OUTLINE SUBMITTAL

FOR THE PALISADES INITIAL EXAMINATION - JULY/AUG 2003

Outline Submittal

Contains the following:

ES-201-1	Examination Preparation Checklist
Letter	Exelon cover letter transmitting the Outline
ES-201-2	Examination Outline Quality Checklist
ES-301-1	Administrative Topics Outline (RO & SRO)
ES-301-2	Control Room Systems and Facility Walk-Through Test Outline (RO, SRO(I) & SRO(U))
ES-301-5	Transient and Event Checklist (3 RO, 6 SRO(I), & 3 SRO(U))
D-1	Dynamic Simulator Scenario Outline for 3 scenarios
ES-401-3	PWR SRO Examination Outline
ES-401-4	PWR RO Examination Outline
ES-401-5	Generic Knowledge and Abilities Outline (SRO & RO)
ES-401-10	Record of Rejected K/As (2 pages)
Document	Documentation of K/A Category Initial De-selections
Admin	There were no NRC Comments on the submitted test and examination outlines

Facility: Palisades Nuclear Power Station Date of Examination: 07/21/2003

Examinations Developed by: (Facility) / NRC (circle one)

Target Date*	Task Description / Reference	Chief Examiner's Initials
-180	1. Examination administration date confirmed (C.1.a; C.2.a & b)	drm
-120	2. NRC examiners and facility contact assigned (C.1.d; C.2.e)	drm
-120	3. Facility contact briefed on security & other requirements (C.2.c)	drm
-120	4. Corporate notification letter sent (C.2.d)	drm
[-90]	[5. Reference material due (C.1.e; C.3.c)]	n/a
-75	6. Integrated examination outline(s) due (C.1.e & f; C.3.d)	drm
-70	7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)	drm
-45	8. Proposed examinations, supporting documentation, and reference materials due (C.1.e, f, g & h; C.3.d)	drm
-30	9. Preliminary license applications due (C.1.l; C.2.g; ES-202)	drm
-14	10. Final license applications due and assignment sheet prepared (C.1.l; C.2.g; ES-202)	drm
-14	11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f)	drm
-14	12. Examinations reviewed with facility licensee (C.1.j; C.2.f & h; C.3.g)	drm
-7	13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h)	drm
-7	14. Final applications reviewed; assignment sheet updated; waiver letters sent (C.2.g, ES-204)	drm
-7	15. Proctoring/written exam administration guidelines reviewed with facility licensee and authorization granted to give written exams (if applicable) (C.3.k)	drm
-7	16. Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i)	drm

* Target dates are keyed to the examination date identified in the corporate notification letter. They are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee.

[ ] Applies only to examinations prepared by the NRC.

May 1, 2003

Mr. Dell McNeil
Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle, IL 60532-4351

PALISADES NUCLEAR PLANT
INITIAL LICENSE EXAMINATION OUTLINE

Nuclear Management Company, LLC, is submitting the initial license examination outline, for the Palisades Nuclear Plant, in accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 8, Supplement 1. The initial license examination is scheduled for July 21, 2003, through August 1, 2003. The following materials are enclosed:

- One Form ES-201-2, Examination Outline Quality Checklist
- Two Forms ES-301-1, Administrative Topics Outline (Reactor Operator (RO) and Senior Reactor Operator (SRO))
- Three Forms ES-301-2, Control Room Systems and Facility Walk-Through Test Outline (RO, SRO and Upgrade SRO)
- One Form ES-301-4, Simulator Scenario Quality Checklist
- Twelve Forms ES-301-5, Transient and Event Checklist, one for each candidate
- Three Forms ES-D-1, Simulator Scenario Outline, one for each projected scenario
- One Form ES-401-3, Pressurized Water Reactor (PWR) SRO Examination Outline, and one (1) associated Form ES-401-5, Generic Knowledge and Abilities Outline (Tier 3)
- One Form ES-401-4, PWR RO Examination Outline, and one (1) associated Form ES-401-5, Generic Knowledge and Abilities Outline (Tier 3)
- One Form ES-401-10, Record of Rejected Knowledge, Skills and Abilities (two pages)

Pursuant to NUREG-1021, these materials shall be withheld from public disclosure until after the examinations are complete.

Please contact Darrell Hensley at (269) 764-2133 if you have any questions regarding this submittal.

Douglas E. Cooper
Site Vice-President, Palisades

Enclosure

Facility: **PALISADES** Date of Examination: **July 2003**

Item	Task Description	Initials a	Initials b*	Initials c#
1. WRITTEN	a. Verify that the outline(s) fit(s) the appropriate model per ES-401.	RKH	RDS	
	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.	RKH	RDS	
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	RKH	RDS	
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	RKH	RDS	
2. SIM	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, and major transients.	RKH	RDS	
	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; ensure 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 scenarios will not be repeated over successive days.	RKH	RDS	
	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.	RKH	RDS	
3. W/T	a. Verify that: (1) the outline(s) contain(s) the required number of control room and in-plant tasks, (2) no more than 30% of the test material is repeated from the last NRC examination, (3)* no tasks are duplicated from the applicants' audit test(s), and (4) no more than 80% of any operating test is taken directly from the licensee's exam banks.	RKH	RDS	
	b. Verify that: (1) the tasks are distributed among the safety function groupings as specified in ES-301, (2) one task is conducted in a low-power or shutdown condition, (3) 40% of the tasks require the applicant to implement an alternate path procedure, (4) one in-plant task tests the applicant's response to an emergency or abnormal condition, and (5) the in-plant walk-through requires the applicant to enter the RCA.	RKH	RDS	
	c. Verify that the required administrative topics are covered, with emphasis on performance-based activities.	RKH	RDS	
	d. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on successive days.	RKH	RDS	
4. GENERAL	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam section.	RKH	RDS	
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	RKH	RDS	
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	RKH	RDS	
	d. Check for duplication and overlap among exam sections.	RKH	RDS	
	e. Check the entire exam for balance of coverage.	RKH	RDS	
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	RKH	RDS	

	Printed Name / Signature	Date
a. Author	Darrell Hensley / Darrell Hensley	4/28/03
b. Facility Reviewer (*)	Ross Snuggerud / Ross Snuggerud	4/28/03
c. NRC Chief Examiner (#)	Dell McNeil / Dell R. McNeil	6/6/03
d. NRC Supervisor	Michael E. Bielby / Michael E. Bielby for R. Lanksbury	6/9/03

Note: * Not applicable for NRC-developed examinations.
Independent NRC reviewer initial items in Column "c;" chief examiner concurrence required.

Facility: **Palisades**		Date of Examination: **July 2003**
Examination Level : **RO**		Operating Test Number: **1**
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	CONDUCT OF OPERATIONS	Perform Shutdown Margin Calculation (EM-04-08)
		Perform PCS Heatup Determination
A.2	EQUIPMENT CONTROL	Perform SHO-1 Surveillance
A.3	RADIATION CONTROL	Determine Expected Dose for Equipment Inspection
A.4	EMERGENCY PLAN	Activate ERDS

Facility: **Palisades**		Date of Examination: **July 2003**
Examination Level : **SRO**		Operating Test Number: **1**
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	CONDUCT OF OPERATIONS	Review Shutdown Margin Calculation (EM-04-08)
		Perform PCS Heatup Determination
A.2	EQUIPMENT CONTROL	Hot Work Permit Authorization
A.3	RADIATION CONTROL	Determine Expected Dose for Equipment Inspection
A.4	EMERGENCY PLAN	Classify an Event and Perform PARs

Facility: **PALISADES**	Date of Examination: **JULY 2003**
Exam Level (circle one): **RO**	Operating Test No.: **1**

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. Perform a Dropped Rod Test	DLS	1
b. Align Charging Pump Suction to SIRWT	NLS	2
c. Alternate Pressurizer Pressure Controllers	DS	3
d. Latch and Rollup the Main Turbine	NLS	4
e. Vent Reactor Head Gases	DLSA	5
f. Shift CCW Pumps	MSA	8
g. Manually Divert to Radwaste	NSA	9

B.2 Facility Walk-Through

a. Alternate Methods of Auxiliary Feedwater	DLR	4
b. Locally Start D/G 1-1	MLA	6
c. Manually Start P-41 Fire Pump	NL	8

* 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: **PALISADES**	Date of Examination: **JULY 2003**
Exam Level (circle one): **SRO**	Operating Test No.: **1**

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. Perform a Dropped Rod Test	DLS	1
b. Align Charging Pump Suction to SIRWT	NLS	2
c. Alternate Pressurizer Pressure Controllers	DS	3
d. Latch and Rollup the Main Turbine	NLS	4
e. Vent Reactor Head Gases	DLSA	5
f. Shift CCW Pumps	MSA	8
g. Manually Divert to Radwaste	NSA	9

B.2 Facility Walk-Through

a. Alternate Methods of Auxiliary Feedwater	DLR	4
b. Locally Start D/G 1-1	MLA	6
c. Manually Start P-41 Fire Pump	NL	8

* 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: **PALISADES**	Date of Examination: **JULY 2003**
Exam Level (circle one): **(U) SRO**	Operating Test No.: **1**

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. *NOT REQUIRED - SRO UPGRADE*		
b. Align Charging Pump Suction to SIRWT	NLS	2
c. *NOT REQUIRED - SRO UPGRADE*		
d. *NOT REQUIRED - SRO UPGRADE*		
e. Vent Reactor Head Gases	DLSA	5
f. *NOT REQUIRED - SRO UPGRADE*		
g. Manually Divert to Radwaste	NSA	9

B.2 Facility Walk-Through

a. Alternate Methods of Auxiliary Feedwater	DLR	4
b. *NOT REQUIRED - SRO UPGRADE*		
c. Manually Start P-41 Fire Pump	NL	8

* 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

PALISADES OPERATING TEST NO.: **Candidate: RO-1**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1	2	-		
	Normal	1	-	1		
	Instrument / Component	4	3,4,7	4,6, 7		
	Major	1	6,8	8,9		
As RO / SRO-I	Reactivity	1				
	Normal	0				
	Instrument / Component	2				
	Major	1				
As SRO	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer: Scott R. McNeil

PALISADES OPERATING TEST NO.: **Candidate: RO-2**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1	2	--		
	Normal	1	--	1		
	Instrument / Component	4	3,4,7	4,6, 7		
	Major	1	6,8	8,9		
As RO	Reactivity	1				
	Normal	0				
	Instrument / Component	2				
	Major	1				
SRO-I						
As SRO	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer: Scott R. McNeil

PALISADES OPERATING TEST NO.: **Candidate: RO-3**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1	2	--		
	Normal	1	--	1		
	Instrument / Component	4	3,4,7	4,6, 7		
	Major	1	6,8	8,9		
As RO / SRO-I	Reactivity	1				
	Normal	0				
	Instrument / Component	2				
	Major	1				
As SRO	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer: Jeff R. Mitchell

PALISADES OPERATING TEST NO.: **Candidate: SRO-1**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
As RO / SRO-I	Reactivity	1		2		
	Normal	0		--		
	Instrument / Component	2		3,5, 10		
	Major	1		8,9		
As SRO	Reactivity	0	--			
	Normal	1	1			
	Instrument / Component	2	3,4,5 7			
	Major	1	6,8			
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer: Scott R. Murphy

PALISADES OPERATING TEST NO.: **Candidate: SRO-2**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
As RO	Reactivity	1		--	2	
	Normal	0		1	--	
	Instrument / Component	2		4,6,7	3,4,9	
	Major	1		8,9	7	
SRO-I						
As SRO	Reactivity	0	--			
	Normal	1	1			
	Instrument / Component	2	3,4,5 7			
	Major	1	6,8			
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer: Jack R. Mitchell

PALISADES OPERATING TEST NO.: **Candidate: SRO-3**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
As RO	Reactivity	1		2		
	Normal	0		--		
	Instrument / Component	2		3,5 10		
	Major	1		8,9		
SRO-I						
As SRO	Reactivity	0	--			
	Normal	1	1			
	Instrument / Component	2	3,4,5 7			
	Major	1	6,8			
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer: Jeff R. McNeil

PALISADES OPERATING TEST NO.: **Candidate: SRO-4**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
As RO	Reactivity	1		2		
	Normal	0		--		
	Instrument / Component	2		3,5, 10		
	Major	1		8,9		
SRO-I						
As SRO	Reactivity	0	--			
	Normal	1	1			
	Instrument / Component	2	3,4,5, 7			
	Major	1	6,8			
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer: Scott R. Murphy

PALISADES OPERATING TEST NO.: **Candidate: SRO-5**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
SRO-I As RO	Reactivity	1	2		--	
	Normal	0	--		1	
	Instrument / Component	2	3,4,7		5,6,8	
	Major	1	6,8		7	
SRO-I As SRO	Reactivity	0		--		
	Normal	1		1		
	Instrument / Component	2		3,4, 5,6, 7,10		
	Major	1		8,9		
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley (signature)

NRC Reviewer: (signature)

PALISADES OPERATING TEST NO.: **Candidate: SRO-6**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3	4
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
As RO	Reactivity	1	--	2		
	Normal	0	1	--		
	Instrument / Component	2	3,5	3,5 10		
	Major	1	6,8	8,9		
SRO-I						
As SRO	Reactivity	0			--	
	Normal	1			1	
	Instrument / Component	2			3,4, 5,6, 8,9	
	Major	1			7	
SRO-U	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.
(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer:

PALISADES OPERATING TEST NO.: **Candidate: USRO-1**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1 BOP	2 SRO	3	4
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
As RO	Reactivity	1				
	Normal	0				
	Instrument / Component	2				
	Major	1				
SRO-I						
As SRO	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				
SRO-U	Reactivity	0	--	--		
	Normal	1	1	1		
	Instrument / Component	2	3,5	3,4,5 ,6,7, 10		
	Major	1	6,8	8,9		

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer: Mark L. McGrath

PALISADES OPERATING TEST NO.: **Candidate: USRO-2**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1 BOP	2 SRO	3	4
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
SRO-I As RO	Reactivity	1				
	Normal	0				
	Instrument / Component	2				
	Major	1				
SRO-I As SRO	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				
SRO-U	Reactivity	0	--	--		
	Normal	1	1	1		
	Instrument / Component	2	3,5	3,4,5 6,7, 10		
	Major	1	6,8	8,9		

Instructions:

(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: ______________________

NRC Reviewer: ______________________

PALISADES OPERATING TEST NO.: **Candidate: USRO-3**

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2	3 BOP	4 SRO
RO	Reactivity	1				
	Normal	1				
	Instrument / Component	4				
	Major	1				
As RO	Reactivity	1				
	Normal	0				
	Instrument / Component	2				
	Major	1				
SRO-I						
As SRO	Reactivity	0				
	Normal	1				
	Instrument / Component	2				
	Major	1				
SRO-U	Reactivity	0	--			
	Normal	1	1	1		
	Instrument / Component	2	3,5	3,4 5, 6,7 ,10		
	Major	1	6,8	8,9		

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

(3) Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: Darrell Hensley

NRC Reviewer:

Facility: **PALISADES** Scenario No.: **1** Op-Test No.: ___1____

Examiners: Operators:

Initial Conditions: Approx. 25% power, MOL, D/G 1-1 tagged out for inspection.

Turnover: Power escalation in progress. One Main Feed Pp. in service. Shift orders are to swap from Startup Power to Station Power and continue the power escalation at 6% per hour to full power.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	SRO (N) BOP (N)	Alternate from Startup to Station Power
2	NA	SRO (N) BOP (N) RO (R)	Continue power escalation
3	RP22B	SRO (I) RO (I) BOP (I)	Hot Leg #1 RTD fails low
4	SW11A	SRO (C) RO (C)	P-7A Service Water Pp. Basket Strainer high dP
5	RX15A	SRO (I) BOP (I)	Main Steam Flow Transmitter FT-0702 fail to lower than normal
6	FW10	SRO (M) BOP (M) RO (M)	Feedwater line rupture outside containment (ramp in)
7	RC17	SRO (C) RO (C)	Stuck open PZR spray valve
8	FW02	SRO (C) BOP (C) RO (C)	Condensate Storage Tank ruptures

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

Facility: **PALISADES** Scenario No.: **2** Op-Test No.: ___1____

Examiners: Operators:

Initial Conditions: Approx. 87% power, MOL; P-66B HPSI Pump tagged out. Aux. Spray CV-2117 is tagged out.

Turnover: Approx. 87% power, EOL. P-66B HPSI pump is out of service for pump alignment and should be restored to service in 3 hours. Aux. Spray CV-2117 is also inoperable due to a wiring problem with the handswitch.

Boron concentration is 333 ppm. A Power Control request to adjust reactive loading on the Main Generator has been approved and Shift Orders are to first raise VARs OUT by 30 MVARs. Then continue raising power at 4% per hour.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	SRO (N) BOP (N)	Adjust reactive loading on Main Generator
2	NA	SRO (N) RO (R) BOP (N)	Raise power
3	CV05	SRO (C) RO (C)	Loss of Letdown Pressure Control high
4	RP11D	SRO (I) BOP (I)	Power Range Safety Channel (8) Power Failure
5	RX05B	SRO (I) RO (I)	PZR Pressure Control Fail High (Channel B)
6	TU01	SRO (C) BOP (C)	Main Turbine High Vibration (requires trip)
7	OVRD ED12B	SRO (C) BOP (C)	De-energization of Bus 1D / D/G 1-2 does not AUTO start
8	MS06A	SRO (M) BOP (M) RO (M)	Steam Generator A Code Safety fail open (1)
9	SG01B	SRO (C) BOP (C) RO (C)	Steam Generator B Tube Leak / Rupture
10	SW10A SW10C	SRO (C) RO (C)	Bus 1D powered SW pumps do not sequence on.

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

Facility: **PALISADES** Scenario No.: **3** Op-Test No.: ___**1**____

Examiners: Operators:

Initial Conditions: 100% power, EOL, P-66B HPSI tagged out for bearing inspection.

Turnover: Shift orders are to commence a power reduction at 20% per hour for refueling outage.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	SRO (N) BOP (N)	Setup Main Turbine DEH controls
2	NA	SRO (N) RO (R) BOP (N)	Power reduction
3	IA04C	SRO (C) RO (C)	Plant Air Compressor C-2C trips (requires realignment)
4	CV06	SRO (I) RO (I)	Letdown pressure demand fails low
5	OVRD	SRO (C) BOP (C)	Turbine bypass valve fails partial open (isolatable)
6	RX10C	SRO (I) BOP (I)	S/G Level Transmitter LT-0703 fails high
7	RC21	SRO (M) BOP (M) RO (M)	PZR PRV fails open (~1%), then full open (100%)
8	TC02	SRO (C) BOP (C)	Main Turbine fails to auto trip
9	SI09A	SRO (C) RO (C)	P-66A HPSI fails to auto start

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

Facility: **Palisades** Date of Exam: **July 2003** 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	A2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	2	4	4				3	7			4	24
	2	5	2	1				1	4			3	16
	3	--	2	--				--	1			--	3
	Tier Totals	7	8	5				4	12			7	43
2. Plant Systems	1	6	2	2	2	2	--	2	--	1	--	2	19
	2	3	1	1	1	1	1	--	4	1	2	2	17
	3	--	--	1	--	1	1	--	--	--	--	1	4
	Tier Totals	9	3	4	3	4	2	2	4	2	2	5	40

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	17
	4	4	4	5	

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).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final exam must total 100 points.
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.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO 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.

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1						Form ES-401-3 (R8, S1)		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1				07			Operate/monitor RPI for a continuous rod withdrawal	3.1	1
000003 Dropped Control Rod / 1		05					Rod drive power supplies and logic circuits	2.8	1
000005 Inoperable/Stuck Control Rod / 1			03				Tech Spec limits for rod mismatch	4.1	1
000011 Large Break LOCA / 3					07		Determine equipment operable for critical pump water seals	3.4	1
000015/17 RCP Malfunctions / 4		10					PCP indicators and controls	2.8	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4				02			Operating behavior characteristics of the facility	3.6	1
000024 Emergency Boration / 1		01					Interrelation between emergency boration and associated valves	2.7	1
000026 Loss of Component Cooling Water / 8			02				Reason for automatic alignments resulting from ESFAS actuation	3.9	1
000029 Anticipated Transient w/o Scram / 1					08		Rod bank step counters and RPI	3.5	1
						2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	4.0	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4				01			Manual and automatic ESFAS initiation	4.6	1
CE/A11; W/E08 RCS Overcooling - PTS / 4		02					Proper operation of heat removal systems	3.4	1
000051 Loss of Condenser Vacuum / 4					02		Conditions requiring reactor and/or turbine trip	4.1	1
000055 Station Blackout / 6					06		Faults and lockouts that must be cleared prior to re-energizing buses	4.1	1
						2.4.6	Knowledge of symptom based EOP mitigation strategies	4.0	1
000057 Loss of Vital AC Elec. Inst. Bus / 6			01				EOP actions for loss of vital AC bus	4.4	1
000059 Accidental Liquid RadWaste Rel. / 9	01						Types of radiation, units, and location of sources	3.1	1
000062 Loss of Nuclear Service Water / 4			02				Automatic actions (alignments) resulting from actuation of the ESFAS	3.9	1
000067 Plant Fire On-site / 9					06		Need for pressurizing Control Room (recirculation mode)	3.6	1
000069 (W/E14) Loss of CTMT Integrity / 5	01						Effects of pressure on leak rate	3.1	1
000074 (W/E06&E07) Inad. Core Cooling / 4					04		Relationship between PCS pressure and main steam pressure	4.2	1
						2.1.30	Locate and operate components, including local controls	3.4	1
000076 High Reactor Coolant Activity / 9					02		Required actions for high fisssion product activity	3.4	1
						2.1.28	Knowledge of purpose of major system components and controls.	3.3	1
K/A Category Totals:	2	4	4	3	7	4	Group Point Total:		24

NOTE: Shaded KAs are SRO only

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2						Form ES-401-3 (R8, S1)		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1					06		Determine or interpret occurrence of a reactor trip	4.5	1
000008 Pressurizer Vapor Space Accident / 3	01						Thermodynamics and flow of open or leaking valve	3.7	1
000009 Small Break LOCA / 3	01						Natural circulation and cooling, including reflux boiling	4.7	1
000022 Loss of Reactor Coolant Makeup / 2						2.4.30	System status events which should be reported to outside agencies	3.6	1
000025 Loss of RHR System / 4				09			LPI indications during loss of RHR	3.1	1
000027 Pressurizer Pressure Control System Malfunction / 3	01						Operational implications of definition of saturation temperature	3.4	1
000032 Loss of Source Range NI / 7		01					Power supplies, including proper switch positions	3.1	1
000033 Loss of Intermediate Range NI / 7						2.2.25	Bases for Tech Spec LCOs and safety limits	3.7	1
000037 Steam Generator Tube Leak / 3			10				Automatic actions for high radioactivity in S/G sample lines	3.7	1
000038 Steam Generator Tube Rupture / 3					15		Pressure at which to maintain PCS during S/G cooldown	4.4	1
000054 (CE/E06) Loss of Main Feedwater / 4					05		Status of MFW pumps and valves	3.7	1
000058 Loss of DC Power / 6					03		Lost loads impact on ability to operate and monitor plant systems	3.9	1
000060 Accidental Gaseous Radwaste Rel. / 9	01						Types of radiation, units, and location of sources	3.1	1
000061 ARM System Alarms / 7		01					Detectors at each ARM system location	2.6	1
000065 Loss of Instrument Air / 8						2.4.6	Knowledge of symptom based EOP strategies	4.0	1
CE/E09 Functional Recovery	02						Normal, abnormal, emergency procedures associated with FRP	4.0	1
K/A Category Point Totals:	5	2	1	1	4	3	Group Point Total:		16

NOTE: Shaded KAs are SRO only

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3						Form ES-401-3 (R8, S1)		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2		03					Controllers and positioners	2.9	1
000036 (BW/A06) Fuel Handling Accident / 8					02		Determine occurrence of a fuel handling incident	4.1	1
CE/A16 Excess RCS Leakage / 2		02					Proper operation of heat removal systems	3.3	1
K/A Category Point Totals:	--	2	--	--	1	--	Group Point Total:		3

NOTE: Shaded KAs are SRO only

ES-401	PWR SRO Examination Outline Plant Systems- Tier 2/Group 1											Form ES-401-3 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive			02									Loss or malfunction effects on PCS	3.5	1
											2.1.33	Parameter indications for Tech Spec entry	4.0	1
003 Reactor Coolant Pump					05							Dependency of flow rate on number of pumps	3.0	1
004 Chemical and Volume Control	17											Cause-effects and connections with PZR	3.4	1
013 Engineered Safety Features Actuation							10					Changes in Tcold when operating ESFAS	3.7	1
014 Rod Position Indication							01					Reed switch display	3.1	1
015 Nuclear Instrumentation		01										Power supplies to NI components	3.7	1
017 In-core Temperature Monitor	01											Relation between ITM and plant computer	3.2	1
022 Containment Cooling		01										Power supplies to containment fans	3.1	1
026 Containment Spray				08								Suction swapover for recirc. after a LOC	4.3	1
056 Condensate	03											Cause-effect with MFW	2.6	1
059 Main Feedwater	04											S/G water level control system	3.4	1
061 Auxiliary/Emergency Feedwater				12								Design features providing natural circulation	3.7	1
											2.4.4	Parameters requiring EOP / AOP entry	4.3	1
063 DC Electrical Distribution			02									Effects of loss or malfunction on components	3.7	1
068 Liquid Radwaste	02											Waste gas vent header	2.6	1
071 Waste Gas Disposal					04							Flammable hydrogen/oxygen concentration	3.1	1
072 Area Radiation Monitoring	03											Fuel building isolation	3.7	1
									01			Change in ventilation alignment	3.1	1
K/A Category Point Totals:	6	2	2	2	2	--	2	--	1	--	2	Group Point Total:		19

NOTE: Shaded KAs are SRO only

ES-401	PWR SRO Examination Outline Plant Systems- Tier 2/Group 2											Form ES-401-3 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
006 Emergency Core Cooling											2.1.33	Tech Spec entry conditions	4.0	1
010 Pressurizer Pressure Control	02											Cause-effect with ESFAS	4.1	1
011 Pressurizer Level Control						03						Level and heater control malfunctions	3.3	1
012 Reactor Protection								06				Failure of RPS to trip the reactor	4.7	1
027 Containment Iodine Removal					01							Purpose of charcoal filters	3.4	1
028 Hydrogen Recombiner and Purge Ctrl								03				Excessive hydrogen in containment	4.0	1
029 Containment Purge										01		Operate/monitor containment purge flow rate	2.5	1
033 Spent Fuel Pool Cooling	05											RWST cause-effect relationship	2.8	1
034 Fuel Handling Equipment									02			Monitor automatic operation of load limits	3.1	1
035 Steam Generator								01				Impact of faulted S/G	4.6	1
055 Condenser Air Removal	06											Cause-effect with PRM	2.6	1
062 AC Electrical Distribution										01		Operate / monitor breakers (incl. switchyard)	3.1	1
064 Emergency Diesel Generator			03									Effects of malfunction on D/G manual loads	3.9	1
073 Process Radiation Monitoring											2.1.32	Explain system limits and precautions	3.8	1
075 Circulating Water		03										Power supplies to SWS pumps	2.7	1
079 Station Air								01				Cross connection with IAS	3.2	1
103 Containment				04								Personnel and emergency access hatch	3.2	1
K/A Category Point Totals:	3	1	1	1	1	1	--	4	1	2	2	Group Point Total:		17

NOTE: Shaded KAs are SRO only

ES-401	PWR SRO Examination Outline Plant Systems- Tier 2/Group 3											Form ES-401-3 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
007 Pressurizer Relief/Quench Tank					02							Method of forming steam bubble in PZR	3.4	1
008 Component Cooling Water											2.1.32	Apply system limits and precautions	3.8	1
041 Steam Dump/Turbine Bypass Control						03						Effects of controller malfunction	2.9	1
078 Instrument Air			02									Loss IAS effects on systems	3.6	1
K/A Category Point Totals:	--	--	1	--	1	1	--	--	--	--	1	Group Point Total:		4

Plant-Specific Priorities

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

Facility: **Palisades**	Date of Exam: **July 2003**		Exam Level: **SRO**
Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.19	Use plant computer to evaluate sys/comp status	3.0	1
	2.1.22	Determine Mode of Operation	3.3	1
	2.1.23	Perform system and integrated procedures	4.0	1
	2.1.29	How to conduct and verify valve lineups	3.3	1
	Total			**4**
Equipment Control	2.2.2	Manipulate controls for S/D and designated power	3.5	1
	2.2.13	Knowledge of tagging clearance procedures	3.8	1
	2.2.27	Knowledge of the refueling process	3.5	1
	2.2.34	Process for determining internal and external effects on reactivity	3.2	1
	Total			**4**
Radiation Control	2.3.1	Knowledge of 10CFR20 and related facility radiation control requirements	3.0	1
	2.3.2	Knowledge of ALARA program	2.9	1
	2.3.6	Approving release permits	3.1	1
	2.3.11	Ability to control radiation releases	3.2	1
	Total			**4**
Emergency Procedures / Plan	2.4.14	General guidelines for EOP flowchart use	3.9	1
	2.4.18	Specific bases for EOPs	3.6	1
	2.4.24	.Knowledge of loss of cooling water procedures	3.7	1
	2.4.40	SRO responsibilities in emerg. plan implement	4.0	1
	2.4.45	Prioritize and interpret each annunciator or alarm	3.6	1
	Total			**5**
Tier 3 Point Total SRO				**17**

Note: Shaded areas are SRO only.

Facility: **Palisades** Date of Exam: **July 2003** 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	2	3	4				2	3			2	16
	2	5	3	1				2	4			2	17
	3	--	2	--				--	1			--	3
	Tier Totals	7	8	5				4	8			4	36
2. Plant Systems	1	6	2	1	3	2	1	1	3	1	1	2	23
	2	3	2	3	1	2	1	1	3	--	1	3	20
	3	--	--	1	1	2	1	--	1	1	--	1	8
	Tier Totals	9	4	5	5	6	3	2	7	2	2	6	51
3. Generic Knowledge and Abilities					**Cat 1**		**Cat 2**		**Cat 3**		**Cat 4**		13
					3		4		3		3		

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).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final exam must total 100 points.
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.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO 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.

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1						Form ES-401-4 (R8, S1)		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1			03				Tech Spec limits for rod mismatch	3.6	1
000015/17 RCP Malfunctions / 4		10					PCP indicators and controls	2.8	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4				02			Operating behavior characteristics of the facility	3.1	1
000024 Emergency Boration / 1		01					Interrelation between emergency boration and associated valves	2.7	1
000026 Loss of Component Cooling Water / 8			02				Reason for automatic alignments resulting from ESFAS actuation	3.6	1
000027 Pressurizer Pressure Control System Malfunction / 3	01						Operational implications of definition of saturation temperature	3.1	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4				01			Manual and automatic ESFAS initiation	4.6	1
CE/A11; W/E08 RCS Overcooling - PTS / 4		02					Proper operation of heat removal systems	3.2	1
000051 Loss of Condenser Vacuum / 4					02		Conditions requiring reactor and/or turbine trip	3.9	1
000055 Station Blackout / 6						2.4.49	Perform immediate operations of components and controls	4.0	1
000057 Loss of Vital AC Elec. Inst. Bus / 6			01				EOP actions for loss of vital AC bus	4.1	1
000062 Loss of Nuclear Service Water / 4			02				Automatic actions (alignments) resulting from actuation of the ESFAS	3.6	1
000067 Plant Fire On-site / 9					06		Need for pressurizing Control Room	3.3	1
000069 (W/E14) Loss of CTMT Integrity / 5	01						Effects of pressure on leak rate	2.6	1
000074 (W/E06&E07) Inad. Core Cooling / 4						2.4.31	Knowledge of alarms and use of response instructions	3.3	1
000076 High Reactor Coolant Activity / 9					02		Required actions for high fission product activity	2.8	1
K/A Category Totals:	2	3	4	2	3	2	Group Point Total:		16

NOTE: Shaded indicates associated question appears only on the RO exam.

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2							Form ES-401-4 (R8, S1)	
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000001 Continuous Rod Withdrawal / 1				07			Operate/monitor RPI for a continuous rod withdrawal	3.3	1
000003 Dropped Control Rod / 1		05					Rod drive power supplies and logic circuits	2.5	1
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1					01		Determine that reactor power is decreasing from indications	4.1	1
000008 Pressurizer Vapor Space Accident / 3	01						Thermodynamics and flow of open or leaking valve	3.2	1
000009 Small Break LOCA / 3	01						Natural circulation and cooling, including reflux boiling	4.2	1
000022 Loss of Reactor Coolant Makeup / 2						2.1.27	Knowledge of system function	2.8	1
000025 Loss of RHR System / 4				09			LPI indications during loss of RHR	3.2	1
000029 Anticipated Transient w/o Scram / 1					01		Interpret reactor nuclear instrumentation	4.4	1
000032 Loss of Source Range NI / 7		01					Power supplies, including proper switch positions	2.7	1
000033 Loss of Intermediate Range NI / 7						2.4.6	Knowledge of symptom based EOP strategies	3.1	1
000037 Steam Generator Tube Leak / 3			10				Automatic actions for high radioactivity in S/G sample lines	3.3	1
000054 (CE/E06) Loss of Main Feedwater / 4					05		Status of MFW pumps and valves	3.5	1
000058 Loss of DC Power / 6					02		125V dc bus voltage, low and low low alarm	3.3	1
000059 Accidental Liquid RadWaste Rel. / 9	01						Types of radiation, units, and location of sources	2.7	1
000060 Accidental Gaseous Radwaste Rel. / 9	01						Types of radiation, units, and location of sources	2.5	1
000061 ARM System Alarms / 7		01					Detectors at each ARM system location	2.5	1
CE/E09 Functional Recovery	02						Normal, abnormal, emergency procedures associated with FRP	3.2	1
K/A Category Point Totals:	5	3	1	2	4	2	Group Point Total:		17

NOTE: Shaded indicates associated question appears only on the RO exam.

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3						Form ES-401-4 (R8, S1)		
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000028 Pressurizer Level Malfunction / 2		03					Controllers and positioners	2.6	1
000056 Loss of Off-site Power / 6					20		AFW flow indicator	3.9	1
CE/A16 Excess RCS Leakage / 2		02					Heat removal systems proper operation	3.0	1
K/A Category Point Totals:	--	2	--	--	1	--	Group Point Total:		3

NOTE: Shaded indicates associated question appears only on the RO exam.

ES-401	PWR RO Examination Outline Plant Systems - Tier 2/Group 1											Form ES-401-4 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive			02									Loss or malfunction effects on PCS	3.4	1
						03						Loss or malfunction effects on reactor trip brkrs.	3.7	1
003 Reactor Coolant Pump					05							Dependency of flow rate on number of pumps	2.8	1
								03				Effects of PCP motor problems	2.7	1
004 Chemical and Volume Control	17											Cause-effects and connections with PZR	3.4	1
								27				Impact of improper RWST boron concentration	3.5	1
013 Engineered Safety Features Actuation							10					Changes in Tcold when operating ESFAS	3.4	1
											2.1.23	Perform system procedures	3.9	1
015 Nuclear Instrumentation		01										Power supplies to NI components	3.3	1
017 In-core Temperature Monitor	01											Relation between ITM and plant computer	3.2	1
										01		Monitor actual in-core temperatures	3.8	1
022 Containment Cooling		01										Power supplies to containment fans	3.0	1
									01			Auto initiation of safeguards mode of operation	4.1	1
056 Condensate	03											Cause-effect with MFW	2.6	1
								04				Loss of condensate pumps	2.6	1
059 Main Feedwater	04											S/G water level control system	3.4	1
				19								Automatic isolation of MFW	3.2	1
061 Auxiliary/Emergency Feedwater				12								Design features providing natural circulation	3.5	1
											2.2.22	Knowledge of LCOs and safety limits	3.4	1
068 Liquid Radwaste	02											Waste gas vent header	2.5	1
071 Waste Gas Disposal					04							Flammable hydrogen/oxygen concentration	2.5	1
				06								Sampling and monitoring of Waste Gas Tanks	2.7	1
072 Area Radiation Monitoring	03											Fuel building isolation	3.6	1
K/A Category Point Totals:	6	2	1	3	2	1	1	3	1	1	2	Group Point Total:		23

NOTE: Shaded indicates associated question appears only on the RO exam.

ES-401	PWR RO Examination Outline Plant Systems- Tier 2/Group 2											Form ES-401-4 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant					10							Relationship between reactor power and delta T	3.6	1
006 Emergency Core Cooling											2.1.33	Tech Spec entry conditions	3.4	1
010 Pressurizer Pressure Control	02											Cause-effect with ESFAS	3.9	1
011 Pressurizer Level Control						03						Level and heater control malfunctions	2.9	1
012 Reactor Protection		01										Power supplies to channels and components	3.3	1
014 Rod Position Indication							01					Reed switch display	2.9	1
016 Non-nuclear Instrumentation					01							Separation of control and protection circuits	2.7	1
026 Containment Spray				08								Suction swapover for recirculation after a LOCA	4.1	1
029 Containment Purge											2.1.2	Operator responsibilities during all plant modes	3.0	1
033 Spent Fuel Pool Cooling	05											RWST cause-effect relationship	2.7	1
035 Steam Generator								01				Impact of faulted S/G	4.5	1
039 Main and Reheat Steam										04		Operate/monitor emergency feed pump turbine	3.8	1
055 Condenser Air Removal	06											Cause-effect with PRM	2.6	1
062 AC Electrical Distribution			01									Effects on major system loads	3.5	1
063 DC Electrical Distribution			02									Effects of loss or malfunction on components	3.5	1
064 Emergency Diesel Generator			03									Effects of malfunction on D/G manual loads	3.6	1
073 Process Radiation Monitoring											2.1.32	Precautions and limitations	3.4	1
075 Circulating Water		03										Power supplies to SWS pumps	2.6	1
079 Station Air								01				Cross connection with IAS	2.9	1
086 Fire Protection								01				Manual shutdown of the FPS	2.9	1
K/A Category Point Totals:	3	2	3	1	2	1	1	3	--	1	3	Group Point Total:		20

NOTE: Shaded indicates associated question appears only on the RO exam.

ES-401	PWR RO Examination Outline Plant Systems- Tier 2/Group 3										Form ES-401-4 (R8, S1)		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
007 Pressurizer Relief/Quench Tank					02							Method of forming steam bubble in PZR	3.1	1
008 Component Cooling Water											2.1.32	Apply system limits and precautions	3.4	1
027 Containment Iodine Removal					01							Purpose of charcoal filters	3.1	1
028 Hydrogen Recombiner and Purge Control								03				Excessive hydrogen in containment	3.4	1
034 Fuel Handling Equipment									02			Monitor auto operation of load limits	2.5	1
041 Steam Dump/Turbine Bypass Control						03						Effects of controller malfunction	2.7	1
078 Instrument Air			02									Loss of IAS effects on systems	3.4	1
103 Containment				04								Personnel and emergency access hatch	2.5	1
K/A Category Point Totals:	--	--	1	1	2	1	--	1	1	--	1	Group Point Total:		8

Plant-Specific Priorities

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

NOTE: *Shaded indicates associated question appears only on the RO exam.*

Facility: ***Palisades*** Date of Exam: **July 2003** Exam Level: **RO**

Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.19	Use plant computer to evaluate sys./comp. status	3.0	1
	2.1.23	Perform system and integrated procedures	3.9	1
	2.1.29	How to conduct and verify valve lineups	3.4	1
	Total			**3**
Equipment Control	2.2.2	Manipulate controls for S/D and designated power	4.0	1
	2.2.13	Knowledge of tagging and clearance procedures	3.6	1
	2.2.27	Knowledge of the refueling process	2.6	1
	2.2.34	Process for determining internal and external effects on reactivity	2.8	1
	Total			**4**
Radiation Control	2.3.1	Knowledge of 10CFR20 and related facility radiation control requirements	2.6	1
	2.3.2	Knowledge of ALARA program	2.5	1
	2.3.11	Ability to control radiation releases	2.7	1
	Total			**3**
Emergency Procedures/ Plan	2.4.14	General guidelines for EOP flowchart use	3.0	1
	2.4.24	Knowledge of loss of cooling water procedures	3.3	1
	2.4.45	Prioritze and interpret significance of each alarm	3.3	1
	Total			**3**
Tier 3 Point Total for RO				**13**

Tier / Group	Randomly Selected K/A	Reason for Rejection	
1 / 1	000029EA2.04	Palisades design does not employ centrifugal charging pps. Resampled and obtained 029EA2.08	SRO
1 / 1	000029 G2.1.14	Unbalanced sampling (excessive KAs relating to notifications). Resampled and obtained G2.1.2	SRO
1 / 1	000055 G2.4.30	Unbalanced sampling (excessive KAs relating to notifications). Resampled and obtained G2.4.6	SRO
1 /1	000067K2	Low importance ratings in K2 category. Resampled and obtained 067A2 category.	COMMON
1 / 1	000062AK3.04	Per discussion/permission from NRC examiners. KA intent unclear. Resampled and obtained 000062AK3.02	COMMON
1 / 2	000033 G2.1.4	K&A (shift staffing requirements) does not apply to APEs. Resampled and obtained G 2.2.25	SRO
1 / 2	000054A2.07	Palisades design does not employ a reactor trip first-out panel indicator. Resampled and obtained A2.05	COMMON
1 / 3	000056 A2.21	Unbalanced sampling (excessive KAs relating to loss of AC electrical power). Resampled and obtained A2.20	COMMON
2 / 1	003K5.09	Low importance rating. Resampled and obtained 003K5.05	COMMON
2 / 1	022K2.03	Low importance rating. Resampled and obtained 022K2.01.	COMMON
2 / 1	022K6	Low importance ratings in K6 category. Resampled and obtained A3.	RO
2 / 1	056K3	Low importance ratings in K3 category. Resampled and obtained K1.	COMMON
2 / 1	059 K1.08	Low importance rating. Resampled and obtained 059K1.04.	COMMON
2 / 1	059K4.04	Low importance rating. Resampled and obtained 059K4.19	RO
2 / 1	071A1.06	Unbalanced sampling (excessive KAs relating to Waste Gas, release, ventilation, etc.). Resampled and obtained K4.06	RO
2 /1	068K1.06	Low importance rating. Resampled and obtained 068K1.02	COMMON
2 / 2	011K6.10	Low importance rating. Resampled and obtained 011K6.03.	COMMON
2 / 2	016K2	Low importance rating. Resampled and obtained 016K5	RO
2 / 2	062K3.02	Unbalanced sampling (excessive KAs relating to EDGs). Resampled and obtained K3.01	RO
2 / 2	029A2.04	To ensure Tier 2 A4 totals at least 2. Resampled and obtained 029A4.01	SRO

2 / 2	033K1.06	Low importance rating. Resampled and obtained 033K1.05	COMMON
2 / 2	073A3	No K&As available. Resampled and obtained G 2.1.32	COMMON
2 / 2	075A3	Low importance ratings in A3 Category. Resampled and obtained 075K2	COMMON
2 / 2	079K5	Low importance ratings in K5 Category. Resampled and obtained 079A2	COMMON
2 / 3	027A1	No K&As available. Resampled and obtained 027K5.	COMMON
2 / 3	034K2	Low importance ratings in K2 Category. Resampled and obtained 034A3	COMMON
2 / 3	078A1	No K&As available. Resampled and obtained 078K4	COMMON
2 / 3	078K4.02	See 079A2.01 (ES-401-4, Tier 2, Group 2). It was selected first and retained as a valid KA. Therefore, the 078K4.02 is being rejected since it is essentially the same as 079A2.01. Resampled and obtained 078K4.03, but then had to reject it. See next row down for explanation.	COMMON
2 / 3	078K4.03	NO design features/interlocks for securing SAS upon loss of cooling water at Palisades. Resampled and obtained K3.02.	COMMON
2 / 3	103K5	No available K&As in category. Resampled and obtained 103K4.	COMMON
2 / 3	103K4.02	Low importance rating. Resampled and obtained 103K4.01	COMMON
2 / 3	103K4.01	Palisades design does not employ a containment vacuum breaker . Resampled and obtained K4.04	COMMON
3 / Cat. 1	G2.1.13	Low importance rating. Resampled and obtained G2.1.19	COMMON
3 / Cat. 2	G2.2.7	Low importance rating. Resampled and obtained G2.2.13	COMMON
3 / Cat. 3	G2.3.8	Low importance rating. Resampled and obtained G2.3.1	COMMON
3 / Cat. 3	G2.3.5	Low importance rating. Resampled and obtained G2.3.11	COMMON

Documentation of K/A Category Initial De-selections

E/APE # / Name	Tier	Group	BASIS for Deselection
BW/E03 Inadequate Subcooling Margin	1	1	Vendor specific to a plant design other than CE
BW/A02&A03 Loss of NNI-X/Y	1	1	Vendor specific to a plant design other than CE
BW/A01 Plant Runback	1	2	Vendor specific to a plant design other than CE
BW/A04 Turbine Trip	1	2	Vendor specific to a plant design other than CE
W/E04 LOCA Outside Containment	1	2	Vendor specific to a plant design other than CE
BW/E08; W/E03 LOCA Cooldown Depress.	1	2	Vendor specific to a plant design other than CE
W/E 11 Loss of Emergency Coolant Recirc	1	2	Vendor specific to a plant design other than CE
W/E 01 & E02 Rediagnosis & SI Termination	1	2	Vendor specific to a plant design other than CE
BW/E04, W/E 05 Inadequate Heat Transfer Loss of Secondary Heat Sink	1	2	Vendor specific to a plant design other than CE
W/E 16 High Containment Radiation	1	2	Vendor specific to a plant design other than CE
BW/E13&E14 EOP Rules and Enclosures	1	3	Vendor specific to a plant design other than CE
BW/A05 Emergency Diesel Actuation	1	3	Vendor specific to a plant design other than CE
BW/A07 Flooding	1	3	Vendor specific to a plant design other than CE
W/E 13 Steam Generator Over pressure	1	3	Vendor specific to a plant design other than CE
W/E 15 Containment Flooding	1	3	Vendor specific to a plant design other than CE
025 Ice Condenser	2	1	Palisades' plant design does not use an Ice Condenser

Note: The above K&A topic areas were actually "deselected" or "prescreened" prior to random systematic selection of K&As, per NUREG 1021, Revision 8, Supplement 1, ES-401, Attachment 1, item 1.