2010 PRAIRIE ISLAND NUCLEAR GENERATING PLANT

INITIAL EXAMINATION

OUTLINE SUBMITTAL

ENCLOSURE WITHHELD FROM PUBLIC DISCLOSURE IN ACCORDANCE WITH NUREG-1021 UNTIL AFTER THE EXAMINATION IS COMPLETE.

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DEC 0 7 2009

L-PI-09-126
NUREG-1021

Regional Administrator, Region III
U S Nuclear Regulatory Commission
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
License Nos. DPR-42 and DPR-60

Prairie Island Nuclear Generating Plant (PINGP) Initial Operator Licensing Examination Outlines

Reference: 1. Nuclear Regulatory Commission (NRC) letter to Mr. Mark A. Schimmel, "Prairie Island Nuclear Generating Plant, Units 1 and 2, Confirmation of Initial License Examination," dated November 5, 2009, Accession Number ML093170483.

In response to Reference 1, Northern States Power Company, a Minnesota Corporation (NSPM), submits the integrated examination outlines for the initial operator licensing examinations to be administered at PINGP the weeks of March 15 and 22, 2010. This information is provided in accordance with guideline ES-201 of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1.

NUREG-1021 physical security requirements state that the enclosed examination materials shall be withheld from public disclosure until after the examination is complete.

1717 Wakonade Drive East • Welch, Minnesota 55089-9642
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Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

Mark A. Schimmel
Site Vice President, Prairie Island Nuclear Generating Plant Units 1 and 2
Northern States Power Company - Minnesota

Enclosure

cc: Charles Zoia, US NRC Region III, with enclosure
Hironori Peterson, US NRC Region III, without enclosure

ENCLOSURE WITHHELD FROM PUBLIC DISCLOSURE IN ACCORDANCE WITH NUREG-1021 UNTIL AFTER THE EXAMINATION IS COMPLETE.

ENCLOSURE 1

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Initial Operator Licensing Examination Outlines

Form Number	Title or Description	Number of Pages
ES-201-2	Examination Outline Quality Checklist	1
ES-201-3	Examination Security Agreement	4
ES-301-1	Administrative Topics Outline – Reactor Operator (RO)	2
ES-301-1	Administrative Topics Outline – Senior Reactor Operator (SRO)	2
ES-301-2	Control Room/In-Plant Systems Outline – RO	2
ES-301-2	Control Room/In-Plant Systems Outline – SRO-U	2
ES-301-2	Control Room/In-Plant Systems Outline – SRO-I	2
ES-301-5	Transient and Event Checklists	3
ES-D-1	Scenario Outline	10
ES-401-2	PWR Examination Outline (RO)	7
ES-401-2	PWR Examination Outline (SRO)	5
ES-401-3	Generic Knowledge and Abilities Outline (Tier 3) (RO)	1
ES-401-3	Generic Knowledge and Abilities Outline (Tier 3) (SRO)	1
ES-401-4	Record of Rejected K/As	1
N/A	2010 ILT Exam Random Selection Methodology	2

45 pages follow

Facility: Prairie Island Date of Examination: 3/15/2010

Item	Task Description	Initials a	Initials b*	Initials c#
1. WRITTEN	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	MP	JK	cm
	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.	MP	JK	cm
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	MP	JK	cm
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	MP	JK	cm
2. SIMULATOR	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.	MP	JK	cm
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.	MP	JK	cm
	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.	MP	JK	cm
3. W/T	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form.	MP	JK	cm
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) the tasks are distributed among the topics as specified on the form (2) at least one task is new or significantly modified (3) no more than one task is repeated from the last two NRC licensing examinations	MP	JK	cm
	c. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.	MP	JK	cm
4. GENERAL	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.	MP	JK	cm
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	MP	JK	cm
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	MP	JK	cm
	d. Check for duplication and overlap among exam sections.	MP	JK	cm
	e. Check the entire exam for balance of coverage.	MP	JK	cm
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	MP	JK	cm

	Printed Name/Signature	Date
a. Author	MICHAEL PETERSEN	12/1/9
b. Facility Reviewer (*)	JOHN KEMPKES	12/3/09
c. NRC Chief Examiner (#)	Michael Bielby / Michael E Bielby for Acting for H. Peterson	12/17/09
d. NRC Supervisor	Charles Zoia /	12/18/09

Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.
* Not applicable for NRC-prepared examination outlines

ES-301 **Administrative Topics Outline** **Form ES-301-1** R.0

Facility: Prairie Island		Date of Examination: March 2010
Examination Level: RO X SRO ☐		Operating Test Number:
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	P, D, R	Admin 43, Determine the time to boil during reduced inventory (2.1.25 3.9/4.2)
Conduct of Operations	D, R	Admin 48, RCS/Steam Generator temperature verification. (2.1.20 4.6/4.6)
Equipment Control	N, R	Admin 61, Approve isolation for "A" CC Pump (2.2.13 4.1/4.3)
Radiation Control	N, R	Admin 62, Verification of RWP limits (2.3.7 3.5/3.6)
Emergency Procedures/Plan		N/A

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

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

R. 3

RO Admin JPM Summary

A1a - Bank JPM – This JPM is to determine if the personnel airlock can be open with the given plant conditions. This JPM was used on the 2007 NRC Exam.

A1b - Bank JPM – This JPM is to determine if plant conditions support starting the first RCP by verifying RCS and S/G temperature difference.

A2 - New JPM – This is a new JPM to approve the isolation of "A" CCW pump for maintenance.

A3 - New JPM – This is a new JPM to verify if work can be performed with a given RWP.

A4 - Not required

R.o

Form ES-301-1

Facility: __Prairie Island_____	Date of Examination: _March 2010__
Examination Level: RO SRO X	Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	P, D, R	Admin 43, Determine the time to boil during reduced inventory (2.1.25 3.9/4.2)
Conduct of Operations	D, R	Admin 48, RCS/Steam Generator temperature verification. (2.1.20 4.6/4.6)
Equipment Control	N, R	Admin 61, Approve isolation for "A" CC Pump (2.2.13 4.1/4.3)
Radiation Control	N, R	Admin 62, Verification of RWP limits (2.3.7 3.5/3.6)
Emergency Procedures/Plan	N, R	Admin 47, Perform Interim Emergency Director Actions (2.4.41 4.6)

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

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

R.0

SRO Admin JPM Summary

A1a - Bank JPM – This JPM is to determine if the personnel airlock can be open with the given plant conditions. This JPM was used on the 2007 NRC Exam.

A1b - Bank JPM – This JPM is to determine if plant conditions support starting the first RCP by verifying RCS and S/G temperature difference.

A2 - New JPM – This is a new JPM to approve the isolation of "A" CCW pump for maintenance.

A3 - New JPM – This is a new JPM to verify if work can be performed with a given RWP.

A4 - New JPM – This is a new JPM to perform the Interim Emergency Director actions during a plant event

R.0

ES-301 **Control Room/In-Plant Systems Outline** **Form ES-301-2**

Facility: Prairie Island Date of Examination: March 2010

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

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. FL-10SF-3, Lineup RWST to charging during ATWS	A, P, D, S	1
b. EO-31SF-1, Perform Attachment L: Containment Isolation Actuation Failure	A, D, S	2
c. PS-3, Respond to a Pressurizer Level Channel Failing Low	D, S	3
d. AF-8S, Restore AFW Flow After AFW Pump trip on Low Pressure	D, S	4S
e. RC-22SF-1, Lower PRT Level	A, P, D, S	5
f. EA-19SF, Restore Power to Bus 15 from Unit 2	A, N, EN, S	6
g. NI-4SF-1, N35 Failure High With Failure Of Reactor to Trip	A, D, S	7
h. CC-6S, Loss of Component Cooling Water	N, S	8
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. VC-16, Borate Unit 1 RCS from Outside the Control Room	D, E, R	1
j. IP-3, Respond to Bypassed Instrument Inverter	D, E, P	6
k. AF-18, Control S/G Water Levels	N, E, L	4S

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

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

R.0

RO JPM Summary

a - Bank JPM – This JPM aligns Charging flow from the RWST during an ATWS condition

b - Bank JPM – This JPM performs Attachment L to complete the isolation of containment by manually aligning components that did not automatically isolate.

c - Bank JPM – This JPM has the operator respond to a PZR level channel failing and taking actions IAW the procedure.

d - Bank JPM – This JPM has the operator restore the 12 MDAFW pump after a trip on low discharge pressure.

e - Bank JPM – This JPM has the operator restore PRT conditions to normal using the RCDT pump.

f - New JPM - This is a new JPM to supply Bus 15 from Unit 2.

g - Bank JPM – This JPM has the operator respond to conditions as they occur. N35 will fail during a reactor startup and the reactor will not automatically trip, but will trip manually.

h - New JPM – This is a new JPM to isolate a leak in the CCW system using 1C14 AOP1.

i - Bank JPM – This JPM requires the operator borate the RCS using MV-32086 locally.

j - Bank JPM – This JPM has the operator to respond to a bypassed instrument inverter and restore the inverter to service.

k - New JPM – This is a new JPM that has the operator control SG water levels during a plant shutdown from outside the control room.

K. 0

ES-301 **Control Room/In-Plant Systems Outline** **Form ES-301-2**

Facility: ___Prairie Island_____	Date of Examination: __March 2010_
Exam Level: RO ☐ SRO-I ☐ SRO-U X	Operating Test No.: _____

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. N/A		
b. EO-31SF-1, Perform Attachment L: Containment Isolation Actuation Failure	A, D, S	2
c. N/A		
d. N/A		
e. N/A		
f. EA-19SF, Restore Power to Bus 15 from Unit 2	A, N, EN, S	6
g. NI-4SF-1, N35 Failure High With Failure Of Reactor to Trip	A, D, S	7
h. N/A		
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. VC-16, Borate Unit 1 RCS from Outside the Control Room	D, E, R	1
j. N/A		
k. AF-18, Control S/G Water Levels	N, E, L	4S

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

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

K.0

SRO-U JPM Summary

a - N/A

b - Bank JPM – This JPM performs Attachment L to complete the isolation of containment by manually aligning components that did not automatically isolate.

c - N/A

d - N/A

e - N/A

f - New JPM - This is a new JPM to supply Bus 15 from Unit 2.

g - Bank JPM – This JPM has the operator respond to conditions as they occur. N35 will fail during a reactor startup and the reactor will not automatically trip, but will trip manually.

h - N/A

i - Bank JPM – This JPM requires the operator borate the RCS using MV-32086 locally.

j - N/A

k - New JPM – This is a new JPM that has the operator control SG water levels during a plant shutdown from outside the control room.

R.O

ES-301 **Control Room/In-Plant Systems Outline** **Form ES-301-2**

Facility: Prairie Island Date of Examination: March 2010

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

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. FL-10SF-3, Lineup RWST to charging during ATWS	A, P, D, S	1
b. N/A		
c. PS-3, Respond to a Pressurizer Level Channel Failing Low	D, S	3
d. AF-8S, Restore AFW Flow After AFW Pump trip on Low Pressure	D, S	4S
e. RC-22SF-1, Lower PRT Level	A, P, D, S	5
f. EA-19SF, Restore Power to Bus 15 from Unit 2	A, N, EN, S	6
g. NI-4SF-1, N35 Failure High With Failure Of Reactor to Trip	A, D, S	7
h. CC-6S, Loss of Component Cooling Water	N, S	8
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. VC-16, Borate Unit 1 RCS from Outside the Control Room	D, E, R	1
j. IP-3, Respond to Bypassed Instrument Inverter	D, E, P	6
k. AF-18, Control S/G Water Levels	N, E, L	4S

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

R. 0

SRO-I JPM Summary

a - Bank JPM – This JPM aligns Charging flow from the RWST during an ATWS condition

b - N/A

c - Bank JPM – This JPM has the operator respond to a PZR level channel failing and taking actions IAW the procedure.

d - Bank JPM – This JPM has the operator restore the 12 MDAFW pump after a trip on low discharge pressure.

e - Bank JPM – This JPM has the operator restore PRT conditions to normal using the RCDT pump.

f - New JPM - This is a new JPM to supply Bus 15 from Unit 2.

g - Bank JPM – This JPM has the operator respond to conditions as they occur. N35 will fail during a reactor startup and the reactor will not automatically trip, but will trip manually.

h - New JPM – This is a new JPM to isolate a leak in the CCW system using 1C14 AOP1.

i - Bank JPM – This JPM requires the operator borate the RCS using MV-32086 locally.

j - Bank JPM – This JPM has the operator to respond to a bypassed instrument inverter and restore the inverter to service.

k - New JPM – This is a new JPM that has the operator control SG water levels during a plant shutdown from outside the control room.

R. 0

Facility: Prairie Island Date of Exam: March 2010 Operating Test No.: 1

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
I1	RX								1					1		1	
	NOR	1												1		1	
	I/C	3			1, 3				3, 4					5		4	
	MAJ	5			4				5					3		2	
	TS	3, 4			2									3		2	
I2	RX								1					1		1	
	NOR	1												1		1	
	I/C	3			1, 3				3, 4					5		4	
	MAJ	5			4				5					3		2	
	TS	3, 4			2									3		2	
I3	RX											1		1		1	
	NOR	1												1		1	
	I/C	3					1, 2, 3, 5					2, 4		7		4	
	MAJ	5					4					5		3		2	
	TS	3, 4												2		2	
I4	RX		1											1		1	
	NOR										1			1		1	
	I/C		2, 3		1, 3						2, 4			6		4	
	MAJ		5		4						5			3		2	
	TS				2						2, 3, 4			4		2	

Instructions:

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

R.0

Facility: Prairie Island		Date of Exam: March 2010																
APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)			
		1			2			3			4							
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U	
R5	RX					1								1	1			
	NOR			1									1	2	1			
	I/C			3, 6, 7		2, 3							2, 3, 4, 6	9	4			
	MAJ			5		4							5	3	2			
	TS													0	0			
R6	RX								1					1	1			
	NOR												1	1	1			
	I/C								3, 4				2, 3, 4, 6	6	4			
	MAJ								5				5	2	2			
	TS													0	0			
R7	RX											1		1	1			
	NOR									1				1	1			
	I/C									2, 4, 6		2, 4		5	4			
	MAJ									5		5		2	2			
	TS													0	0			
U1	RX													0			0	
	NOR							1			1			2			1	
	I/C										2, 4			2			2	
	MAJ							5			5			2			1	
	TS							3, 4			2, 3, 4			5			2	

Instructions:

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

R.0

Facility: Prairie Island Date of Exam: March 2010 Operating Test No.: 1

APPLICANT	EVENT TYPE	Scenarios 1 CREW POSITION SRO	1 ATC	1 BOP	2 SRO	2 ATC	2 BOP	3 SRO	3 ATC	3 BOP	4 SRO	4 ATC	4 BOP	TOTAL	MINIMUM(*) R	I	U
R1	RX		1											1	1		
	NOR									1				1	1		
	I/C		2, 3				1, 2, 3, 5			2, 4, 6				9	4		
	MAJ		5				4			5				3	2		
	TS													0	0		
R2	RX					1								1	1		
	NOR			1										1	1		
	I/C			3, 6, 7		2, 3								5	4		
	MAJ			5		4								2	2		
	TS													0	0		
R3	RX		1											1	1		
	NOR									1				1	1		
	I/C		2, 3				1, 2, 3, 5			2, 4, 6				9	4		
	MAJ		5				4			5				3	2		
	TS													0	0		
R4	RX					1								1	1		
	NOR			1										1	1		
	I/C			3, 6, 7		2, 3								5	4		
	MAJ			5		4								2	2		
	TS													0	0		

Instructions:

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

REVISION 0 (R.0)

ES-401 PWR Examination Outline Form ES-401-2

Facility: Prairie Island Printed:

Date Of Exam: March 2010

Tier	Group	RO K/A Category Points												SRO-Only Points					
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2			G*	Total	
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	0			0	0	
	2	1	2	2				1	2			1	9	0			0	0	
	Tier Totals	4	5	5				4	5			4	27	0			0	0	
2. Plant Systems	1	3	2	3	3	2	2	3	3	2	2	3	28	0			0	0	
	2	1	1	1	1	1	1	1	0	1	1	1	10	0		0	0	0	
	Tier Totals	4	3	4	4	3	3	4	3	3	3	4	38	0			0	0	
3. Generic Knowledge And Abilities Categories		1			2			3			4		10	1	2	3	4	0	
		2			3			2			3			0	0	0	0		

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.

4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.

5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.

6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.

9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

PWR RO Examination Outline

Printed R.O

Facility: Prairie Island

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Point
000007 Reactor Trip - Stabilization - Recovery / 1		X					EK2.02 - Breakers, relays and disconnects	2.6	1
000008 Pressurizer Vapor Space Accident / 3				X			AA1.01 - PZR spray block valve and PORV block valve	4.2	1
000011 Large Break LOCA / 3					X		EA2.11 - Conditions for throttling or stopping HPI	3.9	1
000022 Loss of Rx Coolant Makeup / 2						X	2.4.46 – Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
000025 Loss of RHR System / 4	X						AK1.01 - Loss of RHRS during all modes of operation	3.9	1
000026 Loss of Component Cooling Water / 8				X			AA1.07 - Flow rates to the components and systems that are serviced by the CCWS; interactions among the components	2.9	1
000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 - Controllers and positioners	2.6	1
000029 ATWS / 1					X		EA2.02 – Reactor Trip Alarm	4.2	1
000038 Steam Gen. Tube Rupture / 3				X			EA1.44 – Level operating limits for S/Gs	3.4*	1
000054 Loss of Main Feedwater / 4	X						AK1.01 - MFW line break depressurizes the S/G (similar to a steam line break)	4.1	1
000055 Station Blackout / 6	X						EK1.02 - Natural circulation cooling	4.1	1
000058 Loss of DC Power / 6					X		AA2.01 - That a loss of dc power has occurred; verification that substitute power sources have come on line	3.7	1
00062 Loss of Nuclear Svc Water / 4						X	2.4.8 - Knowledge of how abnormal operating procedures are used in conjunction with EOP's.	3.8	1
000065 Loss of Instrument Air / 8			X				AK3.08 - Actions contained in EOP for loss of instrument air	3.7	1
W/E04 LOCA Outside Containment / 3		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	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4						X	2.1.7 – Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1

PWR RO Examination Outline

Printed R. 0

Facility: Prairie Island

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Point
W/E11 Loss of Emergency Coolant Recirc. / 4			X				EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	3.8	1
W/E12 Uncontrolled Depressurization of all Steam Generators / 4			X				EK3.1 - Facility oper. characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics	3.5	1
K/A Category Totals:	3	3	3	3	3	3	**Group Point Total:**		18

PWR RO Examination Outline

Printed R. 0

Facility: Prairie Island

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Point
000001 Continuous Rod Withdrawal / 1			X				AK3.01 - Manually driving rods into position that existed before start of casualty	3.2	1
000005 Inoperable/Stuck Control Rod / 1				X			AA1.01 - CRDS	3.6	1
000028 Pressurizer Level Malfunction / 2						X	2.4.31 - Knowledge of annunciator alarms, indications, or response procedures).	4.2	1
000059 Accidental Liquid RadWaste Rel. / 9	X						AK1.01 - Types of radiation, their units of intensity and the location of the sources of radiation in a nuclear power plant	2.7	1
000076 High Reactor Coolant Activity / 9			X				AK3.05 - Corrective actions as a result of high fission-product radioactivity level in the RCS	2.9	1
W/E06 Degraded Core Cooling / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.5	1
W/E10 Natural Circ. With steam void in vessel with/without RVLIS / 4		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	1
W/E13 Steam Generator Over-pressure / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.0	1
W/E16 High Containment Radiation / 9					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.0	1
K/A Category Totals:	**1**	**2**	**2**	**1**	**2**	**1**	**Group Point Total:**		**9**

PWR RO Examination Outline

Printed R.0

Facility: Prairie Island

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Point
003 Reactor Coolant Pump	X											K1.04 - CVCS	2.6*	1
004 Chemical and Volume					X							K5.07 - Relationship between SUR and reactivity	2.8	1
005 Residual Heat Removal			X									K3.01 - RCS	3.9	1
006 Emergency Core Cooling						X						K6.02 - Core flood tanks (accumulators)	3.4	1
007 Pressurizer Relief/Quench Tank			X									K3.01 - Containment	3.3	1
008 Component Cooling Water								X				A2.08 - Effects of shutting (auto or otherwise) the isolation valves of the letdown cooler	2.5	1
010 Pressurizer Pressure Control											X	2.4.11 - Knowledge of abnormal condition procedures.	4.0	1
010 Pressurizer Pressure Control				X								K4.03 - Over pressure control	3.8	1
012 Reactor Protection	X											K1.05 - ESFAS	3.8*	1
013 Engineered Safety Features Actuation		X										K2.01 - ESFAS/safeguards equipment control	3.6*	1
022 Containment Cooling	X											K1.04 – Chilled Water	2.9*	1
026 Containment Spray										X		A4.05 - Containment spray reset switches	3.5	1
026 Containment Spray							X					A1.05 - Chemical additive tank level and concentration	3.1	1
039 Main and Reheat Steam				X								K4.07 – Reactor building isolation	3.4	1
059 Main Feedwater									X			A3.06 – Feedwater Isolation	3.2*	1
059 Main Feedwater				X								K4.16 – Automatic Trips for MFW pumps	3.1*	1
061 Auxiliary/Emergency Feedwater					X							K5.05 - Feed line voiding and water hammer	2.7	1
061 Auxiliary/Emergency Feedwater											X	2.4.18 - Knowledge of the specific bases for EOPs.	3.3	1
062 AC Electrical Distribution		X										K2.01 - Major system loads	3.3	1
063 DC Electrical Distribution								X				A2.01 - Grounds	2.5	1
063 DC Electrical Distribution										X		A4.03 - Battery discharge rate	3.0*	1
064 Emergency Diesel Generator											X	2.1.23 – Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1
064 Emergency Diesel Generator						X						K6.07 - Air receivers	2.7	1
073 Process Radiation Monitoring							X					A1.01 - Radiation levels	3.2	1
076 Service Water								X				A2.01 - Loss of SWS	3.5*	1
078 Instrument Air			X									K3.02 – Systems having pneumatic valves and controls	3.4	1

PWR RO Examination Outline

Printed R. 0

Facility: Prairie Island

ES - 401 | **Plant Systems - Tier 2 / Group 1** | **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Point
078 Instrument Air									X			A3.01 - Air pressure	3.1	1
103 Containment							X					A1.01 - Containment pressure, temperature, and humidity	3.7	1
K/A Category Totals:	3	2	3	3	2	2	3	3	2	2	3	**Group Point**		28

PWR RO Examination Outline

Printed R.O

Facility: Prairie Island

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Point
001 Control Rod Drive				X								K4.15 - Operation of latching controls for groups and individual rods	2.7	1
002 Reactor Coolant					X							K5.19 - Neutron embrittlement	2.6	1
015 Nuclear Instrumentation	X											K1.03 - CRDS	3.1*	1
027 Containment Iodine Removal		X										K2.01 - Fans	3.1*	1
029 Containment Purge			X									K3.01 - Containment parameters	2.9	1
035 Steam Generator						X						K6.02 - Secondary PORV	3.1	1
045 Main Turbine Generator									X			A3.11 - Generator trip	2.6*	1
055 Condenser Air Removal											X	2.2.44 – Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.2	1
068 Liquid Radwaste										X		A4.02 - Remote radwaste release	3.2*	1
086 Fire Protection							X					A1.04 - Fire dampers	2.7	1
K/A Category Totals:	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**Group Point Total:**		**10**

Facility: Prairie Island Printed: R. O

Date Of Exam: March 2010

Tier	Group	RO K/A Category Points												SRO-Only Points				
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2		G*	Total
1. Emergency & Abnormal Plant Evolutions	1	0	0	0	N/A			0	0	N/A		0	0	3		3	6
	2	0	0	0				0	0			0	0	2		2	4
	Tier Totals	0	0	0				0	0			0	0	5		5	10
2. Plant Systems	1	0	0	0	0	0	0	0	0	0	0	0	0	3		2	5
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
	Tier Totals	0	0	0	0	0	0	0	0	0	0	0	0	5		3	8
3. Generic Knowledge And Abilities Categories		1		2		3		4					0	1	2	3	4	7
		0		0		0		0						2	2	1	2	

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.

4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.

5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.

6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.

9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

PWR SRO Examination Outline

Printed R. 0

Facility: Prairie Island

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Point
000009 Small Break LOCA / 3					X		EA2.01 - Actions to be taken, based on RCS temperature and pressure, saturated and superheated	4.8	1
000015/000017 RCP Malfunctions / 4					X		AA2.02 - Abnormalities in RCP air vent flow paths and/or oil cooling	3.0	1
W/E12 Uncontrolled Depressurization of all Steam Generators / 4						X	2.4.41 - Knowledge of the emergency action level thresholds and classifications.	4.6	1
000056 Loss of Off-site Power / 6						X	2.2.39 - Knowledge of less than or equal to one hour T. S. action statements for systems.	4.5	1
000057 Loss of Vital AC Inst. Bus / 6						X	2.4.9 - Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	4.2	1
000077 Generator Voltage and Electric Grid Disturbances / 6					X		AA2.09 - Operational status of emergency diesel generators	4.3	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**3**	**3**	**Group Point Total:**		**6**

PWR SRO Examination Outline

Printed R. O

Facility: Prairie Island

ES - 401 Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 **Form ES-401-2**

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Point
000024 Emergency Boration / 1						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.7	1
000051 Loss of Condenser Vacuum / 4					X		AA2.02 - Conditions requiring reactor and/or turbine trip	4.1	1
000067 Plant Fire On-site / 8						X	2.2.40 –Ability to apply Technical Specifications for a system.	4.7	1
000069 Loss of CTMT Integrity / 5					X		AA2.02 - Verification of automatic and manual means of restoring integrity	4.4	1
K/A Category Totals:	**0**	**0**	**0**	**0**	**2**	**2**	**Group Point Total:**		**4**

PWR SRO Examination Outline

Printed R.0

Facility: Prairie Island

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Point
003 Reactor Coolant Pump											X	2.4.1 - Knowledge of EOP entry conditions/Im. actions.	4.8	1
007 Pressurizer Relief/Quench Tank								X				A2.06 - Bubble formation in PZR	2.8	1
008 Component Cooling Water											X	2.1.20 - Ability to interpret and execute procedure steps.	4.6	1
062 AC Electrical Distribution								X				A2.16 - Degraded system voltages	2.9	1
103 Containment								X				A2.01 - Integrated leak rate test	2.6*	1
K/A Category Totals:	0	0	0	0	0	0	0	3	0	0	2	**Group Point**		5

PWR SRO Examination Outline

Printed K.O

Facility: Prairie Island

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Evol # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Point
028 Hydrogen Recombiner and Purge Control								X				A2.01 - Hydrogen recombiner power setting, determined by using plant data book	3.6*	1
071 Waste Gas Disposal								X				A2.08 – Meteorological changes	2.8*	1
075 Circulating Water											X	2.1.27 – Knowledge of system purpose and/or function.	4.0	1
K/A Category Totals:	0	0	0	0	0	0	0	2	0	0	1	**Group Point**		3

Generic Knowledge and Abilities Outline (Tier 3)

PWR RO Examination Outline

R.0

Printed:

Facility: Prairie Island

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.29	Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.	4.1	1
	2.1.41	Knowledge of the refueling process.	2.8	1
		Category Total:		**2**
Equipment Control	2.2.6	Knowledge of the process for making changes to procedures.	3.0	1
	2.2.20	Knowledge of the process for managing troubleshooting activities.	2.6	1
	2.2.36	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	3.1	1
		Category Total:		**3**
Radiation Control	2.3.11	Ability to control radiation releases.	3.8	1
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1
		Category Total:		**2**
Emergency Procedures/Plan	2.4.2	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	4.5	1
	2.4.6	Knowledge of EOP mitigation strategies.	3.7	1
	2.4.42	Knowledge of emergency response facilities.	2.6	1
		Category Total:		**3**
		Generic Total:		**10**

Generic Knowledge and Abilities Outline (Tier 3)

PWR SRO Examination Outline

Printed: R. 0

Facility: Prairie Island

Form ES-401-3

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.5	Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.	3.9	1
	2.1.14	Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc.	3.1	1
		Category Total:		2
Equipment Control	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.	3.9	1
	2.2.35	Ability to determine Technical Specification Mode of Operation.	4.5	1
		Category Total:		2
Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.7	1
		Category Total:		1
Emergency Procedures/Plan	2.4.11	Knowledge of abnormal condition procedures.	4.2	1
	2.4.50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.0	1
		Category Total:		2
		Generic Total:		7

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Appendix D **Scenario Outline** Form ES-D-1

Facility: Prairie Island Scenario No.: 1 Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: 50% Power with xenon increasing

Turnover: No Equipment OOS

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	RXC (RO) N (SRO,BOP)	Increase Power to 60%. Place Second Main Feed pump in service.
2	VC04A	C (RO)	11 Charging Pump Trips.
3	RX226	I (ALL) TS (SRO)	Turbine 1st Stage Pressure (PT-485) Fails High.
4	RC14	TS(SRO)	RCS Leak.
5	RC07A	M (All)	Small Break LOCA.
6	TC11A	C (BOP)	Failure of Turbine to Auto Trip.
7	SI05A, SI05B	C (BOP)	SI Pumps fail to auto start.

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

R.0

Scenario 1 Summary

The crew assumes the duty at 50% power with xenon increasing, No equipment OOS. The crew is directed to increase power to 60%. During the power rise a second main feedwater pump will be started.

After the crew has completed the power increase, 11 Charging Pump Trips. The RO will stabilize seal injection flows and/or start 13 charging pump. The crew responds IAW C47 and 1C12.1.

After the plant is stabilized, Turbine First Stage Pressure channel (PT-485) fails high. The RO will take rod control to manual and stabilize charging. The BOP will address the instrument failure and swap steam dumps to Pressure Mode. The SRO will determine T.S. requirements

After the plant is stabilized, a 20 gpm RCS leak develops. The SRO will determine T.S. requirements. The crew responds IAW 1C4 AOP1.

After the crew identifies the T.S requirements for the RCS leak, a Small Break LOCA occurs. The crew will trip the reactor and enter 1E-0. Upon the trip, BOP will recognize the turbine fails to auto trip and both SI pumps fail to auto start and perform manual actions to remedy these failures. The crew will transition to 1E-1 and the scenario will continue until safeguards pumps are stopped in 1FR-P.1 or the first SI pump is stopped in 1ES-1.1.

Critical Tasks:

E-0 -- H: Manually start at least one safety Injection pump before transition out of E-0.

E-0 – TCOA4: Control AFW flow within 38 minutes following a Reactor Trip.
(SWI O-35 identified Time Critical Operator Action).

E-0 -- Q: Trip turbine before leaving E-0.

E-1-- C: Trip all Reactor Coolant Pumps so that a severe challenge to Core Cooling does not occur when forced circulation in the RCS stops (Small Break LOCA).

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Appendix D **Scenario Outline** **Form ES-D-1**

Facility: Prairie Island Scenario No.: 2 Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: 71% Power and stable

Turnover: 11 CC Pump OOS

Event No.	Malf. No.	Event Type*	Event Description
1	FW13A	R (RO) C (SRO, BOP)	11 Main Feedwater Pump Trip.
2	NI05D	I (RO, BOP) TS (SRO)	N44 Power Range NI Fails High
3	ED08C	C (All)	Loss of Power to Instrument Bus 113
4	MS01A	M (All)	Steam Break I/S Containment on Trip
5	RP06	C (BOP)	11/12 MSIVs fail to automatically close

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

R.0

Scenario 2 Summary

The crew assumes the duty at 71% power and stable. 11 CC pump is OOS.

After the crew takes the duty, 11 MFW pump will trip. The RO will reduce power to ~50% using IAW 1C1.4 AOP1. BOP will address the ARP for the failure and manipulate control room switches as necessary to facilitate trouble shooting and ensure proper system response.

After the crew has completed the power reduction, N44 Power Range NI Fails High. The BOP will address the failure and remove the affected channel from service IAW C47 and 1C51. The RO will place rod control to manual and restore Tave to Tref. The SRO will determine T.S. requirements

After the NI failure is addressed, Instrument Bus 113 loses power. The loss of Bus 113 compounded with N44 being OOS causes an automatic reactor trip. The crew will respond IAW 1E-0 and transition to 1ES-0.1. The SS will direct performance of 1C20.8 AOP1 to restore power to Instrument Bus 113 in conjunction with 1ES-0.1.

After power is restored to Instrument Bus 113, 11 S/G Main Steam line break in containment. The crew will transition back to 1E-0. The BOP will recognize the failure of 11/12 MSIV's to auto close and manually perform the action using 1E-0 Att. L. The crew will then transition to 1E-2 to isolate the faulted SG and transition to 1E-1. The scenario will be terminated when the crew transitions to 1FR-P.1 or upon termination of SI pumps in 1ES-0.2.

Critical Tasks:

E-0 -- P: Manually close MSIVs before transition out of E-0.

E-0 – TCOA4: Control AFW flow within 38 minutes following a Reactor Trip.
(SWI O-35 identified Time Critical Operator Action).

E-2 -- A: Isolate the faulted STEAM GENERATOR before transition out of E-2.

R. 0

Appendix D Scenario Outline **Form ES-D-1**

Facility: Prairie Island Scenario No.: 3 Op-Test No.: 1

Examiners: Operators:

Initial Conditions: Power is $1x10^{-8}$ amps and stable

Turnover: 13 Charging Pump is OOS

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (RO) N (SRO, BOP)	Increase Power to POAH. 12 Condensate pump will be started to replace 11 for Filter Demin Support.
2	IA03B	C (BOP)	122 Air Compressor trips, 123 fails to auto start.
3	DI-46242OFF	C (RO) TS (SRO)	PZR Heater B/U Group 1B Breaker Trip.
4	RX202	I (RO) TS (SRO)	PZR pressure channel (PT-431) fails High.
5	SG02B	M (All)	12 S/G Tube Rupture (on trip).
6	RP12	C (BOP)	SI signal CL System Fails.

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

R. 0

Scenario 3 Summary

The crew assumes the duty with power at $1x10^{-8}$ amps and stable. 13 Charging Pump is OOS. The crew is directed to increase power to the POAH. During the power rise the BOP will start 12 Condensate pump and stop 11 Condensate pump.

After the crew has completed the power increase, 122 Air Compressor trips with the 123 A/C failed to auto start. The BOP will recognize that 123 Air Compressor does not automatically start and will manually start 123 Air Compressor. The crew responds IAW C47 and C34 AOP1.

After the plant is stabilized, PZR Heater B/U Group 1B Breaker will trip. The RO will co-ordinate with the BOP to align the heater group to the alternate power supply and restore the heaters to operation IAW 1C20.6. The SRO will determine T.S. requirements

After the plant is stabilized, the controlling pressurizer pressure channel 1P-431 fails High. The RO will respond to stabilize RCS pressure. The RO and BOP will coordinate to swap the controlling pressurizer channel to another channel IAW C47 and 1C51.3. The SRO will determine T.S. requirements.

After the plant is stabilized, 12 S/G will suffer a Tube Rupture. The crew will trip the reactor and enter 1E-0. The BOP will recognize the CL systems fails to respond to the SI signal and will manually align the system IAW 1E-0 Att L. The crew will transition to 1E-3. The scenario will be terminated upon securing SI pumps in 1E-3.

Critical Tasks:

E-0 – TCOA4: Control AFW flow within 38 minutes following a Reactor Trip. (SWI O-35 identified Time Critical Operator Action).

E-3 -- A: Isolate feedwater flow into and steam flow from the ruptured Steam Generator before a transition to ECA-3.1 occurs.

E-3 – B: Establish/maintain an RCS temperature so that transition from E-3 does not occur because of the inability to maintain required subcooling or such that an extreme or severe challenge to the Subcriticality and/or the Integrity CSF occurs.

E-3 -- C: Depressurize RCS to meet SI termination criteria prior to overfilling the ruptured Steam Generator.

E-3 -- D: Terminate SI prior to overfilling the ruptured Steam Generator.

R. O

Appendix D **Scenario Outline** **Form ES-D-1**

Facility: _Prairie Island_____ Scenario No.: ___4_____ Op-Test No.: __1_____

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: ___100% Power and stable_____

_____

_____

Turnover: 12 MDAFW pump OOS, 13 Heater Drain Pump_____

_____

_____

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (RO) N (BOP/SRO)	Reduce Power to 90% for 12 Heater Drain Pump brush checks. At 95% the BOP remove 12 Heater Drain Pump from service.
2	ED17B, DI-46924T	C (All) TS (SRO)	Loss of Safeguards Bus 16.
3	RX216	C (BOP) TS (SRO)	12 S/G Pressure Instrument PT-478 Fails High, causing 12 S/G PORV to open.
4	RX05C	I (ALL) TS (SRO)	Tavg Instrument Fails High.
5	TC12, RP07A, RP07B, DI-46447B, DI-46447I	M (All)	Turbine Trip with ATWS.
6	FW34A	C (BOP)	11 TDAFW Fails to Auto start.

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

Scenario 4 Summary

The crew assumes the duty at 100% power and stable. 11 MDAFW pump and 13 Heater Drain pump are OOS. The crew will Reduce Power to 90% to remove 12 Heater Drain pump from service for brush inspections.

After the power reduction, Loss of Safeguards Bus 16 occurs. D2 D/G starts and does not auto load. The RO will stabilize RCP seal injection flows. The BOP will restore power to Bus 16 by restoring power from CT-11 IAW 1C20.5 AOP2. The SRO will determine T.S. requirements.

After Bus 16 is restored, 12 S/G Pressure instrument PT-478 Fails high causing 12 S/G PORV to open. The BOP will recognize the failure and manually close 12 S/G PORV. The SRO will determine T.S. requirements

After the plant is stabilized, RCS Loop Thot RTD fails high causing Tavg and Delta T channels to indicate high. The RO will take manual control of charging and rod control. The BOP will coordinate with the RO to take the appropriate channel to 'defeat'. The SRO will determine T.S. requirements

After the plant is stabilized, a spurious turbine trip signal occurs. The turbine will trip but the reactor does not. The Crew will enter 1E-0 and transition immediately to 1FR-S.1. The RO will recognize the ATWS and attempt to manually trip the Reactor, but will be unsuccessful. Rods will be inserted and a boration commenced IAW 1FR-S.1. The BOP will recognize the 11 TDAFW pump failed to automatically start and will manually start the pump. The scenario will be terminated upon successful tripping of the Reactor per 1FR-S.1

Critical Tasks:

E-0 – TCOA4: Control AFW flow within 38 minutes following a Reactor Trip. (SWI O-35 identified Time Critical Operator Action).

FR-S.1 – C: Insert negative reactivity into the core by inserting rods or establishing emergency boration flow to the RCS during the performance of FR-S.1.

R. 0

Appendix D **Scenario Outline** Form ES-D-1

Facility: Prairie Island Scenario No.: SB Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions: 71% Power and stable.

Turnover: 12 MDAFW Pump is OOS,
Breaker 16-10, Bus 26 to 16 Bus Tie Breaker, is OOS

Event No.	Malf. No.	Event Type*	Event Description
1	RC22B	C (RO)	PZR PORV 431C leak.
2	RD0909	C (RO)	Rod F-6 RPI Fails.
3	TC07B, TC07C	R (RO) C (SRO)	Two Turbine Intercept Valves fail closed.
4	DI-46133C	C (RO)	Letdown Line Isolation Valve fails closed.
5	RD03F	C (RO)	Continuous Uncontrolled Rod Withdrawal.
6	RC07A	M (All)	LBLOCA.
7	RP05	C (RO)	Containment Isolation Failure.

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

R. 6

Scenario SB Summary

The crew assumes the duty at 71% power and stable. 12 MDAFW pump and Breaker 16-10 are OOS.

After the crew assumes the duty, PZR PORV PCV-431C starts leaking by. The RO will recognize the failure and coordinate with the BOP to close the associated block valve IAW C47 and 1C4 AOP1. The SRO will determine T.S. requirements.

After the plant is stabilized, Rod F-6 RPI fails to zero. The RO will recognize the failure and coordinate with the BOP to respond IAW C47 and 1C5 AOP4 & AOP5. The SRO will determine T.S. requirements.

After the plant is stabilized, two Turbine Intercept valves fail closed. The BOP will recognize the failure and respond per C47 and 1C23 AOP2 to determine a rapid downpower is required. The RO will reduce power below 50% IAW 1C1.4 AOP1.

After the plant is stabilized, a letdown line isolation valve fails closed. The RO will recognize the failure and coordinate with the BOP to place excess letdown in service IAW 1C12.1 AOP3.

After the plant is stabilized, a continuous uncontrolled rod withdrawal occurs. The RO will recognize the failure and place Rod control in manual. Rods will continue to withdraw and the crew will respond IAW 1C5 AOP1 and trips reactor and enters 1E-0.

After the crew trips the reactor, a large break LOCA occurs. The crew will continue in 1E-0 and transition to E-1. The BOP will recognize automatic containment isolation signal fails to actuate and the Lead operator will ensure all containment isolation valves are closed IAW E-0 Att. L. The crew will transition to 1ES-1.2. The scenario will be terminated when one safeguards train has been restarted on recirc sump B.

Critical Tasks:

E-0 --O: Manually actuate Containment Isolation or close containment isolation valves such that at least one valve is closed on each penetration before the end of the scenario.

E-0 – TCOA4: Control AFW flow within 38 minutes following a Reactor Trip. (SWI O-35 identified Time Critical Operator Action).