

## **OUTLINE FOR NRC-PROPOSED**

**PALISADES INITIAL EXAMINATION - MAY 2005**

Facility: <u>Palisades</u>		Date of Examination: <u>2005</u>		
Item	Task Description	Initials		
		a	b*	c#
1. W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	<u>Cha</u>		<u>nav</u>
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.	<u>Cha</u>		<u>nav</u>
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	<u>Cha</u>		<u>nav</u>
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	<u>Cha</u>		<u>nav</u>
2. S I M U L A T O R	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.	<u>Cha</u>		<u>nav</u>
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.	<u>Cha</u>		<u>nav</u>
	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.	<u>Cha</u>		<u>nav</u>
3. W / T	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form.	<u>Cha</u>		<u>nav</u>
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) the tasks are distributed among the topics as specified on the form (2) at least one task is new or significantly modified (3) no more than one task is repeated from the last two NRC licensing examinations	<u>Cha</u>		<u>nav</u>
	c. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.	<u>Cha</u>		<u>nav</u>
4. G E N E R A L	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.	<u>Cha</u>		<u>nav</u>
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	<u>Cha</u>		<u>nav</u>
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	<u>Cha</u>		<u>nav</u>
	d. Check for duplication and overlap among exam sections.	<u>Cha</u>		<u>nav</u>
	e. Check the entire exam for balance of coverage.	<u>Cha</u>		<u>nav</u>
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	<u>Cha</u>		<u>nav</u>
a. Author <u>NRC</u> b. Facility Reviewer (#) <u>NTA</u> <u>NICHOLAS A. VALOS / Nicholas A. Valos</u> c. NRC Chief Examiner (#) <u>BRUCE PALAGI / Bruce Palagi</u> d. NRC Supervisor <u>Michael A. Wilson / Michael A. Wilson</u>		Printed Name/Signature Date <u>4/22/05</u> <u>4/22/05</u> <u>4/22/05</u> <u>4/22/05</u>		
Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.				

Facility: Palisades  
 Examination Level (circle one): RO

Date of Examination: May 2005  
 Operating Test Number: \_\_\_\_\_

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, P, S or CL	Determine Compensation Required for a Withdrawn, Inoperable Control Rod (KA 2.1.25 Ability to obtain and Interpret Station reference material)
Equipment Control	N, S or CL	Determine the Mechanical and Electrical isolation points for tag out of HP SI Pump (K/A 2.2.13 Knowledge of tagging and clearance procedures)
Radiation Control	N, CL	Determine if Workers can perform containment entry within dose limits (K/A 2.3.1 Knowledge of 10 CFR 20 and related facility radiation control requirements)
Emergency Plan	D, S	Obtain Meteorological Data for Emergency Notification Form (K/A 2.4.4 Obtain Meteorological Data for Emergency Notification Form)

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

\* Type Codes & Criteria:

(C)ontrol room  
 (CL) Class room  
 (D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)  
 (N)ew or (M)odified from bank ( $\geq 1$ )  
 (P)revious 2 exams ( $\leq 1$ ; randomly selected)  
 (S)imulator

Facility: PalisadesDate of Examination: May 2005

Examination Level (circle one): SRO

Operating Test Number: \_\_\_\_\_

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N , CL	Determine Reportability of an Auxiliary Feedwater Pump Failure (K/A 2.1.12 Ability to apply Technical Specifications and Determine Reportability )
Conduct of Operations	N , CL	Determine Shift Staffing Requirements following an illness (K/A 2.1.5 Ability to locate and use procedures and directives related to shift staffing and activities)
Equipment Control	N , CL	Determine the Mechanical and Electrical isolation points for tag out of HP SI Pump (K/A 2.2.13 Knowledge of tagging and clearance procedures)
Radiation Control	N , CL	Determine if workers can perform containment entry within dose limits (K/A 2.3.1 Knowledge of 10 CFR 20 and related facility radiation control requirements)
Emergency Plan	N , CL	Classify a Security Event (K/A 2.4.4 Knowledge of emergency action level thresholds and classifications)

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

## \* Type Codes &amp; Criteria:

(C)ontrol room  
 (CL) Class room  
 (D)irect from bank ( $\leq 3$  for ROs;  $\leq 4$  for SROs & RO retakes)  
 (N)ew or (M)odified from bank ( $\geq 1$ )  
 (P)revious 2 exams ( $\leq 1$ ; randomly selected)  
 (S)imulator

Facility: Palisades  
 Exam Level (circle one): RO

Date of Examination: May 2005  
 Operating Test No.: \_\_\_\_\_

Control Room Systems\* (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a. Respond to a "Control Rods Out of Sequence" alarm. (001 CRDS K/A A4.14)	D, P, S	1
b. Establish the Containment Sump as the ECCS suction source following and Large Break Loss of Coolant Accident (006 ECCS K/A A4.05)	A, N, S, E	2
c. Swapping Pressurizer Pressure Control Channels (010 PZR PCS K/A A1.07)	A, N, S	3
d. Initiate Shutdown Cooling for the PCS (005RHRS K/A A4.01)	A, L, N, S	4P
e. Alignment of Containment Air Coolers (022 CCS K/A A4.01)	A, N, S	5
f. Transfer Electrical Power from Start-up to Safeguard / Station Power (062 AC Dist. Sys. K/A A4.07)	A, N, S,	6
g. Initiate Containment Purge while in Mode 5 (029 CPS K/A A1.02)	A, N, S, L	8
h. Set up Radwaste Discharge Monitor RIA-1049 for a release (068 Liquid Radwaste System K/A 4.02)	D, S	9

In-Plant Systems\* (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

i. Alignment of Fire Water to Auxiliary Feedwater Pumps P-8A & P-8B (061 AFW K/A A2.04)	D,R	4S
j. Start the M-69B Hydrogen Recombiner (028 HRPS K/A A4.01)	D, R	5
k. Isolate and Locally start Diesel Generator 1-1 (064 EDG A4.01)	D	6

@ All control room (and in-plant) systems must be different and 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	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(L)ow-Power	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

ES-301

## Control Room/In-Plant Systems Outline

Form ES-301-2

 Facility: Palisades  
 Exam Level (circle one): SRO-I

 Date of Examination: May 2005  
 Operating Test No.: \_\_\_\_\_

Control Room Systems\* (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a. Respond to a "Control Rods Out of Sequence" alarm. (001 CRDS K/A A4.14)	D, P, S	1
b. Establish the Containment Sump as the ECCS suction source following and Large Break Loss of Coolant Accident (006 ECCS K/A A4.05)	A, N, S, E	2
c. Swapping Pressurizer Pressure Control Channels (010 PZR PCS K/A A1.07)	A, N, S	3
d. Initiate Shutdown Cooling for the PCS (005RHRS K/A A4.01)	A, L, N, S	4P
e.		
f. Transfer Electrical Power from Start-up to Safeguard / Station Power (062 AC Dist. Sys. K/A A4.07)	A, N, S,	6
g. Initiate Containment Purge while in Mode 5 (029 CPS K/A A1.02)	A, N, S, L	8
h. Set up Radwaste Discharge Monitor RIA-1049 for a release (068 Liquid Radwaste System K/A 4.02)	D, S	9

In-Plant Systems\* (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

i. Alignment of Fire Water to Auxiliary Feedwater Pumps P-8A & P-8B (061 AFW K/A A2.04)	D,R	4S
j. Start the M-69B Hydrogen Recombiner (028 HRPS K/A A4.01)	D, R	5
k. Isolate and Locally start Diesel Generator 1-1 (064 EDG A4.01)	D	6

@ All control room (and in-plant) systems must be different and 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	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(L)ow-Power	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

Facility:		Date of Exam:									Operating Test No.:				
A P P L I C A N T	E V E N T  T Y P E	Scenarios												T O T A L	M I N I M U M
		1			2			3			4				
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION				
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		
RO SRO-I SRO-U	RX		2			4			1					1*	1*
	NOR		1	1		1				1				1*	1*
	I/C		4,5,9 10,11	3,6,7		2,5,7	3,4,6		2,5 6,8	3,4,5		2,4,8	1,6,7	24	4*
	MAJ		8	8		8	8		7			9,10	9,10	22	2
	TS													22	2
RO SRO-I SRO-U	RX	2	2		4				1					1*	1*
	NOR	1	1		1									1*	1*
	I/C	3,4,5,8 7,8,9,10	4,5,9 10,10		2,3,4 5,6,7				2,3,4,5 6,8,7		1,2,4,6 7,8			24	4*
	MAJ	8			8			7			9,10			22	2
	TS	3,4			2				5,3,4		4,5	4,5		22	2
RO SRO-I SRO-U	RX													1*	
	NOR													1*	
	I/C													4*	
	MAJ													2	
	TS													2	
RO SRO-I SRO-U	RX													1*	
	NOR													1*	
	I/C													4*	
	MAJ													2	
	TS													2	

Instructions:

- Circle 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 do one scenario, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position.
- 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.
- 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 requirement.

Author:

*Carl Moore*

NRC Reviewer:

*Bruce Palazzi 4/22/05*

Facility: <b>Palisades</b>		Date of Exam: <b>5/23/05</b>																
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	2	1	5				4	3				3	18	3	3	6	
	2	1	1	3	N/A			2	1	N/A			1	9	2	2	4	
	Tier Totals	3	2	8				6	4				4	27	5	5	10	
2. Plant Systems	1	2	2	3	3	3	3	3	2	3	2	2	2	28	2	3	5	
	2	1	1	1	1	0	1	1	1	1	1	1	10	1	2	3		
	Tier Totals	3	3	4	4	3	4	4	3	4	3	3	3	38	3	5	8	
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1	2	3	4	7
				3		2		3		2				2	1	2	2	
<p>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).</p> <p>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 <math>\pm 1</math> 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.</p> <p>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 that are not included on the outline should be added. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements.</p> <p>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.</p> <p>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.</p> <p>6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.</p> <p>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.</p> <p>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. Use duplicate pages for RO and SRO-only exams.</p> <p>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.</p>																		



ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)							Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1					x		Ability to determine or interpret the following as they apply to a Rx trip: Occurrence of a Rx trip (EA2.06)	4.3	1	
000008 Pressurizer Vapor Space Accident / 3						x	Ability to perform specific system and integrated plant procedures during all modes of operation (2.1.23)	3.9	1	
000009 Small Break LOCA / 3	x						Knowledge of the operational implications of the following concept as they apply to a SBLOCA: Use of steam tables (EK1.02)	3.5	1	
000011 Large Break LOCA / 3		x					Knowledge of the interrelations between the following and a LBLOCA: Pumps	2.6	1	
000015/17 RCP Malfunctions / 4			x				Knowledge of the reasons for the following responses as they apply to the RCP malfunctions (Loss of RC flow): Reduction of power to below the steady state power-to-flow limit (AK3.04)	3.1	1	
000022 Loss of Rx Coolant Makeup / 2				x			Ability to operate and/or monitor the following as they apply to the Loss of Rx Coolant Makeup: CVCS charging low flow alarm, sensor, and indication (AA1.02)	3.0	1	
000025 Loss of RHR System / 4					x		Ability to determine and interpret the following as they apply to the Loss of RHR system: Location and isolability of leaks (AA2.04)	3.3	1	
000026 Loss of Component Cooling Water / 8						x	Ability to locate and operate components, including local controls (2.1.30)	3.9	1	
000027 Pressurizer Pressure Control System Malfunction / 3	x						Knowledge of the operational implications of the following concept as it applies to Pzr Pressure Control malfunctions: Definition of saturation temperature (AK1.01)	3.1	1	
000029 ATWS / 1										
000038 Steam Gen. Tube Rupture / 3			x				Knowledge of the reasons for the following as it applies to a SGTR: Criteria for securing / throttling ECCS (EK3.09)	4.1	1	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4			x				Knowledge of the reason for the following as they apply to a Main Steam Line Rupture: Actions contained in EOP's for steam line ruptures (AK3.04)	4.5	1	
000054 (CE/E06) Loss of Main Feedwater / 4				x			Ability to operate or monitor the following as it applies to a Loss of Main Feedwater: AFW controls, including the use of alternate AFW sources (AA1.01)	4.5	1	
000055 Station Blackout / 6					x		Ability to determine or interpret the following as it applies to a Station Blackout: When a battery is approaching fully discharged (EA2.05)	3.4	1	
000056 Loss of Off-site Power / 6						x	Ability to apply Technical Specifications for a system. (2.1.12)	2.9	1	
000057 Loss of Vital AC Inst. Bus / 6				x			Ability to operate or monitor the following as it applies to a Loss of Vital AC Instrument Bus power: RWST and VCT valves (AA1.04)	3.5	1	
000058 Loss of DC Power / 6			x				Knowledge of the reasons for the following responses as it applies to a Loss of DC power: Use of DC control power by D/G's (AK3.01)	3.4	1	
000062 Loss of Nuclear Svc Water / 4			x				Knowledge of the reasons for the following responses as it applies to the Loss of Nuclear Service Water: Effect on the nuclear service water discharge flow header of a loss of CCW (AK3.04)	3.5	1	

000065 Loss of Instrument Air / 8				x			Ability to operate or monitor the following as it applies to a Loss of Instrument Air: components served by IA to minimize drain on system (AA1.02)	2.6	1
W/E04 LOCA Outside Containment / 3									
W/E11 Loss of Emergency Coolant Recirc. / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
K/A Category Totals:	2	1	5	4	3	3	Group Point Total:	18	



BW/E13&E14 EOP Rules and Enclosures										
CE/A11; W/E08 RCS Overcooling - PTS / 4										
CE/A16 Excess RCS Leakage / 2										
CE/E09 Functional Recovery										
K/A Category Point Totals:	0	1	3	2	1	1	Group Point Total:			9

PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)														Form ES-401-2	
ES-401															
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	#
003 Reactor Coolant Pump						x				x		Knowledge of the effect of a loss or malfunction on the following will have on the RCP'S: RCP seals and seal water supply (K6.02)		2.7	2
												Ability to manually operate or monitor in the control room: RCP seal leakage detection instrumentation (A4.05)		3.1	
004 Chemical and Volume Control							x				x	Ability to predict or monitor changes in parameters (to prevent exceeding design limits) associated with operating CVCS including: Tavg and Tref (A1.02)		3.4	2
												Knowledge of surveillance procedures relating to the CVCS (2.2.12)		3.0	
005 Residual Heat Removal	x							x				Knowledge of the physical connections or cause-effect relationships between the RHR system and the following: CCW system(K1.01)		3.2	2
												Ability to predict the impacts of the following malfunctions on the RHR sys, and based on those predictions, use procedures to correct, control, or mitigate the consequences of this malfunction or operation: RHR pump/motor malfunction (A2.03)		2.9	
006 Emergency Core Cooling		x							x			Knowledge of bus power supplies to the following: ESFAS operated valves (K2.04)		3.6	2
												Ability to monitor automatic operation of the ECCS including: Safety injection pumps (A3.05)		3.4	
007 Pressurizer Relief/Quench Tank			x									Knowledge of the effect that a loss or malfunction of the PRT will have on Containment (K3.01)		3.3	1
008 Component Cooling Water				x								Knowledge of CCW design features and interlocks which provide for the following: Automatic start of standby pump (K4.01)		3.1	1
010 Pressurizer Pressure Control					x							Knowledge of the operational implications of the following concepts as it applies to the PZR PCS: Determination of conditions of fluid in PZR using steam tables (K5.01)		3.5	1
012 Reactor Protection						x						Knowledge of the effects of a loss or malfunction of the following will have on the RPS: Trip setpoint calculators (K6.11)		2.9	1
013 Engineered Safety Features Actuation							x					Ability to predict or monitor changes in parameters (to prevent exceeding design limits) associated with operation of the ESFAS controls including: Containment press, temp, and humidity (A1.02)		3.9	1
022 Containment Cooling								x				Ability to a) predict the impacts of the following malfunctions or operations on the Cnmt Cooling sys; b) based on those predictions, use procedures to correct, control, or mitigate the consequences of the following malfunction or operation: Loss of service water (A2.04)		2.9	1
025 Ice Condenser															
026 Containment Spray										x		Ability to manually operate or monitor in the MCR: Cnmt Spray controls (A4.01)		4.5	1

039 Main and Reheat Steam																	x	Ability to manipulate the controls as required to operate the facility between shutdown and designate power levels (2.2.2)	4.0	1
059 Main Feedwater	x																	Knowledge of the physical connections or cause-effect relationship between the MFW sys and the following system: RCS (K1.05)	3.1	1
061 Auxiliary/Emergency Feedwater		x																Knowledge of bus power supplies to the following: AFW electric driven pumps (K2.02)	3.7	1
062 AC Electrical Distribution			x															Knowledge of the effect that a loss or malfunction of the AC distribution system will have on the following: D/G's (K3.02)	4.1	1
063 DC Electrical Distribution				x														Knowledge of DC electrical system design features or interlocks which provide for the following: Manual/Automatic transfer of control (K4.01)	2.7	1
064 Emergency Diesel Generator							x											Knowledge of the effect of a loss or malfunction of the following will have on the D/G's: Fuel oil storage tanks (K6.08)	3.2	1
073 Process Radiation Monitoring					x													Knowledge of the operational implications as they apply to concepts involving the Process Radiation Monitoring system: Radiation intensity changes with source distance (K5.02)	2.5	1
076 Service Water			x					x										Knowledge of the effect that a loss or malfunction of the service water system will have on the following: ESF loads (K3.07)  Ability to predict or monitor changes in parameters (to prevent exceeding design limits) associated with operating the service water system controls including: Rx and turbine bldg closed cooling water temps. (A1.02)	3.7  2.6	2
078 Instrument Air				x										x				Knowledge of IA system design features or interlocks which provide for the following: Systems having pneumatic valves and controls (K4.02)  Ability to monitor automatic operation of the IA system including: air pressure (A3.01)	3.4  3.1	2
103 Containment					x									x				Knowledge of Cnmt system design features or interlocks which provide for the following: Containment Isolation system (K4.06)  Ability to monitor automatic operation of the containment system including: Containment Isolation (A3.01)	3.1  3.9	2
K/A Category Point Totals:	2	2	3	3	3	3	3	2	3	2	2							Group Point Total:		28

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)											Form ES-401-2	
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	#
001 Control Rod Drive														
002 Reactor Coolant														
011 Pressurizer Level Control						X						Knowledge of the effect of a loss or malfunction on the following will have on the Pzr level control sys: Operation of Pzr level controllers (K6.04)	3.1	1
014 Rod Position Indication							X					Ability to predict or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Rod Position Indication system controls including: Axial and radial power distribution (A1.04)	3.5	1
015 Nuclear Instrumentation								X				Ability to a) predict the impact of the following malfunctions or operations on the NIS; and b) based on these predictions, use procedures to correct, control, or mitigate the consequences of malfunctions: Faulty or erratic operation of detectors or compensating components (A2.02)	3.1	1
016 Non-nuclear Instrumentation														
017 In-core Temperature Monitor									X			Ability to monitor automatic operation of the In-core temperature monitoring system including: Indications of normal, natural, and interrupted circulation of the RCS (A3.01)	3.6	1
027 Containment Iodine Removal										X		Ability to manually operate or monitor in the MCR: Cnmt Iodine Removal system fans (A4.03)	3.3	1
028 Hydrogen Recombiner and Purge Control											X	Knowledge of the H2 recombinder and Purge control systems purpose and function (2.1.27)	2.8	1
029 Containment Purge	X											Knowledge of the physical connections or cause-effect relationships between the containment purge system and the following: Cnmt radiation monitors (K1.02)	3.3	1
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment		X										Knowledge of design features or interlocks which provide for the following: Fuel movement (K4.02)	2.5	1
035 Steam Generator														
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator														
055 Condenser Air Removal														
056 Condensate														
068 Liquid Radwaste														
071 Waste Gas Disposal														
072 Area Radiation Monitoring			X									Knowledge of the effect that a loss or malfunction of the Area radiation monitoring system will have on the following: Cnmt. Vent. Isolation (K3.01)	3.2	1
075 Circulating Water				X								Knowledge of circulating water system design features and interlocks which provide for the following: Heat sink (K4.01)	2.5	1
079 Station Air														

[illegible]



Facility: <b>Palisades</b>		Date of Exam: <b>5/23/05</b>				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.22	Ability to determine Mode of Operation	2.8	1		
	2.1.25	Ability to obtain and interpret station reference material such as graphs, monographs, and tables which contain performance data	2.8	1		
	2.1.29	Knowledge of how to conduct and verify valve lineups	3.4	1		
	2.1.					
	2.1.					
	2.1.					
	Subtotal		3			
2. Equipment Control	2.2.12	Knowledge of surveillance procedures	3.6	1		
	2.2.13	Knowledge of tagging and clearance procedures	3.0	1		
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	Subtotal		2			
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized	2.5	1		
	2.3.9	Knowledge of the process for performing a containment purge	2.5	1		
	2.3.11	Ability to control radiation releases	2.7	1		
	2.3.					
	2.3.					
	2.3.					
	Subtotal		3			
4. Emergency Procedures / Plan	2.4.3	Ability to identify post-accident instrumentation	3.5	1		
	2.4.27	Knowledge of fire in the plant procedures	3.0	1		
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	Subtotal		2			
Tier 3 Point Total			10	10		7

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)							Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1										
000008 Pressurizer Vapor Space Accident / 3										
000009 Small Break LOCA / 3										
000011 Large Break LOCA / 3										
000015/17 RCP Malfunctions / 4										
000022 Loss of Rx Coolant Makeup / 2										
000025 Loss of RHR System / 4										
000026 Loss of Component Cooling Water / 8						X	Knowledge of loss of cooling water procedures	3.7	1	
000027 Pressurizer Pressure Control System Malfunction / 3										
000029 ATWS / 1					X		Ability to determine or interpret the following as it applies to a ATWS: CVCS centrifugal charging pump operating indications (EA2.04)	3.3	1	
000038 Steam Gen. Tube Rupture / 3						X	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized ( 2.3.4)	3.1	1	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					X		Ability to determine and interpret the following as it applies to a steamline rupture: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments (EA2.2)	4.2	1	
000054 (CE/E06) Loss of Main Feedwater / 4										
000055 Station Blackout / 6										
000056 Loss of Off-site Power / 6						X	Ability to determine and interpret the following as it applies to the Loss of Off-Site Power: Operational status of Emergency D/G's (AA2.14)	4.6	1	
000057 Loss of Vital AC Inst. Bus / 6										
000058 Loss of DC Power / 6										
000062 Loss of Nuclear Svc Water / 4					X		Ability to determine and interpret the following as it applies to a loss of service water: Normal values for the service water header flow rates and the flow rates to the components cooled by service water (AA2.05)	2.5	1	
000065 Loss of Instrument Air / 8										
W/E04 LOCA Outside Containment / 3										
W/E11 Loss of Emergency Coolant Recirc. / 4										
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4										
K/A Category Totals:					3	3	Group Point Total:		6	

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 ( SRO)							Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
000001 Continuous Rod Withdrawal / 1										
000003 Dropped Control Rod / 1										
000005 Inoperable/Stuck Control Rod / 1										
000024 Emergency Boration / 1										
000028 Pressurizer Level Malfunction / 2						X	Ability to determine and interpret the following as it applies to Pzr Level Control malfunctions: Charging and letdown flow capacities (AA2.09)	3.2	1	
000032 Loss of Source Range NI / 7										
000033 Loss of Intermediate Range NI / 7						X	Knowledge of the purpose and function of major system components and controls	3.3	1	
000036 (BW/A08) Fuel Handling Accident / 8										
000037 Steam Generator Tube Leak / 3										
000051 Loss of Condenser Vacuum / 4										
000059 Accidental Liquid RadWaste Rel. / 9						X	Ability to determine and interpret the following as it applies to an Accidental Liquid Radwaste Release: The occurrence of automatic safety actions as a result of high process radiation monitoring system signal (AA2.05)	3.9	1	
000060 Accidental Gaseous Radwaste Rel. / 9										
000061 ARM System Alarms / 7										
000067 Plant Fire On-site / 8										
000068 (BW/A06) Control Room Evac. / 8										
000069 (W/E14) Loss of CTMT Integrity / 5										
000074 (W/E06&E07) Inad. Core Cooling / 4										
000076 High Reactor Coolant Activity / 9										
W/E01 & E02 Rediagnosis & SI Termination / 3										
W/E13 Steam Generator Over-pressure / 4										
W/E15 Containment Flooding / 5										
W/E16 High Containment Radiation / 9										
BW/A01 Plant Runback / 1										
BW/A02&A03 Loss of NNI-X/Y / 7										
BW/A04 Turbine Trip / 4										
BW/A05 Emergency Diesel Actuation / 6										
BW/A07 Flooding / 8										
BW/E03 Inadequate Subcooling Margin / 4										
BW/E08; W/E03 LOCA Cooledown - Depress. / 4										
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4										
BW/E13&E14 EOP Rules and Enclosures										
CE/A11; W/E08 RCS Overcooling - PTS / 4						X	Ability to determine and interpret the following as it applies to RCS Overcooling: Adherence to appropriate procedures and operations within the limitations in the facility's license and amendments(AA2.2)	3.4	1	

CE/A16 Excess RCS Leakage / 2										
CE/E09 Functional Recovery										
K/A Category Point Totals:					2	2	Group Point Total:			4

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 1 ( SRO)											Form ES-401-2	
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	#
003 Reactor Coolant Pump														
004 Chemical and Volume Control														
005 Residual Heat Removal											X	Ability to apply technical specifications for a system (2.1.12)	4.0	1
006 Emergency Core Cooling														
007 Pressurizer Relief/Quench Tank														
008 Component Cooling Water														
010 Pressurizer Pressure Control								X				Ability to a) predict the impacts of the following malfunctions or operations on the Pzr Press. Control System; and b) based on those predictions, use procedures to correct, control, or mitigate the consequences of the malfunction or operation: Spray valve failure (A2.02)	3.9	1
012 Reactor Protection														
013 Engineered Safety Features Actuation														
022 Containment Cooling														
025 Ice Condenser														
026 Containment Spray														
039 Main and Reheat Steam														
059 Main Feedwater														
061 Auxiliary/Emergency Feedwater														
062 AC Electrical Distribution														
063 DC Electrical Distribution											X	Ability to recognize indications of system operating parameters which are entry-level conditions for technical specifications (2.1.33)	4.0	1
064 Emergency Diesel Generator														
073 Process Radiation Monitoring								X				Ability to a) predict the impacts of the following malfunctions or operations on the Process Radiation Monitoring System; and b) based on those predictions, use procedures to correct, control, or mitigate the consequences of the malfunction or operation: Detector Failure (A2.02)	3.2	1
076 Service Water														
078 Instrument Air														
103 Containment											X	Knowledge of the emergency plan in regards to Cnmt (2.4.29)	4.0	1
K/A Category Point Totals:								2			3	Group Point Total:		5

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 ( SRO)											Form ES-401-2	
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	#
001 Control Rod Drive														
002 Reactor Coolant														
011 Pressurizer Level Control														
014 Rod Position Indication														
015 Nuclear Instrumentation														
016 Non-nuclear Instrumentation														
017 In-core Temperature Monitor														
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control								x				Ability to a) predict the impacts of the following malfunctions or operations on the Hydrogen Recombiner & Purge control System; and b) based on those predictions, use procedures to correct, control, or mitigate the consequences of the malfunction or operation: LOCA conditions and related concerns over hydrogen (A2.02)	3.9	1
029 Containment Purge														
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment														
035 Steam Generator														
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator											x	Ability to execute procedure steps following a turbine generator trip at low power (2.1.20)	4.2	1
055 Condenser Air Removal														
056 Condensate														
068 Liquid Radwaste											x	Knowledge of SRO responsibilities for auxiliary systems that are outside the MCR (2.3.3)	2.9	1
071 Waste Gas Disposal														
072 Area Radiation Monitoring														
075 Circulating Water														
079 Station Air														
086 Fire Protection														
K/A Category Point Totals:								2			1	Group Point Total:		3

Facility: <b>Palisades</b>		Date of Exam: <b>5/23/05</b>				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.33	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications			4.0	1
	2.1.32	Ability to explain and apply all system limits and precautions			3.8	1
	2.1.					
	2.1.					
	2.1.					
	2.1.					
	Subtotal				2	
2. Equipment Control	2.2.32	Knowledge of the effects of alterations on core configuration			3.3	1
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	Subtotal				1	
3. Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements			3.0	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure			3.3	1
	2.3.					
	2.3.					
	2.3.					
	2.3.					
	Subtotal				2	
4. Emergency Procedures / Plan	2.4.6	Knowledge of symptom based EOP mitigation strategies			4.0	1
	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency director			4.0	1
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	Subtotal				2	
Tier 3 Point Total					7	7

## Appendix D

## Scenario Outline

Form ES-D-1

Facility: **PALISADES**Scenario No.: **1**Op-Test No.: **1**

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

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

Initial Conditions: **60% power. P-7B Service Water Pp. is out of service.**Turnover: **Shift orders are to alternate Component Cooling Water Pumps, and then continue a power ascension.**

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	SRO (N) RO (N)	Alternate operating CCW pps.
2	N/A	SRO (N) RO (R) BOP (N)	Power ascension.
3	RP24	SRO (I) BOP (I)	Cold Leg #1 RTD fails high.
4	CC02 CC13	SRO (C) RO (C)	CCW pp. trips; standby fails to start.
5	CC03	SRO (C) RO (C)	CCW system leak (isolable per ONP-6.2).
6	RC09A	SRO (C) RO (C)	P-50A PCP bearing high temperature. Requires manual reactor trip.
7	TC02	SRO (C) BOP (C)	Main Turbine Fails to Auto or Manually Trip.
8	MS03A	SRO (M) RO (M) BOP (M)	Main Steam Line Break Inside Containment (EOP-6.0).
9	CH05	SRO (C) RO (C)	Containment Spray Fails to Auto Actuate.
10	CH05	SRO (C) RO (C)	Containment Isolation Fails to Auto or Manual Actuate
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			



## Appendix D

## Scenario Outline

Form ES-D-1

Facility: **PALISADES**

Scenario No.: 2

Op-Test No.:   1  

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

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

Initial Conditions: 86% power. P-8B AFW Pp. is out of service.

Turnover: Shift orders are to Test Cycle Cont. Spray Valves, per SOP-4.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	SRO (N) RO (N)	Test Cycle Containment Spray Valves (SOP-4).
2	RX09	SRO (I) RO (I)	PZR Normal Level Control signal fails low.
3	N/A	SRO (T)	Report of Lube Oil Inventory Low
4	OVRD	SRO (C) BOP (C)	Turbine Bypass Valve fails open (ONP-9).
5	OVRD	SRO (C) BOP (C) RO (R)	Cooling Tower Pp. P-39A trips (ONP-14), and Rapid Downpower (due to degrading vacuum). (ONP-26).
6	FT01A/B	SRO (C) RO (C)	BOTH Main Feedwater Pps. trip, requiring Manual Reactor Trip.
7	OVRD ED12B	SRO (C) BOP (C)	Safety Bus 1D deenergizes, and D/G 1-2 fails to auto start.
8	IA17A/C	SRO (C) RO (C)	Instrument Air Compressors fail to auto start.
9	FW16A/C	SRO (M) BOP (M)	P-8A AFW Pp. trips, P-8C will not start. (EOP-7.0).

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

Facility: Palisades Scenario No.: NRC 2005-3 Op-Test No.: \_\_\_\_\_

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

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

Initial Conditions: IC-16 86% power, MOL, HPSI P-66B tagged out, PIC-0101A is OOS for calibration. Boron 820PPM, Equilibrium Xenon, ASI -0.001, Target ASI +0.012, Reg Rod group 4 at step 113, SGBD flow 20K / SG, Offgas flow 2.0 cfm

Turnover: 86% power, MOL. P-66B tagged out for impeller replacement and is scheduled to be returned in 2 days. Shift priority is to increase power to 100% at 4% per hour per GOP-5.

Event No.	Mal. No.	Event Type*	Event Description
1	N/A	RO(R) SRO(N)	Increase Rx power from 86% power
2	RX06B	RO(I) SRO(I)	PZR Press Controller output Fails Low
3	RX10A	BOP(I) SRO(I)	S/G 'A' Level Transmitter LT-701 output Fails Low.
4	SW04B	BOP(C) SRO(C)	Service Water Pump P-7B Trips (P-7C will need to be manually started to increase SW pressure)
5	RC03	RO(C) SRO(C)	PCS leak (25 gpm) (Tech Spec). Severity =25
6	OVRDs	BOP/RO (C) SRO(C)	Initiate Rx Trip per ONP-23.1. Failure of Rx to Trip from either Rx Trip pushbuttons.
7	RC04	RO(M) BOP(M) SRO(M)	Small Break LOCA (250gpm) Value = 25%

8	ED13A /B SI07A/ B	RO (C) BOP(C) SRO (C)	Failure of SIAS to automatically or manually actuate.
9	SI01A	BOP(C) SRO(C)	P-66A Trips on ground over-current when manually started (no HPSI flow available).
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

## Appendix D

## Scenario Outline

Form ES-D-1

Facility: Palisades Scenario No.: NRC 2005-4 p-Test No.: \_\_\_\_\_  
 Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_

Initial Conditions: IC-17 100% power, MOL, D/G 1-1 tagged out of service.

Turnover: 100% power, MOL, D/G 1-1 tagged out of service for a governor replacement and is scheduled to be returned in 3 days. Boron 770 ppm, ASI +0.014, S/G blowdown flow 20K per S/G, Offgas flow is 2.0 cfm.

Event No.	Malf. No.	Event Type*	Event Description
1	RX07B	RO (C) SRO(C)	Pressurizer Level Transmitter LT-0101B fails low.
2	OVRD s	BOP(I) SRO(I)	LIC-0702 output fails low in automatic. Feed Reg Valve closes and must be re-opened by taking manual control of LIC-0702.
3	CV06	RO(I) SRO(I)	PT-0202 fails low which causes letdown pressure controller PIC-0202 to close letdown control valve. This causes letdown line relief valve to open. (Tech Spec)
4		SRO	Earthquake reported by Outside AO.
5	CH06 A	BOP (C) SRO (T,C)	Determines Control Room HVAC unit tripped (Tech Spec).
6	EG04 OVRD s	BOP (C) SRO (C)	Generator Voltage Regulator failure causes Main Generator voltage to increase.
7	SG01 A	RO (C) SRO(T,C)	"A" Steam Generator tube leak starts at 10 gpm. SRO to determine PCS leakage Tech. Spec. is being exceeded and a Rx Trip is required (Tech Spec). Severity = 1.0
8	MS06B	RO(M) BOP(M) SRO(M)	"B" Steam Generator fault occurs due to a Main Steam Line Code Safety valve failing open.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (T)ech Spec			