

**INITIAL SUBMITTAL OF THE OUTLINE**

**FOR THE PRAIRIE ISLAND INITIAL EXAMINATION**

**THE WEEKS OF SEPTEMBER 10 AND 17, 2001**

Facility: <b>PRAIRIE ISLAND</b>		Date of Examination: <b>9/10/01</b>		
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 per ES-401.	Y	S	JH
	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.	Y	S	JH
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	Y	S	JH
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	Y	S	JH
2. S I M	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.	Y	S	JH
	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.	Y	S	JH
	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.	Y	S	JH
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.	Y	S	JH
	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.	Y	S	JH
	c. Verify that the required administrative topics are covered, with emphasis on performance-based activities.	Y	S	JH
	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.	Y	S	JH
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 section.	Y	S	JH
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	Y	S	JH
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	Y	S	JH
	d. Check for duplication and overlap among exam sections.	Y	S	JH
	e. Check the entire exam for balance of coverage.	Y	S	JH
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	Y	S	JH
a. Author	JOSEPH W. LOESCH / <i>Joseph W. Loesch</i>		Date 6/19/01	
b. Facility Reviewer (*)	DOUGLAS A. SMITH / <i>Douglas A. Smith</i>		6/19/01	
c. NRC Chief Examiner (#)	JAY HOPKIN / <i>Jay Hopkin</i>		9-624	
d. NRC Supervisor	DAVID E. HILB / <i>David E. Hilb</i>		9-7-01	
Note:	* Not applicable for NRC-developed examinations. # Independent NRC reviewer initial items in Column "c;" chief examiner concurrence required.			

Facility: <b>Prairie Island</b> Examination Level (circle one) <b>RO</b> /SRO		Date of Examination: <b>9/10/01</b> Operating Test Number: <b>1</b>
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	<b>2.1.31</b> Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.	<b>JPM - Verify safeguard component alignment in the control room following SI</b>
	<b>2.1.33</b> Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	<b>JPM - Determine TS operability of equipment during performance of Surveillance Procedure</b>
A.2	<b>2.2.13</b> Knowledge of tagging and clearance procedures.	<b>JPM - Prepare an Isolation for a Leaking Heat Exchanger</b>
A.3	<b>2.3.10</b> Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure	<b>JPM - Prepare for an Emergency Containment Entry</b>
A.4	<b>2.4.27</b> Knowledge of fire in the plant procedure	<b>JPM - Determine Impact of Fire outside of the Control Room</b>

Facility: **Prairie Island**

Date of Examination: **9/10/01**

Examination Level (circle one): RO / **SRO**

Operating Test Number: **1**

	Administrative Topic/Subject Description	Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	<p><b>2.1.4</b> Knowledge of shift staffing requirements</p>	<p><i>JPM</i> - Evaluate Shift Staffing Options.</p>
	<p><b>2.1.33</b> Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications</p>	<p><i>JPM</i> - Determine operability of equipment during Surveillance Procedure Review.</p>
A.2	<p><b>2.2.18</b> Knowledge of the process for managing maintenance activities during shutdown operations.</p>	<p><i>JPM</i> - Conduct a shutdown safety assessment</p>
A.3	<p><b>2.3.6</b> Knowledge of the requirements for reviewing and approving release permits.</p>	<p><i>JPM</i> - Approve Release of Waste Liquid Tank</p>
A.4	<p><b>2.4.41, 2.4.44</b> Knowledge of: - Emergency action level thresholds and classifications. - Emergency plan protective action recommendations.</p>	<p><i>JPM</i> - Classify Event and Initiate PARs for a GE</p>

Facility: <b>Prairie Island</b> Exam Level (circle one) <b>RO</b> <b>SRO(I)</b> SRO(U)		Date of Examination: <b>9/17/01</b> Operating Test No.:
<b>B.1 Control Room Systems</b>		
System / JPM Title	Type Code*	Safety Function
a. Steam Generator / Isolate A Ruptured Steam Generator	(D),(A),(S), (P)	4 (Primary)
b. Reactor Coolant System / Contingency Actions for Loss of All AC Power with the RCS Level at One Foot Below the Reactor Vessel Flange	(N),(S),(L), (P)	2
c. Control Rod Drive System / Perform Control Rod Exercise Surveillance	(D),(S)	1
d. Emergency Core Cooling System / Transfer SI To Recirculation Mode With Failure Of One Safeguard Train	(D),(A),(S), (E),(P)	3
e. Nuclear Instrumentation System / Take Corrective Action For A Power Range NIS Failure High	(D),(S)	7
f. Instrument Air System / Respond to a Loss of Instrument Air	(N),(A),(S), (P)	8
g. Liquid Radwaste System / Perform Test of R-18 "Waste Liquid Release Monitor"	(D),(S)	9
<b>B.2 Facility Walk- Through</b>		
a. Service Water System / Perform Unit 1 Reactor Operator Actions during a Control room evacuation / fire	(D),(A),(P), (O)	4 (Secondary)
b. Containment Cooling System / Establish Containment Integrity After a CFCU Leak In Containment	(D),(R),(2), (O)	5
c. Emergency Diesel Generators / Local Shutdown and Return of D6 to Auto Standby	(N),(2)	6
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow- Power, (R)CA, Unit (2), (E)SF, (P)RAL/ER, EOP/A(O)P		

Facility: **Prairie Island** Date of Examination: **9/10/01**  
 Exam Level (circle one): RO / SRO(I) / **SRO(U)** Operating Test No.: 1

**B.1 Control Room Systems**

	System / JPM Title	Type Code*	Safety Function
b.	<del>a.</del> <i>JW</i> Residual Heat Removal / Contingency Actions for Loss of All AC Power with the RCS Level at One Foot Below the Reactor Vessel Flange	(N),(S),(L), (P)	<del>2</del> <del>4</del> (Primary) <i>JW</i>
d.	<del>b.</del> <i>JW</i> Emergency Core Cooling System / Transfer SI To Recirculation Mode With Failure Of One Safeguard Train	(D),(A),(S), (E),(P)	3 <del>2</del> <i>JW</i>
f.	<del>c.</del> <i>JW</i> Instrument Air System / Respond to a Loss of Instrument Air	(N),(A),(S), (P)	8
	d.		
	e.		
	f.		
	g.		

**B.2 Facility Walk- Through**

b.	<del>a.</del> <i>JW</i> Containment Cooling System / Establish Containment Integrity After a CFCU Leak In Containment	(D),(R),(2), (O)	5
c.	<del>b.</del> <i>JW</i> Emergency Diesel Generators / Local Shutdown and Return of D6 to Auto Standby	(N),(2)	6
	c.		

\* 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, Unit (2), (E)SF, (P)RA/LER, EOP/A(O)P



*Spare*

Facility: **Prairie Island**      Scenario No.: **2**      Op-Test No.:

Examiners:      Operators:

Initial Conditions:

- MOC, Startup in progress
- Generator on line, ready to increase power to 15% for R-M transfer
- Unit 2 at 100%

Turnover:

22 Cooling Water Pump, 13 Charging Pump, 123 Air Compressor, and Breaker 16-10 out of service. Pre-existing stable 8 GPD SG tube leak. Was shutdown for 6 days (Forced outage) after 4 months of full power operation.

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO)	Increase power to 15%
2		N (BOP)	Transfer busses from R to M transformer
3		I (RO)	Steam Generator Pressure channel fails high
4		C (ALL)	RCS to CC leak in thermal barrier heat exchanger.
5		C (BOP)	Inadvertent auto start of 11 TDAFWP leading to steam leak in Turbine building requiring isolation of steam to 11 TDAFW pump. (LCO action entry)
6		M (ALL)	Inadvertent SI requiring entry into E-0. Loss of all feedwater requiring entry into FR-H.1
7		C (RO)	MSIV's fail to auto isolate with a failure of the steam dumps open requiring manual closure of the MSIV's.

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



Facility		Prairie Island		Date of Exam: 09/10/01				Exam Level:				SRO	
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	3	4	4				4	3			6	24
	2	3	3	1				3	2			4	16
	3		2						0.5			1.4	3
	Tier Totals	6	9	5				7	5			11.8	43
2. Plant Systems	1	1	1	3	1	1	2	2	2	2	2	2	19
	2	1	1	2	2	2	1	2	2	1	1	2	17
	3			1		1			1			1	4
	Tier Totals	2	2	6	3	4	3	4	5	3	3	5	40
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					4		5		4		4		17

- Note:
1. Ensure 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.

## Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
001	Continuous Rod Withdrawal						X	2.1.11 Knowledge of less than one hour technical specification action statements for systems.	3.8	
001	Continuous Rod Withdrawal	X						AK1.11 Definitions of core quadrant power tilt	3.3	2
003	Dropped Control Rod									
005	Inoperable/Stuck Control Rod				X			AA1.01 CRDS	3.4	1
011	Large Break LOCA									
015	Reactor Coolant Pump (RCP) Malfunctions						X	2.1.32 Ability to explain and apply all system limits and precautions.	3.8	
015	Reactor Coolant Pump (RCP) Malfunctions			X				AK3.03 Sequence of events for manually tripping reactor and RCP as a result of an RCP malfunction	4.0	2
017	Reactor Coolant Pump (RCP) Malfunctions (Loss of RC Flow)									
024	Emergency Boration						X	2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
026	Loss of Component Cooling Water (CCW)					X		AA2.02 The cause of possible CCW loss	3.6	1
029	Anticipated Transient Without Scram (ATWS)						X	2.4.8 Knowledge of how the event-based emergency/abnormal operating procedures are used in conjunction with the symptom-based EOPs.	3.7	1
040	Steam Line Rupture			X				<i>AK3.03 - Knowledge of the reason for the response of the steam line non-return valves as it applies to steam line rupture</i>	3.5	1
051	Loss of Condenser Vacuum									
055	Loss of Offsite and Onsite Power (Station Blackout)						X	EA2.02 RCS core cooling through natural circulation cooling to S/G cooling	4.6	
055	Loss of Offsite and Onsite Power (Station Blackout)			X				EK3.02 Actions contained in EOP for loss of offsite and onsite power	4.6	2
057	Loss of Vital AC Electrical Instrument Bus						X	2.4.11 Knowledge of abnormal condition procedures.	3.6	1
059	Accidental Liquid Radwaste Release				X			AA1.01 Radioactive-liquid monitor	3.5	1
062	Loss of Nuclear Service Water									
067	Plant Fire on Site						X	2.4.6 Knowledge symptom based EOP mitigation strategies.	4	1
068	Control Room Evacuation			X				<del>AK3.08 Trip of the MFW and necessary Condensate pumps</del>	3.9	<i>1/2</i>
069	Loss of Containment Integrity	X						AK1.01 Effect of pressure on leak rate	3.1	
069	Loss of Containment Integrity			X				AK3.01 Guidance contained in EOP for loss of containment integrity	4.2	2
074	Inadequate Core Cooling									
076	High Reactor Coolant Activity									
E02	SI Termination		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.9	1

ES-401		PWR SRO Examination Outline							ES-401-3	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1										
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
E04	LOCA Outside Containment				X			EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	4.0	
E04	LOCA Outside Containment		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	4.0	2
E06	Degraded Core Cooling									
E07	Saturated Core Cooling		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.5	1
E08	Pressurized Thermal Shock									
E09	Natural Circulation Operations					X		EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.8	1
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS				X			EA1.3 Desired operating results during abnormal and emergency situations.	3.7	1
E12	Uncontrolled Depressurization of all Steam Generators	X						EK1.2 Normal, abnormal and emergency operating procedures associated with Uncontrolled Depressurization of all Steam Generators.	3.8	
E12	Uncontrolled Depressurization of all Steam Generators		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.9	2
E14	High Containment Pressure									
K/A Category Point Totals:		3	4	4	4	3	6	Group Point Total:		24

ES-401		PWR SRO Examination Outline						ES-401-3		
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2										
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
007	Reactor Trip									
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)									
009	Small Break LOCA				X			EA1.05 CCWS	3.4	
009	Small Break LOCA	X						EK1.02 Use of steam tables	4.2	2
022	Loss of Reactor Coolant Makeup									
025	Loss of Residual Heat Removal System (RHRS)						X	2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1
027	Pressurizer Pressure Control (PZR PCS) Malfunction		X					AK2.03 Controllers and positioners	2.8	1
032	Loss of Source Range Nuclear Instrumentation									
033	Loss of Intermediate Range Nuclear Instrumentation				X			AA1.02 Level trip bypass	3.1	
033	Loss of Intermediate Range Nuclear Instrumentation			X				AK3.02 Guidance contained in EOP for loss of intermediate-range instrumentation	3.9	
033	Loss of Intermediate Range Nuclear Instrumentation	X						AK1.01 Effects of voltage changes on performance	3.0	3
037	Steam Generator (S/G) Tube Leak						X	2.4.30 Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	1
038	Steam Generator Tube Rupture (SGTR)				X			EA1.22 RHR operating pump ammeter and indicators	2.6	1
054	Loss of Main Feedwater (MFW)	X						AK1.02 Effects of feedwater introduction on dry S/G	4.2	1
058	Loss of DC Power						X	2.2.22 Knowledge of limiting conditions for operations and safety limits.	4.1	1
060	Accidental Gaseous Radwaste Release		X					AK2.02 Auxiliary building ventilation system	3.1	1
061	Area Radiation Monitoring (ARM) System Alarms									
065	Loss of Instrument Air									
E03	LOCA Cooldown and Depressurization						X	2.1.14 Knowledge of system status criteria which require the notification of plant personnel.	3.3	
E03	LOCA Cooldown and Depressurization					X		EA2.2 Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	4.1	2
E05	Loss of Secondary Heat Sink		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.9	1
E11	Loss of Emergency Coolant Recirculation									
E16	High Containment Radiation					X		EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.3	1
K/A Category Point Totals:		3	3	1	3	2	4	Group Point Total:		16

ES-401		PWR SRO Examination Outline							ES-401-3	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3										
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
028	Pressurizer (PZR) Level Control Malfunction		X					AK2.02 Sensors and detectors	2.7	1
036	Fuel Handling Incidents					X		<del>AA2.03 Magnitude of potential radioactive release</del>	<del>4.2*</del>	<del>1</del>
056	Loss of Offsite Power						X	<i>G.2.1.32 - Ability to Explain &amp; Apply System Limits</i>	3.8	1
E13	Steam Generator Overpressure									
E15	Containment Flooding		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	2.9	1
K/A Category Point Totals:		0	2	0	0	1	1	Group Point Total:		3

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ES-401		PWR SRO Examination Outline Plant Systems - Tier 2/Group 1											ES-401-3		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
001	Control Rod Drive System	X											K1.03 CRDM	3.6	1
003	Reactor Coolant Pump System (RCPS)						X						K6.02 RCP seals and seal water supply	3.1	1
004	Chemical and Volume Control System (CVCS)			X									K3.01 CRDS (automatic)	2.9	2
004	Chemical and Volume Control System (CVCS)				X								K4.03 Protection of ion exchangers (high letdown temperature will isolate ion exchangers)	2.9	
013	Engineered Safety Features Actuation System (ESFAS)														
014	Rod Position Indication System (RPIS)											X	2.4.48 Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.	3.8	1
015	Nuclear Instrumentation System											X	2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	2
015	Nuclear Instrumentation System								X				A3.05 Recognition of audio output expected for a given plant condition	2.7*	
017	In-Core Temperature Monitor (ITM) System			X									K3.01 Natural circulation indications	3.7*	2
017	In-Core Temperature Monitor (ITM) System				X								K5.03 Indication of superheating	4.1	
022	Containment Cooling System (CCS)											X	A4.02 CCS pumps	3.1*	1
025	Ice Condenser System														
026	Containment Spray System (CSS)		X										K2.02 MOVs	2.9	2
026	Containment Spray System (CSS)								X				A2.05 Failure of chemical addition tanks to inject	4.1	
056	Condensate System														
059	Main Feedwater (MFW) System											X	A4.08 Feed regulating valve controller	2.9*	2
059	Main Feedwater (MFW) System			X									K3.02 AFW System	3.7	
061	Auxiliary / Emergency Feedwater (AFW) System							X					A1.03 Interactions when multi unit systems are cross tied	3.6*	1
063	D.C. Electrical Distribution System														
068	Liquid Radwaste System (LRS)								X				A2.02 Lack of tank recirculation prior to release	2.8*	2
068	Liquid Radwaste System (LRS)						X						K6.10 Radiation monitors	2.9	
071	Waste Gas Disposal System (WGDS)							X					A1.06 Ventilation system	2.8	

ES-401		PWR SRO Examination Outline Plant Systems - Tier 2/Group 1											ES-401-3		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
071	Waste Gas Disposal System (WGDS)									X			A3.02 Pressure-regulating system for waste gas vent header	2.8	2
072	Area Radiation Monitoring (ARM) System														
K/A Category Point Totals:		1	1	3	1	1	2	2	2	2	2	2	Group Point Total:		19

ES-401		PWR SRO Examination Outline Plant Systems - Tier 2/Group 2											ES-401-3		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
002	Reactor Coolant System (RCS)														
006	Emergency Core Cooling System (ECCS)							X					A1.12 RHR heatup limits	3.4	
006	Emergency Core Cooling System (ECCS)			X									K3.03 Containment	4.4	2
010	Pressurizer Pressure Control System (PZR PCS)						X						K6.01 Pressure detection systems	3.1	1
011	Pressurizer Level Control System (PZR LCS)	X											K1.04 RPS	3.9	1
012	Reactor Protection System								X				A2.07 Loss of dc control power	3.7	
012	Reactor Protection System									X			A3.02 Bistables	3.6	2
016	Non-Nuclear Instrumentation System (NNIS)			X									K3.08 PZR PCS	3.7*	
016	Non-Nuclear Instrumentation System (NNIS)					X							K5.01 Separation of control and protection circuits	2.8*	2
027	Containment Iodine Removal System (CIRS)		X										K2.01 Fans	3.4*	1
028	Hydrogen Recombiner and Purge Control System (HRPS)										X		A4.01 HRPS controls	4.0*	
028	Hydrogen Recombiner and Purge Control System (HRPS)								X				A2.03 The hydrogen air concentration in excess of limit flame propagation or detonation with resulting equipment damage in containment	4.0	2
029	Containment Purge System (CPS)														
033	Spent Fuel Pool Cooling System (SFPCS)											X	2.1.32 Ability to explain and apply all system limits and precautions.	3.8	
033	Spent Fuel Pool Cooling System (SFPCS)							X					A1.01 Spent fuel pool water level	3.3	2
034	Fuel Handling Equipment System (FHES)														
035	Steam Generator System (S/GS)					X							K5.01 Effect of secondary parameters, pressure, and temperature on reactivity	3.9	1
039	Main and Reheat Steam System (MRSS)											X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm.	3.6	1
055	Condenser Air Removal System (CARS)														
062	A.C. Electrical Distribution System				X								K4.02 Circuit breaker automatic trips	2.7	1
064	Emergency Diesel Generator (ED/G) System				X								K4.04 Overload ratings	3.7	1
073	Process Radiation Monitoring (PRM) System														
075	Circulating Water System														
079	Station Air System (SAS)														
086	Fire Protection System (FPS)														
103	Containment System														
K/A Category Point Totals:		1	1	2	2	2	1	2	2	1	1	2	Group Point Total:		17

ES-401		PWR SRO Examination Outline Plant Systems - Tier 2/Group 3											ES-401-3		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
005	Residual Heat Removal System (RHRS)														
007	Pressurizer Relief Tank/Quench Tank System (PRTS)														
008	Component Cooling Water System (CCWS)			X									K3.03 RCP	4.2	1
041	Steam Dump System (SDS) and Turbine Bypass Control											X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm.	3.6	
041	Steam Dump System (SDS) and Turbine Bypass Control					X							K5.02 Use of steam tables for saturation temperature and pressure	2.8	2
045	Main Turbine Generator (MT/G) System								X				A2.08 Steam dumps are not cycling properly at low load, or stick open at higher load (isolate and use atmospheric reliefs when necessary)	3.1*	1
076	Service Water System (SWS)														
078	Instrument Air System (IAS)														
K/A Category Point Totals:		0	0	1	0	1	0	0	1	0	0	1	Group Point Total:		4
Plant-Specific Priorities															
System / Topic				Recommended Replacement for ...				Reason				Pts			
Plant Specific Priority Total: (limit 10)															

Facility	Date:	Exam Level:	SRO
Prairie Island	September 10, 2001		
Category	KA #	KA Topic	Imp. Points
Conduct of Operations	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4 1
	2.1.13	Knowledge of facility requirements for controlling vital / controlled access.	2.9 1
	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	3.0 1
	2.1.30	Ability to locate and operate components, including local controls.	3.4 1
Total			4
Equipment Control	2.2.4	(multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.	3.0* 1
	2.2.8	Knowledge of the process for determining if the proposed change, test, or experiment involves an unreviewed safety question.	3.3 1
	2.2.12	Knowledge of surveillance procedures.	3.4 1
	2.2.24	Ability to analyze the affect of maintenance activities on LCO status.	3.8 1
	2.2.28	Knowledge of new and spent fuel movement procedures.	3.5 1
Total			5
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0 1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1 1
	2.3.9	Knowledge of the process for performing a containment purge.	3.4 1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3 1
Total			4
Emergency Procedures and Plan	2.4.10	Knowledge of annunciator response procedures.	3.1 1
	2.4.14	Knowledge of general guidelines for EOP flowchart use.	3.9 1
	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	4.0 1
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0 1
Total			4
Tier 3 Target Point Total (SRO)			17

Facility		Prairie Island		Date of Exam: 09/10/01				Exam Level: RO					
Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	2	3	4				3	1			3	16
	2	4	4 <sup>5</sup>	1				5	1			2 <sup>1</sup>	17
	3		1	1				1					3
	Tier Totals	6	9 <sup>5</sup>	6				9	2			4 <sup>5</sup>	36
2. Plant Systems	1	1	3	3	1	1	2	2	2	2	4	2	23
	2	1	2	2	3	2	2	2	2	2	1	1	20
	3		1	1		1			2	1	2		8
	Tier Totals	2	6	6	4	4	4	4	6	5	7	3	51
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					3		3		4		3		13
<p>Note: 1. Ensure at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. 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.</p> <p>3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.</p> <p>4. Systems/evolutions within each group are identified on the associated outline.</p> <p>5. The shaded areas are not applicable to the category/tier.</p> <p>6.* The generic K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.</p> <p>7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.</p>													

ES-401		PWR RO Examination Outline							ES-401-4		
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1											
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.	
005	Inoperable/Stuck Control Rod				X			AA1.01 CRDS	3.6	1	
015	Reactor Coolant Pump (RCP) Malfunctions			X				AK3.03 Sequence of events for manually tripping reactor and RCP as a result of an RCP malfunction	3.7	1	
017	Reactor Coolant Pump (RCP) Malfunctions (Loss of RC Flow)										
024	Emergency Boration						X	2.4.4 Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.0	1	
026	Loss of Component Cooling Water (CCW)										
027	Pressurizer Pressure Control (PZR PCS) Malfunction		X					AK2.03 Controllers and positioners	2.6	1	
040	Steam Line Rupture			X				AK3.03 - Knowledge of Reasons for the response of the steam line non-return valves as it applies to a Steam line Rupture.	3.2	1	
051	Loss of Condenser Vacuum										
055	Loss of Offsite and Onsite Power (Station Blackout)					X		EA2.01 Existing valve positioning on a loss of instrument air system	3.4		
055	Loss of Offsite and Onsite Power (Station Blackout)			X				EK3.02 Actions contained in EOP for loss of offsite and onsite power	4.3	2	
057	Loss of Vital AC Electrical Instrument Bus										
062	Loss of Nuclear Service Water										
067	Plant Fire on Site						X	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	1	
068	Control Room Evacuation			X				AK3.08 Trip of the MFW and necessary Condensate pumps. <i>per 3.2</i>	2.4	1	
069	Loss of Containment Integrity			X				AK3.01 Guidance contained in EOP for loss of containment integrity	3.8*		
069	Loss of Containment Integrity	X						AK1.01 Effect of pressure on leak rate	2.6	2	
074	Inadequate Core Cooling										
076	High Reactor Coolant Activity										
E06	Degraded Core Cooling										
E07	Saturated Core Cooling		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.2		
E07	Saturated Core Cooling						X	2.4.21 Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control; 2. Core cooling and heat removal; 3. Reactor coolant system integrity; 4. Containment conditions; 5. Radioactivity release control	3.7	2	
E08	Pressurized Thermal Shock										

ES-401		PWR RO Examination Outline							ES-401-4	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1										
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
E09	Natural Circulation Operations				X			EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.5	1
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS				X			EA1.3 Desired operating results during abnormal and emergency situations.	3.4	1
E12	Uncontrolled Depressurization of all Steam Generators		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.6	
E12	Uncontrolled Depressurization of all Steam Generators	X						EK1.2 Normal, abnormal and emergency operating procedures associated with Uncontrolled Depressurization of all Steam Generators.	3.5	2
E14	High Containment Pressure									
K/A Category Point Totals:		2	3	4	3	1	3	Group Point Total:		16

ES-401		PWR RO Examination Outline							ES-401-4	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2										
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
001	Continuous Rod Withdrawal	X						AK1.11 Definitions of core quadrant power tilt	2.8	1
003	Dropped Control Rod									
007	Reactor Trip									
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)		X					<del>2.4.8 Knowledge of how the event-based emergency/abnormal operating procedures are used in conjunction with the symptom-based EOPs.</del> AK2.01 - Relationship between PZR Vapor space accident & valve	2.7 2.0	1
009	Small Break LOCA				X			EA1.05 CCWS	3.4*	
009	Small Break LOCA	X						EK1.02 Use of steam tables	3.5	2
011	Large Break LOCA									
022	Loss of Reactor Coolant Makeup									
025	Loss of Residual Heat Removal System (RHRS)									
029	Anticipated Transient Without Scram (ATWS)									
032	Loss of Source Range Nuclear Instrumentation									
033	Loss of Intermediate Range Nuclear Instrumentation				X			AA1.02 Level trip bypass	3	
033	Loss of Intermediate Range Nuclear Instrumentation	X						AK1.01 Effects of voltage changes on performance	2.7	
033	Loss of Intermediate Range Nuclear Instrumentation			X				AK3.02 Guidance contained in EOP for loss of intermediate-range instrumentation	3.6	3
037	Steam Generator (S/G) Tube Leak									
038	Steam Generator Tube Rupture (SGTR)				X			EA1.22 RHR operating pump ammeter and indicators	2.7*	
038	Steam Generator Tube Rupture (SGTR)						X	2.4.13 Knowledge of crew roles and responsibilities during EOP flowchart use.	3.3	2
054	Loss of Main Feedwater (MFW)	X						AK1.02 Effects of feedwater introduction on dry S/G	3.6	1
058	Loss of DC Power									
059	Accidental Liquid Radwaste Release				X			AA1.01 Radioactive-liquid monitor	3.5	1
060	Accidental Gaseous Radwaste Release		X					AK2.02 Auxiliary building ventilation system	2.7	1
061	Area Radiation Monitoring (ARM) System Alarms									
E02	SI Termination		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.4	1
E03	LOCA Cooldown and Depressurization									

ES-401		PWR RO Examination Outline							ES-401-4	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2										
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
E04	LOCA Outside Containment				X			EA1.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	4.0	
E04	LOCA Outside Containment		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.8	2
E05	Loss of Secondary Heat Sink		X					EK2.1 Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.7	1
E11	Loss of Emergency Coolant Recirculation									
E16	High Containment Radiation					X		EA2.1 Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	2.9	1
K/A Category Point Totals:		4	<del>4</del>	1	5	1	<del>2</del>	Group Point Total:		17

*5*  
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ES-401		PWR RO Examination Outline						ES-401-4		
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3										
Number#	Name	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts.
028	Pressurizer (PZR) Level Control Malfunction			X				AK3.02 Relationships between PZR pressure increase and reactor makeup/letdown imbalance	2.9	1
036	Fuel Handling Incidents									
056	Loss of Offsite Power				X			AA1.02 ESF bus synchronization select switch to close bus tie breakers	4.0*	1
065	Loss of Instrument Air									
E13	Steam Generator Overpressure									
E15	Containment Flooding		X					EK2.2 Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	2.7	1
K/A Category Point Totals:		0	1	1	1	0	0	Group Point Total:		3

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 1											ES-401-4		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
001	Control Rod Drive System											X	2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	2.5	
001	Control Rod Drive System	X											K1.03 CRDM	3.4	2
003	Reactor Coolant Pump System (RCPS)		X										K2.02 CCW pumps	2.5*	
003	Reactor Coolant Pump System (RCPS)						X						K6.02 RCP seals and seal water supply	2.7	2
004	Chemical and Volume Control System (CVCS)			X									K3.01 CRDS (automatic)	2.5*	
004	Chemical and Volume Control System (CVCS)				X								K4.03 Protection of ion exchangers (high letdown temperature will isolate ion exchangers)	2.8	2
013	Engineered Safety Features Actuation System (ESFAS)										X		A4.03 ESFAS initiation	4.5	
013	Engineered Safety Features Actuation System (ESFAS)		X										K2.01 ESFAS/safeguards equipment control	3.6*	2
015	Nuclear Instrumentation System									X			A3.05 Recognition of audio output expected for a given plant condition	2.6	
015	Nuclear Instrumentation System		X										K2.01 NIS channels, components, and interconnections	3.3	2
017	In-Core Temperature Monitor (ITM) System					X							K5.03 Indication of superheating	3.7	
017	In-Core Temperature Monitor (ITM) System			X									K3.01 Natural circulation indications	3.5*	2
022	Containment Cooling System (CCS)										X		A4.02 CCS pumps	3.2*	
022	Containment Cooling System (CCS)							X					A2.03 Fan motor thermal overload/high-speed operation	2.6	2
025	Ice Condenser System														
056	Condensate System											X	2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3	1
059	Main Feedwater (MFW) System										X		A4.08 Feed regulating valve controller	3.0*	
059	Main Feedwater (MFW) System			X									K3.02 AFW System	3.6	2
061	Auxiliary / Emergency Feedwater (AFW) System							X					A1.03 Interactions when multi unit systems are cross tied	3.1*	1
068	Liquid Radwaste System (LRS)								X				A2.02 Lack of tank recirculation prior to release	2.7*	
068	Liquid Radwaste System (LRS)						X						K6.10 Radiation monitors	2.5	2

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 1											ES-401-4		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
071	Waste Gas Disposal System (WGDS)							X					A1.06 Ventilation system	2.5	
071	Waste Gas Disposal System (WGDS)									X			A3.02 Pressure-regulating system for waste gas vent header	2.8	2
072	Area Radiation Monitoring (ARM) System										X		A4.02 Major components	2.5*	1
K/A Category Point Totals:		1	3	3	1	1	2	2	2	2	4	2	Group Point Total:	23	

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 2											ES-401-4		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
002	Reactor Coolant System (RCS)														
006	Emergency Core Cooling System (ECCS)							X					A1.12 RHR heatup limits	2.9	
006	Emergency Core Cooling System (ECCS)			X									K3.03 Containment	4.2	2
010	Pressurizer Pressure Control System (PZR PCS)						X						K6.01 Pressure detection systems	2.7	1
011	Pressurizer Level Control System (PZR LCS)	X											K1.04 RPS	3.8	1
012	Reactor Protection System								X				A2.07 Loss of dc control power	3.2*	
012	Reactor Protection System									X			A3.02 Bistables	3.6	2
014	Rod Position Indication System (RPIS)														
016	Non-Nuclear Instrumentation System (NNIS)			X									K3.08 PZR PCS	3.5*	
016	Non-Nuclear Instrumentation System (NNIS)					X							K5.01 Separation of control and protection circuits	2.7*	2
026	Containment Spray System (CSS)								X				A2.05 Failure of chemical addition tanks to inject	3.7	
026	Containment Spray System (CSS)		X										K2.02 MOVs	2.7*	2
029	Containment Purge System (CPS)														
033	Spent Fuel Pool Cooling System (SFPCS)							X					A1.01 Spent fuel pool water level	2.7	1
035	Steam Generator System (S/GS)					X							K5.01 Effect of secondary parameters, pressure, and temperature on reactivity	3.4	
035	Steam Generator System (S/GS)										X		A4.01 Shift of S/G controls between manual and automatic control, by bumpless transfer	3.7	2
039	Main and Reheat Steam System (MRSS)									X			A3.02 Isolation of the MRSS	3.1	1
055	Condenser Air Removal System (CARs)														
062	A.C. Electrical Distribution System				X								K4.02 Circuit breaker automatic trips	2.5	1
063	D.C. Electrical Distribution System														
064	Emergency Diesel Generator (ED/G) System				X								K4.04 Overload ratings	3.1	
064	Emergency Diesel Generator (ED/G) System		X										K2.02 Fuel oil pumps	2.8*	2
073	Process Radiation Monitoring (PRM) System														
075	Circulating Water System														

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 2											ES-401-4		
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.
079	Station Air System (SAS)											X	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	
079	Station Air System (SAS)				X								K4.01 Cross-connect with IAS	2.9	2
086	Fire Protection System (FPS)						X						K6.04 Fire, smoke, and heat detectors	2.6	1
K/A Category Point Totals:		1	2	2	3	2	2	2	2	2	1	1	Group Point Total:		20

ES-401		PWR RO Examination Outline Plant Systems - Tier 2/Group 3													ES-401-4	
Number#	Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts.	
005	Residual Heat Removal System (RHRS)											X	A4.01 Controls and indication for RHR pumps	3.6*	1	
007	Pressurizer Relief Tank/Quench Tank System (PRTS)															
008	Component Cooling Water System (CCWS)			X									K3.03 RCP	4.1	1	
027	Containment Iodine Removal System (CIRS)	X											K2.01 Fans	3.1*	1	
028	Hydrogen Recombiner and Purge Control System (HRPS)											X	A4.01 HRPS controls	4.0*		
028	Hydrogen Recombiner and Purge Control System (HRPS)								X				A2.03 The hydrogen air concentration in excess of limit flame propagation or detonation with resulting equipment damage in containment	3.4	2	
034	Fuel Handling Equipment System (FHES)															
041	Steam Dump System (SDS) and Turbine Bypass Control					X							K5.02 Use of steam tables for saturation temperature and pressure	2.5	1	
045	Main Turbine Generator (MT/G) System								X				A2.08 Steam dumps are not cycling properly at low load, or stick open at higher load (isolate and use atmospheric reliefs when necessary)	2.8	1	
076	Service Water System (SWS)									X			A3.02 Emergency heat loads	3.7	1	
078	Instrument Air System (IAS)															
103	Containment System															
K/A Category Point Totals:		0	1	1	0	1	0	0	2	1	2	0	Group Point Total:	8		
Plant-Specific Priorities																
System / Topic		Recommended Replacement for ...											Reason	Pts		
Plant Specific Priority Total: (limit 10)																

Facility	Date: September 10, 2001		Exam Level:	RO
Category	KA #	KA Topic	Imp.	Points
Conduct of Operations	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.4	1
	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	2.9	1
	2.1.30	Ability to locate and operate components, including local controls.	3.9	1
Total				3
Equipment Control	2.2.4	(multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.	2.8	1
	2.2.12	Knowledge of surveillance procedures.	3.0	1
	2.2.24	Ability to analyze the affect of maintenance activities on LCO status.	2.6	1
Total				3
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6	1
	2.3.2	Knowledge of facility ALARA program.	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
Total				4
Emergency Procedures and Plan	2.4.10	Knowledge of annunciator response procedures.	3.0	1
	2.4.14	Knowledge of general guidelines for EOP flowchart use.	3.0	1
	2.4.49	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
Total				3
Tier 3 Target Point Total (RO)				13