, Turbine Trip, this should have caused a Reactor Trip. (ATWS installed). Team will have to trip MG sets and go to FRP S.1.

Event 6A After the reactor is shutdown and the team is in ESP-0.1 a tube rupture will occur on B steam generator.

# Draft Submittal

(Pink Paper)

1. Written Exam Sample outlines

**FARLEY EXAM 2000-301**

**50-348, 50-364/2000-301**

**MAY 8 - 18, 2000**

O: Farley,

**Southern Nuclear  
Operating Company, Inc.**  
Post Office Drawer 470  
Ashford, Alabama 36312  
  
Tel 334.899.5156  
Fax 334.814.4661



*Energy to Serve Your World™*

FNP-2000-0027-TRN  
February 21, 2000

Mr. Mike Ernstes  
United States Nuclear Regulatory Commission  
Region II, Atlanta Federal Center  
61 Forsyth St., Suite 23T85  
Atlanta, GA 30303-3415

Dear Mr. Ernstes:

Enclosed is the examination outline required by NUREG 1021, Operator Licensing Examinations for Power Reactors, ES-201 for the initial licensing examination to be given at the J. M. Farley Nuclear Plant beginning the week of May 8, 2000.

The enclosed examination materials should be withheld from public disclosure until after the examination, scheduled to begin the week of May 8, 2000.

If you have any questions regarding this outline, please contact Gerry Laska at (334) 899-5156 extension 6148 or Gary Ohmstede at (334) 899-5156 extension 6111.

Sincerely,

A handwritten signature in black ink, appearing to read "W. D. Oldfield", is written over a horizontal line.

W. D. Oldfield  
Supervisor Operations Training

Enclosures

WDO/GWL:mgr

cc: M.J. Ajluni w/o enclosures  
File w/o enclosures  
File

MISC DISK #35

Facility: Farley      Date of Exam: 5/8/2000      Exam Level: RO													
Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	3	1	3				3	3			3	16
	2	3	3	3				3	3			2	17
	3	0	0	1				1	1			0	3
	Tier Totals	6	4	7				7	7			5	36
2. Plant Systems	1	2	2	2	2	2	2	2	2	3	2	2	23
	2	1	2	2	3	2	1	2	2	1	2	2	20
	3	0	0	1	2	1	0	1	1	1	0	1	8
	Tier Totals	3	4	5	7	5	3	5	5	5	4	5	51
3. Generic Knowledge and Abilities							Cat 1	Cat 2	Cat 3	Cat 4	13		
							4	3	3	3			
<p>Note: 1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. Actual point totals must match those specified in the table.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic 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.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

ES-401 PWR RO Examination Outline Form ES-401-4  
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	A <sub>1</sub>	A <sub>2</sub>	G	K/A Topic(s)	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1			X				AK3.06 Actions contained in EOP for inoperable/stuck control rod.	3.9	1
000015/17 RCP Malfunctions / 4						X	G2.1.32 Ability to explain all system limits and precautions.	3.4	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4									
000024 Emergency Boration / 1	X						AK1.04 Low temperature limits for boron concentration.	2.8	1
000026 Loss of Component Cooling Water / 8				X			AA1.02 Loads on CCWS in the control room.	3.2	1
000027 Pressurizer Pressure Control System Malfunction / 3					X		AA2.15 Actions to be taken if Pressurizer Pressure instrument fails high.	3.7	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4			X				AK3.06 Containment temperature and pressure considerations	3.4	1
CE/A11; W/E08 RCS Overcooling - PTS / 4									
000051 Loss of Condenser Vacuum / 4									
000055 Station Blackout / 6	X			X			EK1.01 Effects of Battery discharge rates on Battery. EA1.07 Restoration of power from off site.	3.3 4.3	2
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		AA2.19 Plant Auto actions that will occur on a loss of vital instrument bus.	4.0	1
000062 Loss of Nuclear Service Water / 4			X	X			AK3.03 Actions in EOP for loss of SW. AA1.02 Loads on SW system in control room.	4.0/3.2	2
000067 Plant Fire On-site / 9					X		AA2.16 Vital Equip. and control systems to be maint. Or operated in fire.	3.3	1
000068 (BW/A06) Control Room Evac. / 8		X					AK2.01 Knowledge of interrelations and auxiliary shutdown panel layout.	3.9	1
000069 (W/E14) Loss of CTMT Integrity / 5						X	G2.4.8 Event based EOP/AOP use with system based EOP's	3.0	1
000074 (W/E06&E07) Inad. Core Cooling / 4	X						EK1.04 Use of steam tables.	3.7	1
BW/E03 Inadequate Subcooling Margin / 4									
000076 High Reactor Coolant Activity / 9						X	G2.1.33 Entry level conditions for Technical Specifications.	3.4	1
BW/A02&A03 Loss of NNI-X/Y / 7									
K/A Category Totals:	3	1	3	3	3	3	Group Point Total:		16

ES-401 PWR RO Examination Outline Form ES-401-4 Emergency and Abnormal Plant Evolutions - Tier 1/Group 2									
E/APE # / Name / Safety Function	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	A <sub>1</sub>	A <sub>2</sub>	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1					X		AA2.01 Rod position indication to actual rod position.	3.7	1
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	G2.4.6 Knowledge of system based EOP mitigation strategies.	3.1	1
BW/A01 Plant Runback / 1									
BW/A04 Turbine Trip / 4									
000008 Pressurizer Vapor Space Accident / 3	R						AK1.01 Thermodynamics and flow characteristics of open/leaking valves.	3.2	1
000009 Small Break LOCA / 3		X					EK2.03 Interrelations between SBLOCA and S/G.	3.0	1
000011 Large Break LOCA / 3				X			EA1.03 LOCA and securing of RCP's.	4.0	1
W/E04 LOCA Outside Containment / 3		R					EK2.1 Components and functions of control and safety systems...	3.5	1
BW/E08; W/E03 LOCA Cooldown/Depress. / 4									
W/E11 Loss of Emergency Coolant Recirc. / 4	R						EK1.1 Components, capacity, and function of emergency systems.	3.7	1
W/E01 & E02 Rediagnosis & SI Termination / 3									
000022 Loss of Reactor Coolant Makeup / 2			X				AK3.02 Actions contained in SOP's and EOP's for RCP's for loss of M/U.	3.5	1
000025 Loss of RHR System / 4						R	G2.4.4 Ability to recognize entry level conditions for EOP's and AOP's.	4.0	1
000029 Anticipated Transient w/o Scram / 1									
000032 Loss of Source Range NI / 7					X		AA2.04 Satisfactory source-range/intermediate range overlap.	3.1	1
000033 Loss of Intermediate Range NI / 7									
000037 Steam Generator Tube Leak / 3				R			AA1.11 Ability to operate and or monitor Pressurizer level during tube leak	3.4	1
000038 Steam Generator Tube Rupture / 3			X				EK3.06 Actions contained in EOP for water inventory balance in SGTR.	4.2	1
000054 (CE/E06) Loss of Main Feedwater / 4			X				AK3.04 Actions contained in EOP's for a loss of MFW.	4.4	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4					R		EA2.1 Facility conditions and selection of appropriate EOP/AOP.	3.4	1
000058 Loss of DC Power / 6	X						AK1.01 Knowledge of operational implications of battery charger equip.	2.8	1
000059 Accidental Liquid RadWaste Rel. / 9		X					AK2.01 Accidental release and radioactive liquid monitors.	2.7	1
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7				X			AA1.01 Ability to operate or monitor ARMS; Automatic actuation.	3.6	1
W/E16 High Containment Radiation / 9									
CE/E09 Functional Recovery									
K/A Category Point Totals:	3	3	3	3	3	2	Group Point Total:		17



ES-401 PWR RO Examination Outline Form ES-401-4  
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	A <sub>1</sub>	A <sub>2</sub>	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2									
000036 (BW/A08) Fuel Handling Accident / 8				X			AA1.01 Ability to operate Reactor building/containment purge ventilation.	3.3	1
000056 Loss of Off-site Power / 6			X				AK3.02 Actions contained in AOP for loss of off site power.	4.4	1
000065 Loss of Instrument Air / 8					X		AA2.08 Failure modes of air operated equipment.	2.9	1
BW/E13&E14 EOP Rules and Enclosures									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
CE/A16 Excess RCS Leakage / 2									
W/E13 Steam Generator Over-pressure / 4									
W/E15 Containment Flooding / 5									
K/A Category Point Totals:	0	0	1	1	1	0	Group Point Total:		3

ES-401 PWR RO Examination OutlineForm ES-401-4 Plant Systems - Tier 2/Group 1														
System # / Name	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	K <sub>4</sub>	K <sub>5</sub>	K <sub>6</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive				X		R						K4.01Rod position indication. K6.03 Knowledge of Reactor trip breakers.	3.5 3.7	2
003 Reactor Coolant Pump					R		X					K5.04 Effects of RCP S/D on Secondary parameters. A1.06 RCP's and spray flow.	3.2 2.9	2
004 Chemical and Volume Control	R								X		R	K1.04 RCP's including seal inj. Flow. A3.09Auto operation of VCT level. G2.1.32 Apply system limits and precautions	3.4 3.3 3.4	3
013 Engineered Safety Features Actuation								X			R	A2.05 Loss of DC control power. A4.02 Reset of ESFAS channels.	3.7 4.3	2
015 Nuclear Instrumentation				R			X					K4.07 Pemiissives. A1.04 QPTR	3.7 3.5	2
017 In-core Temperature Monitor										X		A4.02 Temp values used to determine RCP	3.8	1
022 Containment Cooling		X										K2.01 Power supplies to cooling fans.	3.0	1
025 Ice Condenser														
056 Condensate	X											K1.03 Physical connections Cond/MFW	2.6	1
059 Main Feedwater			R					X				K3.02Effects of loss of MFW on AFW A2.04Feeding a Dry generator.	3.6 2.9	2
061 Auxiliary/Emergency Feedwater		R							R		X	K2.01 Power supplies to AFW MOV's. A3.01 AFW start up and flows. G2.1.27 System purpose or function.	3.2 4.2 2.8	3
068 Liquid Radwaste						X						K6.10 Effects of malfunction on radiation monitors	2.5	1
071 Waste Gas Disposal									X			A3.03 Auto operation of rad. monitor.	3.6	1
072 Area Radiation Monitoring			R		X							K3.01 Malfunction and containment ventilation isolation. K5.01 Radiation theory and types of detectors.	3.2 2.7	2
K/A Category Point Totals:	2	2	2	2	2	2	2	2	3	2	2	Group Point Total:		23

ES-401 PWR RO Examination OutlineForm ES-401-4  
Plant Systems - Tier 2/Group 2

System # / Name	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	K <sub>4</sub>	K <sub>5</sub>	K <sub>6</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant				X								K4.10 RCS overpressure protection.	4.2	1
006 Emergency Core Cooling		R							X			K2.04 Power supplies to ESFAS valves. A3.05 Monitor auto ops of SI pumps.	3.6 4.2	2
010 Pressurizer Pressure Control			X									K3.01 Effects of loss of PLC on RCS	3.8	1
011 Pressurizer Level Control					R							K5.12 Criteria and purpose of level program	2.7	1
012 Reactor Protection					X							K5.01 Knowledge of RPS and DNB.	3.3	1
014 Rod Position Indication											X	G2.1.12 Ability to apply T/S for a system.	2.9	1
016 Non-nuclear Instrumentation														
026 Containment Spray										X		A4.01 Ability to manually operate CSS.	4.5	1
029 Containment Purge				X								K4.02Design features for neg. pressure in containment	2.9	1
033 Spent Fuel Pool Cooling								X				A2.03 Abnormal/loss of SFP level	3.1	1
035 Steam Generator										R		A4.06 S/G isolation on SGTR or leak	4.5	1
039 Main and Reheat Steam				R								K4.08 Interlocks on MSIV and Bypass valves.	3.3	1
055 Condenser Air Removal														
062 AC Electrical Distribution							X					A1.01 Ability to predict/monitor D/G load limit	3.4	1
063 DC Electrical Distribution			X									K3.01 Loss of DC and Emer.diesel Gen.	3.7	1
064 Emergency Diesel Generator		X									R	K2.03 Control Power. G2.1.28 function of major systems comp. And controls	3.2 3.2	2
073 Process Radiation Monitoring							X					A1.01Ability to predict changes in Rad levels.	3.2	1
075 Circulating Water								X				A2.03 Ability to predict impact of safety features	2.5	1
079 Station Air	X											K1.01Knowledge of connections SA/IAS	3.0	1
086 Fire Protection						X						K6.04 Loss of fire,smoke,heat detectors.	2.6	1
K/A Category Point Totals:	1	2	2	3	2	1	2	2	1	2	2	Group Point Total:		20

ES-401 PWR RO Examination Outline Form ES-401-4  
Plant Systems - Tier 2/Group 3

Plant Systems - Tier 2/Group 3														
System # / Name	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	K <sub>4</sub>	K <sub>5</sub>	K <sub>6</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal				X								K4.03 RHR HX bypass flow control.	2.9	1
007 Pressurizer Relief/Quench Tank							R					A1.02 Maintaining quench tank pressure.	2.7	1
008 Component Cooling Water									X			A3.08 Auto actions from an SI.	3.6	1
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control					X							K5.02 Flammable hydrogen concentrations.	3.4	1
034 Fuel Handling Equipment														
041 Steam Dump/Turbine Bypass Control				R								K4.11 SDS and Tave/Tref program	2.8	1
045 Main Turbine Generator														
076 Service Water								X				A2.01 Impact of loss of service water.	3.5	1
078 Instrument Air											X	G2.4.11 Knowledge of abnormal condition.	3.4	1
103 Containment			R									K3.03 Loss of integrity during refueling	3.7	1
K/A Category Point Totals:	0	0	1	2	1	0	1	1	1	0	1	Group Point Total:		8
Plant-Specific Priorities														
System / Topic							Recommended Replacement for...				Reason			Points
Plant-Specific Priority Total: (limit 10)														

Facility: Farley		Date of Exam: 5/8/2000	Exam Level: RO	
Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.1	Knowledge of conduct of operation requirements	3.7	1
	2.1.3	(R) Knowledge of shift turnover practices.	3.0	1
	2.1.22	Ability to determine modes of operation.	2.8	1
	2.1.29	Knowledge of how to conduct and verify lineups.	3.4	1
	2.1.			
	Total			
Equipment Control	2.2.3	Knowledge of the design, procedural, and operational differences between units.	3.1	1
	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1
	2.2.30	Knowledge of RO duties in the control room during fuel handling.	3.5	1
	2.2.			
	Total			
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6	1
	2.3.4	Knowledge of radiation exposure limits and contamination control including permissible levels in excess of those authorized.	2.5	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation, and guard against personnel exposure.	2.9	1
	2.3.			
	Total			
Emergency Procedures/ Plan	2.4.12	(R) Knowledge of general operating crew responsibilities during emergency operations.	3.4	1
	2.4.17	Knowledge of EOP terms and definitions.	3.1	1
	2.4.39	Knowledge of RO's responsibilities in emergency plan implementation.	3.3	1
	2.4.			
	2.4.			
	Total			
Tier 3 Point Total (RO/SRO)				13

Facility: Farley		Date of Exam: 5/8/2000		Exam Level: SRO									
Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	3	2	3				4	6			6	24
	2	1	1	3				1	6			4	16
	3	0	0	1				1	0			1	3
	Tier Totals	4	3	7				6	12			11	43
2. Plant Systems	1	1	1	1	1	1	1	2	4	2	2	3	19
	2	1	1	1	2	2	1	2	4	1	1	1	17
	3	0	0	0	1	0	0	0	1	1	0	1	4
	Tier Totals	2	2	2	4	3	2	4	9	4	3	5	40
3. Generic Knowledge and Abilities				Cat 1		Cat 2		Cat 3		Cat 4		17	
				5		4		3		5			
<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</li> <li>2. Actual point totals must match those specified in the table.</li> <li>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</li> <li>4. Systems/evolutions within each group are identified on the associated outline.</li> <li>5. The shaded areas are not applicable to the category/tier.</li> <li>6.* The generic 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.</li> <li>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</li> </ol>													

ES-401 PWR SRO Examination OutlineForm ES-401-3  
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1					X		AA2.01 Rod position indication to actual rod position.	3.9	1
000005 Inoperable/Stuck Control Rod / 1			X			S	AK3.06; 2.2.12 Actions contained in EOP for stuck rod./Tech Spec. (S)	4.2/4.0	2
000011 Large Break LOCA / 3				X			EA1.03 LOCA and securing of RCP's.	4.0	1
W/E04 LOCA Outside Containment / 3						S	2.1.32 Ability to explain and apply all system limits and precautions. (S).	3.8	1
W/E01 & E02 Rediagnosis & SI Termination / 3									
000015/17 RCP Malfunctions / 4						X	G2.1.32 Ability to explain and apply all system limits and precautions.	3.8	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4					S		EA2.1 Facility conditions and selection of appropriate procedures...	3.8	1
000024 Emergency Boration / 1	X						AK1.04 Low temperature limits for boron concentration.	3.6	1
000026 Loss of Component Cooling Water / 8				X	S		AA1.02; AA2.02 Loads on CCWS in the control room / cause of ccw loss	3.3/3.6	2
000029 Anticipated Transient w/o Scram / 1									
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4			X				AK3.06 Containment temperature and pressure considerations.	3.9	1
CE/A11; W/E08 RCS Overcooling - PTS / 4									
000051 Loss of Condenser Vacuum / 4									
000055 Station Blackout / 6	X			X		S	EK1.01; EA1.07; 2.4.7(S) Knowledge of event based EOP mitigation ...	3.7/4.5 3.8	3
000057 Loss of Vital AC Elec. Inst. Bus / 6					X		AA2.19 Automatic actions that will occur on loss of vital bus.	4.3	1
000059 Accidental Liquid RadWaste Rel. / 9		X					AK2.01 Accidental release and radioactive liquid monitors.	2.8	1
000062 Loss of Nuclear Service Water / 4			X	X			AK3.03; AA1.02 Actions in EOP./ Loads on the SW system in C.R.	4.2/3.3	2
000067 Plant Fire On-site / 9					X		AA2.16 Vital equip. and control systems to be maint. Or operated in fire.	4.0	1
000068 (BW/A06) Control Room Evac. / 8		X			S		AK2.01; AA2.04 Aux S/D panel layout./ S/G Pressure.	4.0	2
000069 (W/E14) Loss of CTMT Integrity / 5						X	G2.4.8 Event based AOP and EOP vrs. System Based procedures.	3.7	1
000074 (W/E06&E07) Inad. Core Cooling / 4	X						EK1.04 Use of steam tables.	4.1	1
BW/E03 Inadequate Subcooling Margin / 4									
000076 High Reactor Coolant Activity / 9						X	G2.1.33 Entry level conditions for Technical Specifications.	4.0	1
BW/A02&A03 Loss of NNI-X/Y / 7									
K/A Category Totals:	3	2	3	4	6	6	Group Point Total:		24

ES-401 PWR SRO Examination Outline Form ES-401-3  
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	A <sub>1</sub>	A <sub>2</sub>	G	K/A Topic(s)	Imp.	Points
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	G2.4.6 Knowledge system based EOP mitigations strategies.	4.0	1
BW/A01 Plant Runback / 1									
BW/A04 Turbine Trip / 4									
000008 Pressurizer Vapor Space Accident / 3					S		AA2.06 PORV logic under low pressure conditions.	3.6	1
000009 Small Break LOCA / 3		X					EK2.03 Interrelations between SBLOCA and S/G.	3.3	1
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
W/E11 Loss of Emergency Coolant Recirc. / 4						S	2.1.7 Ability to evaluate plant performance and make operational decision	4.4	1
000022 Loss of Reactor Coolant Makeup / 2			X				AK3.02 Actions contained in SOP's and EOP's for RCP's for loss of M/U.	3.8	1
000025 Loss of RHR System / 4					S		AA2.05 Limitations on LPI flow and temperature rates of change.	3.5	1
000027 Pressurizer Pressure Control System Malfunction / 3					X		AA2.15 Actions to be taken if Pressurizer Press instrument fails high	4.0	1
000032 Loss of Source Range NI / 7					X		AA2.04 Satisfactory source-range/intermediate range overlap	3.5	1
000033 Loss of Intermediate Range NI / 7									
000037 Steam Generator Tube Leak / 3						S	2.4.4 ability to recognize abnormal indications for entry into EOP/AOP.	4.3	1
000038 Steam Generator Tube Rupture / 3			X				EK3.06 Actions contained in EOP for water inventory balance,SGTR...	4.5	1
000054 (CE/E06) Loss of Main Feedwater / 4			X				AK3.04 Actions contained in EOP's for a loss of MFW.	4.6	1
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4						S	2.4.22 Knowledge of the basis for prioritizing safety functions during ..	4.0	1
000058 Loss of DC Power / 6	X						AK1.01 Knowledge of operational implications on battery charger equip.	3.1	1
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7				X			AA1.01 Ability to operate or monitor ARMS; Automatic actuation	3.6	1
W/E16 High Containment Radiation / 9					S		EA2.2 Adherence to appropriate procedures and operation within the limit	3.3	1
000065 Loss of Instrument Air / 8					X		AA2.08 Failure modes of Air operated equipment.	3.3	1
CE/E09 Functional Recovery									
K/A Category Point Totals:	1	1	3	1	6	4	Group Point Total:		15



ES-401 PWR SRO Examination Outline Form ES-401-3  
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	A <sub>1</sub>	A <sub>2</sub>	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2						S	2.1.33 Ability to recognize indications for system operating parameters for.	4.0	1
000036 (BW/A08) Fuel Handling Accident / 8				X			AA1.01 Ability to operate Reactor building Containment purge ventilation	3.8	1
000056 Loss of Off-site Power / 6			X				AK3.02 Actions contained in AOP for loss of off site power.	4.7	1
BW/E13&E14 EOP Rules and Enclosures									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
CE/A16 Excess RCS Leakage / 2									
W/E13 Steam Generator Over-pressure / 4									
W/E15 Containment Flooding / 5									
K/A Category Point Totals:	0	0	1	1	0	1	Group Point Total:		3

ES-401 PWR SRO Examination Outline Form ES-401-3  
Plant Systems - Tier 2/Group 1

System # / Name	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	K <sub>4</sub>	K <sub>5</sub>	K <sub>6</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive				X								K4.01 Rod position Indication	3.8	1
003 Reactor Coolant Pump							X					A1.06 RCP's and Pressurizer spray flow	3.1	1
004 Chemical and Volume Control									X			A3.09 Auto operation of VCT level	3.2	1
013 Engineered Safety Features Actuation								X			S	A2.05; 2.2.22 (S) Knowledge of LCO's and	4.2/4.1	2
014 Rod Position Indication											X	G2.1.12 Ability to apply T/S for a system	4.0	1
015 Nuclear Instrumentation							X					A1.04 Ability to predict or monitor QPTR	3.7	1
017 In-core Temperature Monitor										X		A4.02 Temp values used to determine RCP	4.1	1
022 Containment Cooling		X										K2.01 Power supplies to cooling fans	3.1	1
025 Ice Condenser														
026 Containment Spray								S		X		A2.07; A4.01 (S) Loss of recirc suction	3.9/4.3	2
056 Condensate	X											K1.03 physical connections Cond/MFW	2.6	1
059 Main Feedwater								X				A2.04 Feeding a Dry Generator.	3.4	1
061 Auxiliary/Emergency Feedwater											X	G2.1.27 System purpose or function	2.9	1
063 DC Electrical Distribution			X									K3.01 Loss of DC and Emer. D/G	4.1	1
068 Liquid Radwaste						X		S				K6.10; A2.04 (S) failure of Auto-isolation	2.9/3.3	2
071 Waste Gas Disposal									X			A3.03 Auto operation of Rad monitor	3.8	1
072 Area Radiation Monitoring					X							K5..01 Radiation theory-types of detectors	3.0	1
K/A Category Point Totals:	1	1	1	1	1	1	2	4	2	2	3	Group Point Total:		19

ES-401 PWR SRO Examination Outline Form ES-401-3  
Plant Systems - Tier 2/Group 2

System # / Name	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	K <sub>4</sub>	K <sub>5</sub>	K <sub>6</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant				X								K4.10 RCS Overpressure protection.	4.4	1
006 Emergency Core Cooling									X			A3.05 Monitor Auto ops of SI pumps	4.3	1
010 Pressurizer Pressure Control			X									K3.01 Effects of loss of PLC on RCS	3.9	1
011 Pressurizer Level Control														
012 Reactor Protection					X							K5.01 Knowledge of RPS and DNB	3.8	1
016 Non-nuclear Instrumentation														
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control					X							K5.02 Flammable Hydrogen Concentrations	3.9	1
029 Containment Purge				X								K4..02 Design features for Neg.Press in Cont.	3.1	1
033 Spent Fuel Pool Cooling								X				A2.03 Abnormal/Loss of SFP level	3.5	1
034 Fuel Handling Equipment										S		A4.01 Ability to operate/ monitor Rad levels	3.7	1
035 Steam Generator											S	2.2.24 Maintenance activities on LCO's	3.8	1
039 Main and Reheat Steam														
055 Condenser Air Removal														
062 AC Electrical Distribution							X					A1.01 Ability to predict monitor D/G load limit	3.8	1
064 Emergency Diesel Generator		X						S				K2.03; A2.16(S) Full load test with LOSP	3.6/3.7	2
073 Process Radiation Monitoring							X					A1.01 Ability to predict changes in rad levels	3.5	1
075 Circulating Water								X				A2.03 Ability to predict impacts of safety feat.	2.7	1
079 Station Air	X											K1.01 Knowledge of connections SA / IAS	3.1	1
086 Fire Protection						X						K6.04 Loss of fire, smoke and heat detectors	2.9	1
103 Containment								S				A2.03 Ability to predict the impact of malif.	3.8	1
K/A Category Point Totals:	1	1	1	2	2	1	2	4	1	1	1	Group Point Total:		17

ES-401 PWR SRO Examination Outline Form ES-401-3  
Plant Systems - Tier 2/Group 3

System # / Name	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	K <sub>4</sub>	K <sub>5</sub>	K <sub>6</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal				X								K4.03 RHR Hx. Bypass flow control	3.2	1
007 Pressurizer Relief/Quench Tank														
008 Component Cooling Water									X			A3.08 Auto actions from a SI	3.7	1
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator														
076 Service Water								X				A2.01 Impact of loss of Service Water	3.7	1
078 Instrument Air											X	G2.4.11 Knowledge of abnormal condition	3.6	1
K/A Category Point Totals:	0	0	0	1	0	0	0	1	1	0	1	Group Point Total:		4

Plant-Specific Priorities			
System / Topic	Recommended Replacement for...	Reason	Points
Plant-Specific Priority Total: (limit 10)			

Facility: Farley		Date of Exam: 5/8/00		Exam Level: SRO	
Category	K/A #	Topic	Imp.	Points	
Conduct of Operations	2.1.1	Knowledge of conduct of operations requirements	3.8	1	
	2.1.13	(S) Knowledge of facility requirements for controlling vital / control..	2.9	1	
	2.1.22	Ability to determine modes of operation.	3.3	1	
	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.3	1	
	2.1.34	(S) Ability to maintain primary and secondary chemistry within ...	2.9	1	
	2.1.				
	Total				
Equipment Control	2.2.3	Knowledge of the design, procedural, and operational differences between units.	3.3	1	
	2.2.6	(S) Knowledge of the process for making changes in procedures .	3.3	1	
	2.2.13	Knowledge of tagging and clearance procedures.	3.8	1	
	2.2.30	Knowledge of RO duties in the control room during fuel handling	3.3	1	
	2.2.				
	2.2.				
	Total				
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control ...	3.0	1	
	2.3.4	Knowledge of radiation exposure limits and contamination control,	3.1	1	
	2.3.10	Ability to perform procedures to reduce excessive levels of ...	3.3	1	
	2.3.				
	2.3.				
	2.3.				
	Total				
Emergency Procedures/ Plan	2.4.17	Knowledge of EOP terms and definitions.	3.8	1	
	2.4.20	(S) Knowledge of operational implications of EOP warnings...	4.0	1	
	2.4.30	(S) Knowledge of which events related to system operations/...	3.6	1	
	2.4.39	Knowledge of the RO's responsibilities in emergency plan ...	3.1	1	
	2.4.40	(S) Knowledge of the SRO's responsibilities in emergency plan..	4.0	1	
	2.4.				
	Total				
Tier 3 Point Total (RO/SRO)				17	