

**2008 D. C. COOK NUCLEAR POWER STATION**

**INITIAL EXAMINATION**

**OUTLINE SUBMITTAL**



A unit of American Electric Power

Indiana Michigan Power  
Cook Nuclear Plant  
One Cook Place  
Bridgman, MI 49106  
AEP.com

May 8, 2008

U. S. Nuclear Regulatory Commission  
Attn: Mr. Michael E. Bielby  
Region III Examiner  
2443 Warrenville Road, Suite 210  
Lisle, Illinois 60532-4352

Donald C. Cook Nuclear Plant Units 1 and 2  
2008 NRC EXAMINATION OUTLINE SUBMITTAL

Enclosed you will find a copy of the Initial License Examination Outline for the planned August 2008 examination at Donald C. Cook Nuclear Plant (CNP). Also enclosed is the proposed examination schedule, based on 4 Instant Senior Reactor Operator (SROI), 2 Upgrade Senior Reactor Operator (SROU), and 6 Reactor Operator (RO) candidates. The examination is being prepared in accordance with NUREG 1021, Revision 9, Supplement 1.

The following items are enclosed in the sealed envelope:

- 1) Form ES-201-2, Examination Outline Quality Checklist
- 2) Form ES-201-3, Examination Security Agreement
- 3) CNP 2008 NRC Operating Examination Overview
- 4) Draft CNP 2008 ILT Examination Detailed Schedule
- 5) Written Examination Sample Methodology
- 6) Probabilistic Risk Assessment Input
- 7) Scenario Outlines Form ES-D-1 COOK08-01
- 8) Scenario Outlines Form ES-D-1 COOK08-02
- 9) Scenario Outlines Form ES-D-1 COOK08-03
- 10) ES-301-4, Simulator Checklist
- 11) ES-301-5, Transient and Event Checklist, Crews 1 and 2
- 12) ES-301-5, Transient and Event Checklist, Crew 3
- 13) ES-301-5, Transient and Event Checklist, Crew 4
- 14) ES-301-6, Competencies Checklist, Crews 1 and 2
- 15) ES-301-6, Competencies Checklist, Crew 3
- 16) ES-301-6, Competencies Checklist, Crew 4
- 17) ES-301-2, SRO (I) JPM Outline
- 18) ES-301-2, SRO (U) JPM Outline
- 19) ES-301-2, RO JPM Outline

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- 20) ES-301-1, SRO Admin JPM Outline
- 21) ES-301-1, RO Admin JPM Outline
- 22) PWR Exam Outline, Form ES-401-2 (SRO)
- 23) Generic K/A Outline, Form ES-401-3 (SRO)
- 24) PWR Exam Outline, Form ES-401-2 (RO)
- 25) Generic K/A Outline, Form ES-401-3 (RO)
- 26) Form ES-401-4, Submittal (RO/SRO)

A hard copy of all the examination materials is provided for your review. An electronic copy of documents without initials or signatures or other handwritten notations for the Public Document Room (ADAMS) has also been provided.

None of these materials are to go to the Public Document Room (ADAMS) until after the examination has been completed.

If you have any questions, please contact Ted Conrad or Steve Pettinger at (269) 466-3387 or myself at (269) 466-3407.

Sincerely,

A handwritten signature in cursive script, appearing to read "Ronald E. Harrah for".

Ronald E. Harrah  
Operations Training Manager

JTC/jen

Enclosures

Facility:		Date of Examination:		
Item	Task Description	Initials		
		a	b*	c#
W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	GR	PR	MEB
	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.	GR	PR	MEB
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	GR	PR	MEB
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	GR	PR	MEB
S I M U L A T O R	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.	GR	PR	MEB
	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.	GR	PR	1) MEB
	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.	GR	PR	MEB
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.	GR	PR	1) MEB
	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	GR	PR	MEB
	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.	GR	PR	MEB
G E N E R A L	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.	GR	PR	MEB
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	GR	PR	MEB
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	GR	PR	MEB
	d. Check for duplication and overlap among exam sections.	GR	PR	MEB
	e. Check the entire exam for balance of coverage.	GR	PR	MEB
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	GR	PR	MEB
a. Author: <u>JOHN T. CONRAD</u> Printed Name/Signature b. Facility Reviewer (*): <u>PATRICK T. GLENN</u> c. NRC Chief Examiner (#): <u>MICHAEL E. BIELBY</u> d. NRC Supervisor: <u>HIRONORI PETERSON</u>		Date: <u>4/30/08</u> <del>5/2/08</del> <u>5/16/08</u>		5-8-08
Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required. * Not applicable for NRC-prepared examination outlines				

1) Will evaluate after audit exam reviewed.

## DC Cook 2008 NRC Examination

**ES-301**

**Administrative Topics Outline**

**Form ES-301-1**

Facility: <u>DC Cook</u>		Date of Examination: <u>8/18/08</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>2008 NRC</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N-R	Perform Boron or Dilution Volume Determination for RCS Temperature Change per 02-OHP-4021-005-002 Attachment 9. KA 2.1.43 4.1/4.3
Conduct of Operations	D-R	Calculate QPTR with an Inoperable Power Range per 01-OHP-4030-STP-032 Data Sheet 3 KA 2.1.7 4.4/4.7
Equipment Control		
Radiation Control	D-S	Perform Containment Pressure Relief per 02-OHP-4021-028-004. K/A 2.3.11 3.8/4.3
Emergency Procedures/Plan	D-R	Complete EMD-32A Nuclear Plant Event Notification Form per PMP-2080-EPP-107. K/A 2.4.39 3.9/3.8
<p><b>NOTE:</b> 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.</p>		
<p>* Type Codes &amp; Criteria:</p> <ul style="list-style-type: none"> <li>(C)ontrol room, (S)imulator, or Class(R)oom</li> <li>(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs &amp; RO retakes)</li> <li>(N)ew or (M)odified from bank (≥ 1)</li> <li>(P)revious 2 exams (≤ 1; randomly selected)</li> </ul>		

**DC Cook 2008 NRC Examination**

**ES-301**

**Administrative Topics Outline**

**Form ES-301-1**

Facility: <u>DC Cook</u>		Date of Examination: <u>8/18/08</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>2008 NRC</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N-R	Perform Boron or Dilution Volume Determination for RCS Temperature Change per 02-OHP-4021-005-002 Attachment 9. KA 2.1.43 4.1/4.3
Conduct of Operations	D-R	Review QPTR with an Inoperable Power Range per 01-OHP-4030-STP-032 Data Sheet 3 KA 2.1.7 4.4/4.7
Equipment Control	D-R	Review Unit 1 LTOP Verification per 01-OHP-4030-114-030. K/A 2.2.42 3.9/4.6
Radiation Control	D-S	Perform Containment Pressure Relief per 02-OHP-4021-028-004 K/A 2.3.11 3.8/4.3
Emergency Procedures/Plan	D-R	Perform an Emergency Plan Classification with PAR per PMP-2080-EPP-101. KA 2.4.44 2.4/4.4
<p><b>NOTE:</b> 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.</p>		
<p>* Type Codes &amp; Criteria:</p> <p>(C)ontrol room, (S)imulator, or Class(R)oom          (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs &amp; RO retakes)          (N)ew or (M)odified from bank (≥ 1)          (P)revious 2 exams (≤ 1; randomly selected)</p>		

**DC Cook 2008 NRC Examination**

**ES-301**

**Control Room/In-Plant Systems Outline**

**Form ES-301-2**

Facility: <u>DC Cook</u>		Date of Examination: <u>8/18/2008</u>
Exam Level: RO <input checked="" type="checkbox"/>	SRO-I <input type="checkbox"/>	SRO-U <input type="checkbox"/>
		Operating Test No.: <u>Cook 2008</u>
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. NRC08-SIM01 - Dilute the RCS per 02-OHP-4021-005-002. K/A SYS 004 A4.12 3.3/3.8	A-M-S	1
b. NRC08-SIM02 - Raise SI Accumulator Level per OHP-4021.008.004 Attachment 3 (with loss of pressure relief) KA 006 A4.07 4.4/4.4 (ALT)	A-D-EN-S	2
c. NRC08-SIM03 - Depressurize the RCS to Minimize Subcooling/Refill the Pressurizer during SB LOCA OHP-4023-ES-1.2. KA EPE 009 EA1.01 4.4/4.3	A-L-N-S	3
d. NRC08-SIM04 - Start a RCP per 02-OHP-4023-SUP-010 & 007(CCW isolated - Restore) KA SYS 003 A4.08 3.2/2.9	A-L-D-P-S 2006 exam	4P
e. NRC08-SIM05 - Perform Steam Generator Stop Valve Dump Valve Surveillance Test per 2-OHP-4030-251-018. SYS 039 K4.05 3.7/3.7	D-S	4S
f. NRC08-SIM06 - Restore RCP Bus 2A Power to AC Bus T21A Emergency Bus(T21A on EDG) KA SYS 062 A4.07 3.1/3.1	L-EN-N-S	6
g. NRC08-SIM07 - Energize SR Detectors and Audio Count Rate following a Trip per OHP-4023.ES-1.2 and OHP-4021.013.005 (IR Range Under Compensated) KA 015 A2.02 3.1/3.5 (ALT)	A-D-L-S	7
h. NRC08-SIM08 - Swap In-service Component Cooling Water Pumps per OHP-4021.016-003 KA SYS 008 A4.01 3.3/3.1	D-P-S 2007 exam	8
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. NRC08-INP01 - Local Operation of IRV-310, RHR Hx Outlet Valve using R12-16 (Unit 1 & 2) KA 005 A2.04 2.9/2.9	E-D-R	4P
j. NRC08-INP02 - Modify, Relatch and Start the Turbine Driven Auxiliary Feedwater Pump LS-2 (Overspeed Trip reset required) KA APE 068 AA1.02 4.3/4.5	E-D	4S
k. NRC08-INP03 - Perform an Authorized Gaseous Release per 4021.023.002 KA 071 A4.26 3.1/3.9	D-R	9
<p><sup>@</sup> 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.</p>		
* 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		

**DC Cook 2008 NRC Examination**

**ES-301**

**Control Room/In-Plant Systems Outline**

**Form ES-301-2**

Facility: <u>DC Cook</u>		Date of Examination: <u>8/18/2008</u>
Exam Level: RO <input type="checkbox"/>	SRO-I <input checked="" type="checkbox"/>	SRO-U <input type="checkbox"/>
		Operating Test No.: <u>Cook 2008</u>
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. NRC08-SIM01 - Dilute the RCS per 02-OHP-4021-005-002. K/A SYS 004 A4.12 3.3/3.8	A-M-S	1
b. NRC08-SIM02 - Raise SI Accumulator Level per OHP-4021.008.004 Attachment 3 (with loss of pressure relief) KA 006 A4.07 4.4/4.4 (ALT)	A-D-EN-S	2
c. NRC08-SIM03 - Depressurize the RCS to Minimize Subcooling/Refill the Pressurizer during SB LOCA OHP-4023-ES-1.2. KA EPE 009 EA1.01 4.4/4.3	A-L-N-S	3
d. NRC08-SIM04 - Start a RCP per 02-OHP-4023-SUP-010 & 007(CCW isolated - Restore) KA SYS 003 A4.08 3.2/2.9	A-L-D-P-S 2006 exam	4P
e.		
f. NRC08-SIM06 - Restore RCP Bus 2A Power to AC Bus T21A Emergency Bus(T21A on EDG) KA SYS 062 A4.07 3.1/3.1	L-EN-N-S	6
g. NRC08-SIM07 - Energize SR Detectors and Audio Count Rate following a Trip per OHP-4023.ES-1.2 and OHP-4021.013.005 (IR Range Under Compensated) KA 015 A2.02 3.1/3.5 (ALT)	A-D-L-S	7
h. NRC08-SIM08 - Swap In-service Component Cooling Water Pumps per OHP-4021.016-003 KA SYS 008 A4.01 3.3/3.1	D-P-S 2007 exam	8
In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. NRC08-INP01 - Local Operation of IRV-310, RHR Hx Outlet Valve using R12-16 (Unit 1 & 2) KA 005 A2.04 2.9/2.9	E-D-R	4P
j. NRC08-INP02 - Modify, Relatch and Start the Turbine Driven Auxiliary Feedwater Pump LS-2 (Overspeed Trip reset required) KA APE 068 AA1.02 4.3/4.5	E-D	4S
k. NRC08-INP03 - Perform an Authorized Gaseous Release per 4021.023.002 KA 071 A4.26 3.1/3.9	D-R	9
<p><sup>@</sup> 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.</p>		
* 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		

**DC Cook 2008 NRC Examination**

**ES-301**

**Control Room/In-Plant Systems Outline**

**Form ES-301-2**

Facility: <u>DC Cook</u>		Date of Examination: <u>8/18/2008</u>
Exam Level: RO <input type="checkbox"/>	SRO-I <input type="checkbox"/>	SRO-U <input checked="" type="checkbox"/>
		Operating Test No.: <u>Cook 2008</u>
<b>Control Room Systems<sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)</b>		
System / JPM Title	Type Code*	Safety Function
a.		
b. NRC08-SIM02 - Raise SI Accumulator Level per OHP-4021.008.004 Attachment 3 (with loss of pressure relief) KA 006 A4.07 4.4/4.4 (ALT)	A-D-EN-S	2
c. NRC08-SIM03 - Depressurize the RCS to Minimize Subcooling/Refill the Pressurizer during SB LOCA OHP-4023-ES-1.2. KA EPE 009 EA1.01 4.4/4.3	A-L-N-S	3
d.		
e.		
f. NRC08-SIM06 - Restore RCP Bus 2A Power to AC Bus T21A Emergency Bus(T21A on EDG) KA SYS 062 A4.07 3.1/3.1	L-EN-N-S	6
g.		
h.		
<b>In-Plant Systems<sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)</b>		
i. NRC08-INP01 - Local Operation of IRV-310, RHR Hx Outlet Valve using R12-16 (Unit 1 & 2) KA 005 A2.04 2.9/2.9	E-D-R	4P
j. NRC08-INP02 - Modify, Relatch and Start the Turbine Driven Auxiliary Feedwater Pump LS-2 (Overspeed Trip reset required) KA APE 068 AA1.02 4.3/4.5	E-D	4S
k.		
<p><b>@</b> 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.</p>		
* 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		

Facility: <u>DC Cook</u>		Date of Exam: <u>8/18/08</u>		Operating Test No.: <u>Crew 1 &amp; 2</u>														
A P P L I C A N T	E V E N T  T Y P E	Scenarios												T O T A L	M I N I M U M (*)			
		Cook 08-01			Cook 08-02			Cook 08-03			CREW POSITION				R	I	U	
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P					
RO	RX	1				1			1						3	1	1	0
<input type="checkbox"/> SRO-I	NOR	1				0			1						2	1	1	1
<input checked="" type="checkbox"/> SRO-U	I/C	4				2			4						10	4	4	2
<input type="checkbox"/>	MAJ	1				1			1						3	2	2	1
	TS	2				0			2						4	0	2	2
RO	RX		1		1						0				2	1	1	0
<input type="checkbox"/> SRO-I	NOR		0		1						1				2	1	1	1
<input checked="" type="checkbox"/> SRO-U	I/C		2		4						2				8	4	4	2
<input type="checkbox"/>	MAJ		1		1						1				3	2	2	1
	TS		0		2						0				2	0	2	2
RO	RX			0				0		1					1	1	1	0
<input checked="" type="checkbox"/> SRO-I	NOR			1				1		0					2	1	1	1
<input type="checkbox"/> SRO-U	I/C			2				2		2					6	4	4	2
<input type="checkbox"/>	MAJ			1				1		1					3	2	2	1
	TS			0				0		0					0	0	2	2
RO	RX														0	1	1	0
<input type="checkbox"/> SRO-I	NOR														0	1	1	1
<input type="checkbox"/> SRO-U	I/C														0	4	4	2
<input type="checkbox"/>	MAJ														0	2	2	1
	TS														0	0	2	2

Instructions:

1. 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.
2. 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.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: <u>DC Cook</u>		Date of Exam: <u>08/18/2008</u>						Operating Test No.: <u>Crew 3</u>									
A P P L I C A N T	E V E N T  T Y P E	Scenarios												T O T A L	M I N I M U M (*)		
		Cook 08-02			Cook 08-03												
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P													
												R	I	U			
RO <input type="checkbox"/>	RX	1			1											2	1
SRO-I <input type="checkbox"/>	NOR	1			1								2	1	1	1	
SRO-U <input type="checkbox"/>	I/C	4			4								8	4	4	2	
<input checked="" type="checkbox"/>	MAJ	1			1								2	2	2	1	
	TS	2			2								4	0	2	2	
RO <input checked="" type="checkbox"/>	RX		1			0							1	1	1	0	
SRO-I <input checked="" type="checkbox"/>	NOR		0			1							1	1	1	1	
SRO-U <input type="checkbox"/>	I/C		2			2							4	4	4	2	
<input type="checkbox"/>	MAJ		1			1							2	2	2	1	
	TS		0			0							0	0	2	2	
RO <input checked="" type="checkbox"/>	RX			0		1							1	1	1	0	
SRO-I <input checked="" type="checkbox"/>	NOR			1		0							1	1	1	1	
SRO-U <input type="checkbox"/>	I/C			2		2							4	4	4	2	
<input type="checkbox"/>	MAJ			1		1							2	2	2	1	
	TS			0		0							0	0	2	2	
RO <input type="checkbox"/>	RX												0	1	1	0	
SRO-I <input type="checkbox"/>	NOR												0	1	1	1	
SRO-U <input type="checkbox"/>	I/C												0	4	4	2	
<input type="checkbox"/>	MAJ												0	2	2	1	
	TS												0	0	2	2	

Instructions:

1. 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.
2. 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.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: <u>DC Cook</u>		Date of Exam: <u>08/18/2008</u>						Operating Test No.: <u>Crew 4</u>									
A P P L I C A N T	E V E N T  T Y P E	Scenarios												T O T A L	M I N I M U M (*)		
		Cook 08-01			Cook 08-02												
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P													
													R	I	U		
RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX			0		1								1	1	1	0
	NOR			1		0								1	1	1	1
	I/C			2		2								4	4	4	2
	MAJ			1		1								2	2	2	1
	TS			0		0								0	0	2	2
RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX		1				0							1	1	1	0
	NOR		0				1							1	1	1	1
	I/C		2				2							4	4	4	2
	MAJ		1				1							2	2	2	1
	TS		0				0							0	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX													0	1	1	0
	NOR													0	1	1	1
	I/C													0	4	4	2
	MAJ													0	2	2	1
	TS													0	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX													0	1	1	0
	NOR													0	1	1	1
	I/C													0	4	4	2
	MAJ													0	2	2	1
	TS													0	0	2	2

Instructions:

1. 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.
2. 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.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility: DC Cook

Printed: 05/06/2008

Date Of Exam: 08/28/2008

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	1	N/A			1	2	N/A			2	9	0	0	0	
	Tier Totals	4	5	4	N/A			4	5	N/A			5	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	1	0	1	1	10	0	0	0		
	Tier Totals	4	3	4	4	3	3	4	4	2	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:

- 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).
- 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.
- 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.
- 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.
- 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.
- Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
- \* 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.
- 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.
- 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: 05/06/2008

Facility: DC Cook

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.	Points
000008 Pressurizer Vapor Space Accident / 3				X			AA1.01 - PZR spray block valve and PORV block valve	4.2	1
000009 Small Break LOCA / 3		X					EK2.03 - S/Gs	3.0	1
000011 Large Break LOCA / 3				X			EA1.07 - Containment isolation system	4.4	1
000015/000017 RCP Malfunctions / 4		X					AK2.10 - RCP indicators and controls	2.8*	1
000022 Loss of Rx Coolant Makeup / 2			X				AK3.05 - Need to avoid plant transients	3.2	1
000027 Pressurizer Pressure Control System Malfunction / 3	X						AK1.01 - Definition of saturation temperature	3.1	1
000038 Steam Gen. Tube Rupture / 3						X	2.4.11 - Knowledge of abnormal condition procedures.	4.0	1
000054 Loss of Main Feedwater / 4					X		AA2.04 - Proper operation of AFW pumps and regulating valves	4.2	1
000055 Station Blackout / 6					X		EA2.03 - Actions necessary to restore power	3.9	1
000056 Loss of Off-site Power / 6			X				AK3.02 - Actions contained in EOP for loss of offsite power	4.4	1
000058 Loss of DC Power / 6				X			AA1.02 - Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector	3.1*	1
000062 Loss of Nuclear Svc Water / 4						X	2.2.40 - Ability to apply technical specifications for a system.	3.4	1
000065 Loss of Instrument Air / 8					X		AA2.05 - When to commence plant shutdown if instrument air pressure is decreasing	3.4*	1
000077 Generator Voltage and Electric Grid Disturbances / 6						X	2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
W/E04 LOCA Outside Containment / 3	X						EK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the LOCA Outside Containment	3.5	1
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4		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
W/E11 Loss of Emergency Coolant Recirc. / 4			X				EK3.1 - Facility operating 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	3.3	1

**PWR RO Examination Outline**

Printed: 05/06/2008

Facility: DC Cook

ES - 401

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

**Form ES-401-2**

<b>E/APE # / Name / Safety Function</b>	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>A1</b>	<b>A2</b>	<b>G</b>	<b>KA Topic</b>	<b>Imp.</b>	<b>Points</b>
W/E12 - Steam Line Rupture - Excessive Heat Transfer / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with Uncontrolled Depressurization of all Steam Generators	3.5	1
<b>K/A Category Totals:</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>Group Point Total:</b>	<b>18</b>	

**PWR RO Examination Outline**

Printed: 05/06/2008

Facility: DC Cook

ES - 401

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

**Form ES-401-2**

<b>E/APE # / Name / Safety Function</b>	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>A1</b>	<b>A2</b>	<b>G</b>	<b>KA Topic</b>	<b>Imp.</b>	<b>Points</b>
000001 Continuous Rod Withdrawal / 1	X						AK1.18 - Fuel temperature coefficient	3.4	1
000005 Inoperable/Stuck Control Rod / 1					X		AA2.03 - Required actions if more than one rod is stuck or inoperable	3.5	1
000024 Emergency Boration / 1					X		AA2.01 - Whether boron flow and/or MOVs are malfunctioning, from plant conditions	3.8*	1
000028 Pressurizer Level Malfunction / 2			X				AK3.05 - Actions contained in EOP for PZR level malfunction	3.7	1
000074 Inad. Core Cooling / 4						X	2.1.30 - Ability to locate and operate components, including local controls.	4.4	1
000076 High Reactor Coolant Activity / 9						X	2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	1
W/E03 LOCA Cooldown - Depress. / 4				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	4.0	1
W/E14 Loss of CTMT Integrity / 5		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	3.4	1
W/E16 High Containment Radiation / 9		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
<b>K/A Category Totals:</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>Group Point Total:</b>	<b>9</b>	

PWR RO Examination Outline

Printed: 05/06/2008

Facility: DC Cook

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.	Points
003 Reactor Coolant Pump				X								K4.07 - Minimizing RCS leakage (mechanical seals)	3.2	1
004 Chemical and Volume Control									X			A3.02 - Letdown isolation	3.6	1
005 Residual Heat Removal		X										K2.01 - RHR pumps	3.0	1
006 Emergency Core Cooling						X						K6.05 - HPI/LPI cooling water	3.0	1
007 Pressurizer Relief/Quench Tank			X									K3.01 - Containment	3.3	1
008 Component Cooling Water	X											K1.03 - PRMS	2.8*	1
010 Pressurizer Pressure Control				X								K4.02 - Prevention of uncovering PZR heaters	3.0	1
012 Reactor Protection										X		A4.06 - Reactor trip breakers	4.3	1
012 Reactor Protection								X				A2.07 - Loss of dc control power	3.2*	1
013 Engineered Safety Features Actuation										X		A4.02 - Reset of ESFAS channels	4.3	1
013 Engineered Safety Features Actuation					X							K5.02 - Safety system logic and reliability	2.9	1
022 Containment Cooling			X									K3.02 - Containment instrumentation readings	3.0	1
022 Containment Cooling											X	2.1.27 - Knowledge of system purpose and/or function.	3.9	1
025 Ice Condenser											X	2.2.12 - Knowledge of surveillance procedures.	3.7	1
025 Ice Condenser								X				A2.04 - Containment isolation	3.0*	1
026 Containment Spray				X								K4.07 - Adequate level in containment sump for suction (interlock)	3.8*	1
039 Main and Reheat Steam											X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	3.8	1
039 Main and Reheat Steam					X							K5.05 - Bases for RCS cooldown limits	2.7	1
059 Main Feedwater							X					A1.07 - Feed Pump speed, including normal control speed for ICS	2.5*	1
059 Main Feedwater									X			A3.04 - Turbine driven feed pump	2.5*	1
061 Auxiliary/Emergency Feedwater						X						K6.02 - Pumps	2.6	1
062 AC Electrical Distribution			X									K3.02 - ED/G	4.1	1
063 DC Electrical Distribution		X										K2.01 - Major DC loads	2.9*	1

**PWR RO Examination Outline**

Printed: 05/06/2008

Facility: DC Cook

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.	Points
064 Emergency Diesel Generator	X											K1.02 - ED/G cooling water system	3.1	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											K1.05 - MSIV air	3.4*	1
103 Containment							X					A1.01 - Containment pressure, temperature, and humidity	3.7	1
<b>K/A Category Totals:</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>Group Point Total:</b>		<b>28</b>

**PWR RO Examination Outline**

Printed: 05/06/2008

Facility: DC Cook

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.	Points
002 Reactor Coolant						X						K6.02 - RCP	3.6	1
011 Pressurizer Level Control		X										K2.01 - Charging pumps	3.1	1
015 Nuclear Instrumentation							X					A1.03 - NIS power indication	3.7	1
017 In-core Temperature Monitor								X				A2.02 - Core damage	3.6	1
035 Steam Generator										X		A4.01 - Shift of S/G controls between manual and automatic control, by bumpless transfer	3.7	1
045 Main Turbine Generator				X								K4.34 - Operation of CRDS in manual mode at T/G power below 15%	2.7	1
055 Condenser Air Removal			X									K3.01 - Main condenser	2.5	1
071 Waste Gas Disposal					X							K5.04 - Relationship of hydrogen/oxygen concentrations to flammability	2.5	1
079 Station Air	X											K1.01 - IAS	3.0	1
086 Fire Protection											X	2.4.8 - Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	3.8	1
<b>K/A Category Totals:</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>Group Point Total: 10</b>									

Facility: DC Cook

Printed: 04/30/2008

Date Of Exam: 08/28/2008

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	N/A			0	0	N/A			0	0	2		2	4
	Tier Totals	0	0	0	N/A			0	0	N/A			0	0	5		5	10
2. Plant Systems	1	0	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	1	1	1	3
	Tier Totals	0	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		0		2	1	2	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: 04/30/2008

Facility: DC Cook

ES - 401

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

**Form ES-401-2**

<b>E/APE # / Name / Safety Function</b>	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>A1</b>	<b>A2</b>	<b>G</b>	<b>KA Topic</b>	<b>Imp.</b>	<b>Points</b>
000007 Reactor Trip - Stabilization - Recovery / 1						X	2.2.38 - Knowledge of conditions and limitations in the facility license.	4.5	1
000025 Loss of RHR System / 4					X		AA2.04 - Location and isolability of leaks	3.6	1
000026 Loss of Component Cooling Water / 8					X		AA2.02 - The cause of possible CCW loss	3.6	1
000029 ATWS / 1						X	2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	4.8	1
000040 Steam Line Rupture - Excessive Heat Transfer / 4					X		AA2.03 - Difference between steam line rupture and LOCA	4.7	1
000057 Loss of Vital AC Inst. Bus / 6						X	2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	4.2	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>		<b>Group Point Total:</b>	<b>6</b>

**PWR SRO Examination Outline**

Printed: 04/30/2008

Facility: DC Cook

ES - 401

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

**Form ES-401-2**

<b>E/APE # / Name / Safety Function</b>	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>A1</b>	<b>A2</b>	<b>G</b>	<b>KA Topic</b>	<b>Imp.</b>	<b>Points</b>
000003 Dropped Control Rod / 1						X	2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.0	1
000061 ARM System Alarms / 7						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
000068 Control Room Evac. / 8						X	AA2.11 - Indications of natural circulation	4.4	1
W/E07 Inad. Core Cooling / 4						X	EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.9	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>Group Point Total:</b>	<b>4</b>	

PWR SRO Examination Outline

Printed: 04/30/2008

Facility: DC Cook

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.	Points
006 Emergency Core Cooling								X				A2.12 - Conditions requiring actuation of ECCS	4.8	1
007 Pressurizer Relief/Quench Tank								X				A2.02 - Abnormal pressure in the PRT	3.2	1
008 Component Cooling Water											X	2.2.44 - 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.	4.4	1
010 Pressurizer Pressure Control								X				A2.02 - Spray valve failures	3.9	1
062 AC Electrical Distribution											X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>Group Point Total:</b>	<b>5</b>							

# PWR SRO Examination Outline

Printed: 04/30/2008

Facility: DC Cook

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.	Points
034 Fuel Handling Equipment											X	A4.02 - Neutron levels	3.9	1
056 Condensate											X	2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	1
072 Area Radiation Monitoring								X				A2.01 - Erratic or failed power supply	2.9	1
<b>K/A Category Totals:</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>Group Point Total:</b>	<b>3</b>							

# Generic Knowledge and Abilities Outline (Tier 3)

## PWR SRO Examination Outline

Printed: 04/30/2008

**Facility:** DC Cook

**Form ES-401-3**

<u>Generic Category</u>	<u>KA</u>	<u>KA Topic</u>	<u>Imp.</u>	<u>Points</u>
<b>Conduct of Operations</b>	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	1
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	4.2	1
	<b>Category Total:</b>			<b>2</b>
<b>Equipment Control</b>	2.2.35	Ability to determine Technical Specification Mode of Operation.	4.5	1
	<b>Category Total:</b>			<b>1</b>
<b>Radiation Control</b>	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personal monitoring equipment, etc.	2.9	1
	2.3.6	Ability to approve release permits.	3.8	1
	<b>Category Total:</b>			<b>2</b>
<b>Emergency Procedures/Plan</b>	2.4.27	Knowledge of "fire in the plant" procedure.	3.9	1
	2.4.38	Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator if required.	4.4	1
	<b>Category Total:</b>			<b>2</b>

**Generic Total: 7**

Facility: Cook Plant Unit 1 & Unit 2 Scenario No.: COOK08-01 Op-Test No.: Sets 1 & 3

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

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

Initial Conditions: IC- 35 (960), MOL; 78% power, 1135 ppm Boron, 8 GWD, 567°F Tave  
 CBD @ 194 steps, 807 MW.

Turnover: 2CD EDG has been out of service for one day for fuel rack repairs.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP	Swap from the North to the Middle Condensate Booster Pump.
2		R-RO	Raise Turbine and Reactor Power to 100%.
3	CV09 @ 50°F	C-RO	Letdown Temperature Controller fails LOW
4	CC01A, CC02B - Preload	C-BOP TS	2E CCW pump Trips (2W CCW [Standby] Fails to Auto Start)
5	RX02E to 650°F	I-RO TS	Loop 2 Hot Leg NTP-121 Temperature Transmitter Fails High
6	RX27 to 30 over 12 min ramp	I-BOP	Main Feedwater Pump Delta-P Controller Setpoint fails low over 12 minutes.
7	RC10D to 70%	M-ALL	Loop 4 Cold Leg Primary Coolant System 700gpm Leak inside Containment over 5 minutes
8	RP13A, RP13B - Preload	C-BOP	Failure of Automatic Phase A Actuation
9	RP20B RP19G, RP20G - Preload	C-RO	Slave Relay failures: High Head Charging SI valves fail to align (also DG 2AB fails to auto start)

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

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**Simulator Instructions**  
(COOK08-01)

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Event 1 will be the swap of the Condensate Booster Pumps. The operator will place the Middle CBP in service then remove the North CBP from service in accordance with the normal operating procedure.

Event 2 will be the power escalation to 100%.

Event 3 will be a failure of the Letdown Temperature controller will cause the transmitted value to the letdown heat exchanger temperature controller and temperature indicator to fail at the selected severity level. Selection of a severity level lower than the controller setpoint (normally 120°F.) will cause the letdown temperature control valve (CRV-470) to move to its fully closed position in AUTO. Actual letdown temperature will rise resulting in a rising VCT temperatures. The operator may limit the consequences of this malfunction by taking manual control of CRV-470.

Event 4 is a trip of the operating (East) Component Cooling Water (CCW) pump. The BOP will have to start the standby pump manually (auto start failure).

Event 5 will occur after the Crew has addressed the Tech Specs for CCW. The Loop 2 Hot Leg NTP-121 Temperature Transmitter fails high. The rods will insert and power will have to be restored. The crew will need to enter an Abnormal Operating Procedure, defeat the failed channel, address Technical Specifications, and restore rod control to auto.

Event 6 occurs following the RCS Temperature restoration. The Main Feedwater Pump Delta-P Controller Setpoint fails low causing the FW pumps to slow down. The BOP will need to take manual control of FW Pump Speed to establish the proper DP to continue feeding the SGs.

Event 7 (Major Event) will occur when the SG level has been stabilized. A 700 gpm Primary System Leak in Containment will occur requiring a Reactor Trip and SI.

On the SI, various slave relay failures (Event 9) will cause the High Head Charging SI injection flowpath to fail to align and the 2AB DG to fail to auto start. The RO will need to manually align the High Head Injection Valves. The auto Phase A Isolation will also fail (Event 8) requiring manual actuation to align Phase A equipment. The crew should progress through E-0 to E-1 to ES-1.2. The scenario will terminate once a transition has been made to ES-1.2.

**Critical Tasks:**

Restore High Head Injection  
Trip RCPs

**Procedures:**

E-0 Reactor Trip or Safety Injection  
E-1 Loss of Reactor or Secondary Coolant

Facility: Cook Plant Unit 1 & Unit 2 Scenario No.: COOK08-02 Op-Test No.: Sets 1, 2 & 3

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

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

Initial Conditions: IC- 35 (960), MOL; 78% power, 1135 ppm Boron, 8 GWD, 567°F Tave  
 CBD @ 194 steps, 807 MW.

Turnover: 2CD EDG has been out of service for one day for fuel rack repairs.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP	Swap #3 Control Fluid Pump for #1 Control Fluid Pump
2		R-RO	Raise Turbine and Reactor Power to 100%.
3	RX19A @ 0	I-RO TS	Turbine Impulse Transmitter (MPC-253) fails LOW
4	RX08B @ 100%	C-RO	Pressurizer Spray Valve Controller NRV-164 fails to 100% opening 2-NRV-164
5	RX21C @ 2	I-BOP TS	SG Feed Flow Instrument (FFC-220) fails LOW
6	SW07A @ 0	C-BOP	Main Turbine Oil Cooler Controller (WRV-970) fails LOW
7a	ED19 @ 25	M-ALL	Electrical Grid Load Rejection
7b	ED01 ED25 EG01		Loss of All AC Power (2 min 10 sec delay)
8	EG08A	C-BOP	2AB EDG Speed Governor failure
9	FW48C	C-BOP	TD AFW pump fails to AUTO start

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

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**Simulator Instructions**  
**( COOK08-02 )**

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Event 1 occurs when the crew is directed start #3 Control Fluid Pump and place #1 Control Fluid Pump in AUTO to even out pump run times.

Event 2 will be the power escalation to 100% power.

Event 3 is a failure of Turbine Impulse instrument (MPC-253). This results in a control rod insertion. The associated steam flow main steam isolation setpoint signal will decrease. When the setpoint is reduced below actual steam flow the trip status lights and alarms will come in but no steam line isolation will occur until Tave is below the lo-lo Tave setpoint 541 °F. The auto rod control circuit will see a power mismatch causing the rods to move in, decreasing reactor power and Tave. The auto rod control circuit will also see a decreased Tref (min 547 deg f) causing rods to move in. RO will be required to place rod control in manual. The tref signal for the steam dump system Tave /Tref controller (load reject controller) will also increase. The steam dump load reject circuit will arm if transmitter is failed down by more than 10% power. The P-13 and P-7 Permissives will be half in. Trip status light will not come on. Crew will be required to implement AOP actions to stabilize the plant and trip Bistables.

Event 4 will be the failure of the Pressurizer Spray Valve controller for NRV-164 failing to 100% causing NRV-164 to go full open. RCS pressure will begin to lower. The RO will be required to take manual control of NRV-164 and close the spray valve then return pressure to the normal band. Pressurizer pressure control may still be operated in AUTO with NRV-163.

Event 5 will involve a LOW failure of #22 Steam Generator Feed Flow instrument (FFC-220). This will result in a rise in feedwater flow to #22 SG with corresponding SG level rise. The BOP will be required to take manual control of FRV-220. Crew will be required to implement AOP actions to stabilize the plant and trip bistables.

Event 6 is an AUTO controller failure of the Main Turbine Lube Oil Cooler temperature control valve (WRV-970). The BOP will be required to take manual control of WRV-970 and restore Main Turbine Lube Oil temperature to the normal band.

The Major Event (Events 7 – 9) will involve a GRID load rejection leading to a total loss of all AC power. The unit will trip. Failure of the only available EDG will require entry into ECA-0.0 actions. Failure of the TDAFW pump to auto start will require a manual start to restore feedwater flow. The crew will be required to take actions to restore emergency (EP) power. The crew should transition to ECA-0.1 once power has been restored to one Safeguards Bus. The scenario will terminate when the crew has restored emergency power and transitioned to ECA-0.1.

**Critical Tasks**

Establish AFW (Start TDAFWP)  
Restore Emergency Power to Safeguards Bus

**Procedures**

E-0, Reactor Trip or Safety Injection  
ECA-0.0, Loss of All AC Power

Facility: Cook Plant Unit 1 & Unit 2 Scenario No.: COOK08-03 Op-Test No.: Sets 1, & 2

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

Operators: \_\_\_\_\_  
 \_\_\_\_\_  
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Initial Conditions: IC- 35 (960), MOL; 78% power, 1135 ppm Boron, 8 GWD, 567°F Tave  
 CBD @ 194 steps, 807 MW.

Turnover: 2CD EDG has been out of service for one day for fuel rack repairs.

Event No.	Malf. No.	Event Type*	Event Description
1		N-BOP	Perform Pressurizer Heater Capacity Test (Direct BOP to Perform)
2	RCR20 @ 3	C-RO TS	PRZ PORV (NRV-153) Leak by (6 gpm) <b>NOTE: Time compression may be used as the procedure requires a 15 minute wait time after unisolating each PORV.</b>
3		R-RO	Raise Turbine and Reactor Power
4	RX05A @ 0	I-RO TS	Controlling Pressurizer Level Channel (NLP-151) fails LOW
5	FW41A to 100%	I-BOP	Hotwell Level Transmitter CLC-10 fails HIGH.
6	RX24C to 100% Ramp over 10 sec	C-BOP	FRV-220 Feedwater Control Valve Controller Fails OPEN in Auto
7	RC23B @ 40 5 min ramp	M-ALL	SGTR on #22 SG (400 gpm)
8a	RP10A RP11C	C-RO	Train A Safety Injection signal failure to actuate in AUTO or Manual mode (PRZ panel only)
8b	RP10B RP11B RP11D	C-RO C-BOP	Train B Safety Injection signal failure to actuate in AUTO or Manual mode

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

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**Simulator Instructions**  
**( COOK08-03 )**

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Event 1 occurs as the crew is directed to perform Pressurizer Heater Capacity Test prior the power escalation.

Event 2 occurs following the Pressurizer Heater Test. Pressurizer PORV NRV-153 drifts partially open. The crew will need to close Block valve (NMO-153) to stop NRV-153 leakage. Crew will be required to address PORV Technical Specifications. **NOTE: Time compression may be used as the procedure requires a 15 minute wait time after unisolating each PORV.**

Event 3 begins after the Pressurizer PORV failure. The crew is directed to begin raising power to 100%.

Event 4 occurs following a short power escalation. The controlling Pressurizer Level channel NLP-151 fails LOW. Charging flow control valve (QV-251) opens to raise charging flow which causes actual pressurizer level to rise. Pressurizer water level low control alarm comes in, a letdown isolation occurs, all pressurizer heaters will de-energize. The RO will need to take manual control of the Pressurizer Level controller and restore level. The crew should implement an Abnormal Operating Procedure, stabilize the plant, trip bistables, select an operable channel, and restore level control to auto.

Event 5 occurs when Hotwell Level Transmitter CLC-10 fails HIGH. The high failure will cause the Condensate Makeup valve (CRV-55) to fully close and the Condensate Letdown Valve (CRV-155) to fully open causing a lowering of hotwell level. The BOP will be required to take manual control of the Hotwell Level Controller and return hotwell level to a normal band. The non-failed hotwell level input may be selected for subsequent auto control.

Event 6 is the failure of the controller for #22 SG Feed Reg Valve to 100% in AUTO. The BOP will be required to take manual control of FRV-220 and return SG level to the normal band. The controller will NOT be able to be placed back in AUTO.

Event 7 – 8 (Major Event) involves a Steam Generator Tube Rupture. The SGTR will build in to 400 gpm over 5 minutes. The crew will perform a Reactor Trip and Safety Injection. As the crew performs the actions of E-0, Safety Injection signal will fail to AUTO actuate. Train A Safety Injection can be actuated only from the SIS panel switch. The crew should identify the Steam Generator Tube Rupture on #22 SG. The crew will transition to E-3 to isolate #22 SG. The scenario will terminate when the crew has completed the cooldown, depressurization, and terminated SI.

**Critical Tasks**

- Manually actuate at least one train of SI before completion of E-0, Step 5.
- Isolate #22 Steam Generator
- Cooldown RCS
- Depressurize RCS to stop #22 SGTR leakage

**Procedures**

- E-0, Reactor Trip or Safety Injection
- E-3, Steam Generator Tube Rupture