

2009 FERMI 2 POWER PLANT

INITIAL EXAMINATION

OUTLINE SUBMITTAL

Joseph H. Pious
Site Vice President

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DTE Energy



10 CFR 55.40

December 19, 2008
NRC-08-0077

Mr. Hironori Peterson
Chief, Operations Branch
Division of Reactor Safety
Region III
U. S. Nuclear Regulatory Commission
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Fermi 2 Initial License Operator Examination Outline

Enclosed please find the proposed examination outline for the upcoming Fermi 2 Initial License Examination that is scheduled for the week of March 16, 2009:

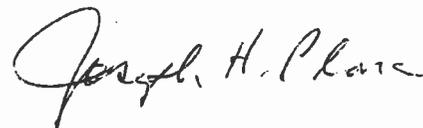
- Examination Outline Quality Checklist (Form ES-201-2)
- Photocopies of Examination Security Agreements (Form ES-201-3)
- RO Administrative Topics Outline(s) (Form ES-301-1)
- SRO Administrative Topics Outline(s) (Form ES-301-1)
- RO Control Room/In-Plant Systems Outline (Form ES-301-2)
- SRO Upgrade Control Room/In-Plant Systems Outline (Form ES-301-2)
- SRO Instant Control Room/In-Plant Systems Outline (Form ES-301-2)
- Transient and Event Checklist (Form ES-301-5)
- Scenario Outlines (Form ES-D-1)
- RO BWR Examination Outline (Form ES-401-1)
- SRO BWR Examination Outline (Form ES-401-1)

- Generic Knowledge and Abilities Outline (Form ES-401-3)
- Record of Rejected K/As (Form ES-401-4)

The examination outline was developed using the appropriate guidance contained in Revision 9, NUREG 1021, Supplement 1. These materials shall be withheld from public disclosure until after the examinations are complete.

We look forward to working with you and your examination team during the examination development and administration process. If you have any questions or comments regarding the contents of the items listed above, please contact Mr. Michael G. Doucet, General Supervisor, Operations Training at (734) 586-4961.

Sincerely,



Enclosures

cc: [w/o Enclosures],
NRC Project Manager
Reactor Projects Chief, Branch 4, Region III
NRC Resident Office
Document Control Desk
Washington D C

USNRC
NRC-08-0077
Page 3

bcc: [w/o Enclosures]
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Electronic Licensing Library (ELL) (200 TAC) [w/o Enclosures]
Information Management (140 NOC) [w/o Enclosures]
NSRG Administrator (200 TAC) [w/o Enclosures]
NRR Chron File [w/o Enclosures]
M. J. Doucet [w/o Enclosures]
P. A. Tarwacki [w/o Enclosures]

Facility Fermi 2		Date of Examination 3/16/2009		
Item	Task Description	Initials		
		a	b*	c#
1. W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	DB	D	Chm
	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.	BB	D	Chm
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	BB	D	Chm
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	BB	D	Chm
2. S I M U L A T O R	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.	BB	D	Chm
	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 scenarios will not be repeated on subsequent days.	BB	D	Chm
	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.	BB	D	Chm
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	BB	D	Chm
	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	BB	D	Chm
	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.	BB	D	Chm
4. G E N E R A L	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam section.	BB	D	Chm
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	BB	D	Chm
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	BB	D	Chm
	d. Check for duplication and overlap among exam sections.	BB	D	Chm
	e. Check the entire exam for balance of coverage.	BB	D	Chm
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	BB	D	Chm
a. Author	<i>Theresa J. Smith</i>	Printed Name / Signature		Date
b. Facility Reviewer (*)	<i>Shel J. Smith</i>			12-18-08
c. NRC Chief Examiner (#)	<i>Carl Moore</i>			12-18-08
d. NRC Supervisor	<i>Glenn A. Peterson</i>			1/6/09 * 1/15/09 *
NOTE: # Independent NRC Reviewer initial items in Column "c"; chief examiner concurrence required * Not applicable for NRC-prepared examination outlines				

** OUTLINE RECEIVED 12/23/08. NRC REVIEW COMPLETE 1/6/09 DUE TO ANNUAL LEAVE.

* Reviewed week following - holidays + annual leave also due to BC unavailability in other exam observations.

Facility: Fermi 2		Date of Examination: 3/16/2009
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: 2009-01
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	S, D	Control Room Nuclear Supervising Operator short term relief IAW MOP07. GENERIC 2.1.3 Knowledge of shift or short-term relief turnover practices. (CFR 41.10 / 45.13) IMPORTANCE RO 3.7 SRO 3.9
Conduct of Operations	S, D	Demonstrating Operability of AC Sources IAW 24.000.01, Att. 28.b GENERIC 2.1.29 Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc. (CFR: 41.10 / 45.1 / 45.12) IMPORTANCE RO 4.1 SRO 4.0
Equipment Control		
Radiation Control	R, N	Recognize need and sign on to new task on RWP. GENERIC 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions. (CFR: 41.12 / 45.10) IMPORTANCE RO 3.5 SRO 3.6
Emergency Procedures/Plan	S, D	Requests for ambulance support made by the Control Room IAW EP-290. GENERIC 2.4.43 Knowledge of emergency communications systems and techniques. (CFR: 41.10/ 45.13) IMPORTANCE RO 3.2 SRO 3.8

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)

Facility: Fermi 2		Date of Examination: 3/16/2009
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: 2009-01
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	S, D	Perform CRS Short Term Relief IAW MOP07. GENERIC 2.1.3 Knowledge of shift or short-term relief turnover practices. (CFR 41.10 / 45.13) IMPORTANCE RO 3.7 SRO 3.9
Conduct of Operations	S(R), N	Review Results of Jet Pump Operability Test. GENERIC 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12) IMPORTANCE RO 3.9 SRO 4.2
Equipment Control	S, M	Identify less than required AC electrical power distribution subsystems OPERABLE and perform remedial action. GENERIC 2.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (CFR: 41.10 / 43.2 / 45.13) IMPORTANCE RO 3.1 SRO 4.2
Radiation Control	R, N	Recognize need and sign on to new task on RWP. GENERIC 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions. (CFR: 41.12 / 45.10) IMPORTANCE RO 3.5 SRO 3.6
Emergency Procedures/Plan	S(R), M	Perform Emergency Classification IAW EP-101 for a Plant Event. GENERIC 2.4.41 Knowledge of the emergency action level thresholds and classifications. (CFR: 41.10 / 43.5 / 45.11) IMPORTANCE RO 2.9 SRO 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)

Facility: Fermi 2		Date of Examination: 3/16/2009
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: 2009-01
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
<p>a. Rod Pattern Adjustment/Difficult Rod Movement</p> <p>201003 Control Rod and Drive Mechanism</p> <p>A2. Ability to (a) predict the impacts of the following on the CONTROL ROD AND DRIVE MECHANISM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.01 Stuck rod.</p> <p>(CFR: 41.5 / 45.6)</p> <p>IMPORTANCE RO 3.4 SRO 3.6</p>	A, M, S	SF-1
<p>b. RWCU Temperature Control During Blowdown</p> <p>204000 Reactor Water Cleanup System</p> <p>A1. Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER CLEANUP SYSTEM controls including: A1.07 RWCU drain flow</p> <p>(CFR: 41.5 / 45.5)</p> <p>IMPORTANCE RO 2.9 SRO 2.9</p>	A, D, L, S	SF-2
<p>c. On-Load Closure of a Low Pressure Intercept Valve</p> <p>241000 Reactor/Turbine Pressure Regulating System</p> <p>A4. Ability to manually operate and/or monitor in the control room: A4.09 Combined intermediate valves (operation)</p> <p>(CFR: 41.7 / 45.5 to 45.8)</p> <p>IMPORTANCE RO 3.2 SRO 3.1</p>	N, S	SF-3
<p>d. Manually Initiate Core Spray System with E21-F005A(B) Stuck Shut.</p> <p>209001 Low Pressure Core Spray System</p> <p>A2. Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.02 Valve closures</p> <p>(CFR: 41.5 / 45.6)</p> <p>IMPORTANCE RO 3.2 SRO 3.2</p>	A, D, EN, S	SF-4

<p>e. HPCI Steam Leak with Automatic Isolation Failure - Manual Isolation Successful</p> <p>295032 High Secondary Containment Area Temperature</p> <p>EA1. Ability to operate and/or monitor the following as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE: EA1.05 Affected systems so as to isolate damaged portions.</p> <p>(CFR: 41.7 / 45.6)</p> <p>IMPORTANCE RO 3.7 SRO 3.9</p>	<p>A, N, EN, S</p>	<p>SF-5</p>
<p>f. Restore Off-Site Power to an ESF and EDG Bus.</p> <p>262001 A.C. Electrical Distribution</p> <p>A4. Ability to manually operate and/or monitor in the control room: A4.02 Synchroscope, including understanding of running and incoming voltages.</p> <p>(CFR: 41.7 / 45.5 to 45.8)</p> <p>IMPORTANCE RO 3.4 SRO 3.4</p>	<p>N, L, EN, S</p>	<p>SF-6</p>
<p>g. Perform Manual Scram Functional Test</p> <p>212000 Reactor Protection System</p> <p>A2. Ability to (a) predict the impacts of the following on the REACTOR PROTECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.03 Surveillance testing.</p> <p>(CFR: 41.5 / 45.6)</p> <p>IMPORTANCE RO 3.3 SRO 3.5</p>	<p>D, S</p>	<p>SF-7</p>
<p>h. Shift CCHVAC to Division 2 Operating, Division 1 in Stby</p> <p>290003 Control Room HVAC</p> <p>A2. Ability to (a) predict the impacts of the following on the CONTROL ROOM HVAC and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.01 Initiation/reconfiguration.</p> <p>(CFR: 41.5 / 45.6)</p> <p>IMPORTANCE RO 3.1 SRO 3.2</p>	<p>D, S, EN</p>	<p>SF-9</p>

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Startup a UPS Rectifier Charger/Inverter 262001 A.C. Electrical Distribution A1. Ability to predict and/or monitor changes in parameters associated with operating the A.C. ELECTRICAL DISTRIBUTION controls including: A1.05 Breaker lineups. (CFR: 41.5 / 45.5) IMPORTANCE RO 3.2 SRO 3.5	D, R	SF-6
j. Defeat of RBCCW/EECW to Drywell Isolations 295024 High Drywell Pressure EA1. Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: EA1.07 PCIS/NSSSS (CFR: 41.7 / 45.6) IMPORTANCE RO 3.8 SRO 3.9	D, E, EN, R	SF-8
k. Restore D1/D2 Fuel Pool Ventilation Exhaust Radiation Monitors Following Maintenance 272000 Radiation Monitoring System A1. Ability to predict and/or monitor changes in parameters associated with operating the RADIATION MONITORING SYSTEM controls including: A1.01 Lights, alarms, and indications associated with normal operations. (CFR: 41.5 / 45.5) IMPORTANCE RO 3.2 SRO 3.2	D, EN, R	SF-9
<p>[@] 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: Fermi 2		Date of Examination: 3/16/2009
Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: 2009-01
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. Rod Pattern Adjustment/Difficult Rod Movement 201003 Control Rod and Drive Mechanism A2. Ability to (a) predict the impacts of the following on the CONTROL ROD AND DRIVE MECHANISM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.01 Stuck rod. (CFR: 41.5 / 45.6) IMPORTANCE RO 3.4 SRO 3.6	A, M, S	SF-1
b. RWCU Temperature Control During Blowdown 204000 Reactor Water Cleanup System A1. Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER CLEANUP SYSTEM controls including: A1.07 RWCU drain flow (CFR: 41.5 / 45.5) IMPORTANCE RO 2.9 SRO 2.9	A, D, L, S	SF-2
c. On-Load Closure of a Low Pressure Intercept Valve 241000 Reactor/Turbine Pressure Regulating System A4. Ability to manually operate and/or monitor in the control room: A4.09 Combined intermediate valves (operation) (CFR: 41.7 / 45.5 to 45.8) IMPORTANCE RO 3.2 SRO 3.1	N, S	SF-3

<p>d. Manually Initiate Core Spray System with E21-F005A(B) Stuck Shut.</p> <p>209001 Low Pressure Core Spray System</p> <p>A2. Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.02 Valve closures</p> <p>(CFR: 41.5 / 45.6)</p> <p>IMPORTANCE RO 3.2 SRO 3.2</p>	<p>A, D, EN, S</p>	<p>SF-4</p>
<p>e. HPCI Steam Leak with Automatic Isolation Failure - Manual Isolation Successful</p> <p>295032 High Secondary Containment Area Temperature</p> <p>EA1. Ability to operate and/or monitor the following as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE : EA1.05 Affected systems so as to isolate damaged portions.</p> <p>(CFR: 41.7 / 45.6)</p> <p>IMPORTANCE RO 3.7 SRO 3.9</p>	<p>A, N, EN, S</p>	<p>SF-5</p>
<p>f. Restore Off-Site Power to an ESF and EDG Bus.</p> <p>262001 A.C. Electrical Distribution</p> <p>A4. Ability to manually operate and/or monitor in the control room: A4.02 Synchroscope, including understanding of running and incoming voltages.</p> <p>(CFR: 41.7 / 45.5 to 45.8)</p> <p>IMPORTANCE RO 3.4 SRO 3.4</p>	<p>N, L, EN, S</p>	<p>SF-6</p>
<p>g.</p>		
<p>h. Shift CCHVAC to Division 2 Operating, Division 1 in Stby</p> <p>290003 Control Room HVAC</p> <p>A2. Ability to (a) predict the impacts of the following on the CONTROL ROOM HVAC and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.01 Initiation/reconfiguration.</p> <p>(CFR: 41.5 / 45.6)</p> <p>IMPORTANCE RO 3.1 SRO 3.2</p>	<p>D, S, EN</p>	<p>SF-9</p>

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Startup a UPS Rectifier Charger/Inverter 262001 A.C. Electrical Distribution A1. Ability to predict and/or monitor changes in parameters associated with operating the A.C. ELECTRICAL DISTRIBUTION controls including: A1.05 Breaker lineups. (CFR: 41.5 / 45.5) IMPORTANCE RO 3.2 SRO 3.5	D, R	SF-6
j. Defeat of RBCCW/EECW to Drywell Isolations 295024 High Drywell Pressure EA1. Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: EA1.07 PCIS/NSSSS (CFR: 41.7 / 45.6) IMPORTANCE RO 3.8 SRO 3.9	D, E, EN, R	SF-8
k. Restore D1/D2 Fuel Pool Ventilation Exhaust Radiation Monitors Following Maintenance 272000 Radiation Monitoring System A1. Ability to predict and/or monitor changes in parameters associated with operating the RADIATION MONITORING SYSTEM controls including: A1.01 Lights, alarms, and indications associated with normal operations. (CFR: 41.5 / 45.5) IMPORTANCE RO 3.2 SRO 3.2	D, EN, R	SF-9
<p>[@] 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 (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$	

Facility: Fermi 2		Date of Examination: 3/16/2009
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: 2009-01
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.		
b. RWCU Temperature Control During Blowdown 204000 Reactor Water Cleanup System A1. Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER CLEANUP SYSTEM controls including: A1.07 RWCU drain flow (CFR: 41.5 / 45.5) IMPORTANCE RO 2.9 SRO 2.9	A, D, L, S	SF-2
c.		
d.		
e. HPCI Steam Leak with Automatic Isolation Failure - Manual Isolation Successful 295032 High Secondary Containment Area Temperature EA1. Ability to operate and/or monitor the following as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE: EA1.05 Affected systems so as to isolate damaged portions. (CFR: 41.7 / 45.6) IMPORTANCE RO 3.7 SRO 3.9	A, N, EN, S	SF-5
f.		
g.		
h.		

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Startup a UPS Rectifier Charger/Inverter 262001 A.C. Electrical Distribution A1. Ability to predict and/or monitor changes in parameters associated with operating the A.C. ELECTRICAL DISTRIBUTION controls including: A1.05 Breaker lineups. (CFR: 41.5 / 45.5) IMPORTANCE RO 3.2 SRO 3.5	D, R	SF-6
j. Defeat of RBCCW/EECW to Drywell Isolations 295024 High Drywell Pressure EA1. Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: EA1.07 PCIS/NSSSS (CFR: 41.7 / 45.6) IMPORTANCE RO 3.8 SRO 3.9	D, E, EN, R	SF-8
k. Restore D1/D2 Fuel Pool Ventilation Exhaust Radiation Monitors Following Maintenance 272000 Radiation Monitoring System A1. Ability to predict and/or monitor changes in parameters associated with operating the RADIATION MONITORING SYSTEM controls including: A1.01 Lights, alarms, and indications associated with normal operations. (CFR: 41.5 / 45.5) IMPORTANCE RO 3.2 SRO 3.2	D, EN, R	SF-9
@ 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		
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(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: Fermi-2		Date of Exam: 3/16/09			Operating Test Number: 2009-1												
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		
RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	RX							5						1	1	1	0
	NOR			1										1	1	1	1
	I/C			5,6,12,13				7						5	4	4	2
	MAJ			7,8				8,12						4	2	2	1
	TS													0	0	2	2
RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U	RX					7								1	1	1	0
	NOR									1				1	1	1	1
	I/C					2,3,5,6				3,4,10,12				8	4	4	2
	MAJ					10				8,12				3	2	2	1
	TS													0	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>	RX	2												1	1	1	0
	NOR	1												1	1	1	1
	I/C	3,5,6,9,12,13												6	4	4	2
	MAJ	7,8												2	2	2	1
	TS	4,5												2	0	2	2
RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U	RX		2			7								2	1	1	0
	NOR					1								1	1	1	1
	I/C		3,9			2,4,5,6,11								7	4	4	2
	MAJ		7,8			10								3	2	2	1
	TS					3,5,7								3	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 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: Fermi-2		Date of Exam: 3/16/09											Operating Test Number: 2009-1				
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M (*)		
		1			2			3			4				R	I	U
		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													
RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX				7									1	1	1	0
	NOR			1										1	1	1	1
	I/C			5,6,12,13	3,5,6									7	4	4	2
	MAJ			7,8	10									3	2	2	1
	TS													0	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>	RX	2												1	1	1	0
	NOR	1												1	1	1	1
	I/C	3,5,6,9,12,13												6	4	4	2
	MAJ	7,8												2	2	2	1
	TS	4,5												2	0	2	2
RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/>	RX		2		7									2	1	1	0
	NOR				1									1	1	1	1
	I/C		3,9		4,5,6,11									6	4	4	2
	MAJ		7,8		10									3	2	2	1
	TS				3,5,7									3	0	2	2
RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														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 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 (IC) 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: Fermi 2		Date of Exam: 3/16/09															
Tier	Group	RO K/A Category Points											SRO-Only Points				
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total	
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	4	N/A			4	20			
	2	1	2	1	N/A			1	1	N/A			1	7			
	Tier Totals	4	5	4				4	5				5	27			
2. Plant Systems	1	2	2	2	2	1	3	3	3	2	3	3	26				
	2	2	1	1	1	1	1	1	1	1	1	1	12				
	Tier Totals	4	3	3	3	2	4	4	4	3	4	4	38				
3. Generic Knowledge and Abilities Categories				1	2	3	4					10	1	2	3	4	
				3	2	2	3										

- Note:
- Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO 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 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.

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO / SRO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					X		AA2 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION : AA2.04 - Individual jet pump flows	3.0	RO1
295003 Partial or Complete Loss of AC / 6						X	2.2.40 - Ability to apply Technical Specifications for a system.	3.4	RO2
295004 Partial or Total Loss of DC Pwr / 6	X						AK1 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : AK1.05 - Loss of breaker protection	3.3	RO3
295005 Main Turbine Generator Trip / 3		X					AK2 - Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following : AK2.04 - Main generator protection	3.3	RO4
295006 SCRAM / 1			X				AK3 - Knowledge of the reasons for the following responses as they apply to SCRAM : AK3.02 – Reactor power response	4.1	RO5
295016 Control Room Abandonment / 7				X			AA1 - Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT : AA1.06 - Reactor water level	4.0	RO6
295018 Partial or Total Loss of CCW / 8					X		AA2 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : AA2.05 – System pressure	2.9	RO7
295019 Partial or Total Loss of Inst. Air / 8						X	2.1.30 - Ability to locate and operate components, including local controls.	4.4	RO8
295021 Loss of Shutdown Cooling / 4	X						AK1 - Knowledge of the operational implications of the following concepts as they apply to LOSS OF SHUTDOWN COOLING : AK1.02 - Thermal stratification	3.3	RO9
295023 Refueling Acc / 8		X					AK2 - Knowledge of the interrelations between REFUELING ACCIDENTS and the following : AK2.03 – Radiation monitoring equipment	3.4	RO10
295024 High Drywell Pressure / 5			X				EK3 - Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL PRESSURE : EK3.08 – Containment spray	3.7	RO11
295025 High Reactor Pressure / 3				X			EA1 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE : EA1.03 - Safety/relief valves	4.4	RO12
295026 Suppression Pool High Water Temp. / 5					X		EA2 - Ability to determine and/or interpret the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE : EA2.03 – Reactor pressure	3.9	RO13
295027 High Containment Temperature / 5							DELETED (SEE ES-401-4)	N/A	N/A
295028 High Drywell Temperature / 5						X	2.4.11 - Knowledge of abnormal condition procedures.	4.0	RO14

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO / SRO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295030 Low Suppression Pool Wtr Lvl / 5	X						EK1 - Knowledge of the operational implications of the following concepts as they apply to LOW SUPPRESSION POOL WATER LEVEL : EK1.02 - Pump NPSH	3.5	RO15
295031 Reactor Low Water Level / 2		X					EK2 - Knowledge of the interrelations between REACTOR LOW WATER LEVEL and the following : EK2.01 - Reactor water level indication	4.4	RO16
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			X				EK3 - Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : EK3.02 - SBLC Injection	4.3	RO17
295038 High Off-site Release Rate / 9				X			EA1 - Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE : EA1.06 - Plant ventilation	3.5	RO18
600000 Plant Fire On Site / 8					X		AA2 - Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE : AA2.17 - Systems that may be affected by the fire	3.1	RO19
700000 Generator Voltage and Electric Grid Disturbances						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.5	RO20
K/A Category Totals:	3	3	3	3	4	4	Group Point Total:		20

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 2 (RO / SRO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3							Not Randomly Selected		
295007 High Reactor Pressure / 3		X					AK2 - Knowledge of the interrelations between HIGH REACTOR PRESSURE and the following : AK2.03 - RHR/LPCI	3.1	RO21
295008 High Reactor Water Level / 2							Not Randomly Selected		
295009 Low Reactor Water Level / 2			X				AK3 - Knowledge of the reasons for the following responses as they apply to LOW REACTOR WATER LEVEL : AK3.01 - Recirculation pump run back:	3.2	RO22
295010 High Drywell Pressure / 5							Not Randomly Selected		
295011 High Containment Temp / 5							DELETED (SEE ES-401-4)	N/A	N/A
295012 High Drywell Temperature / 5							Not Randomly Selected		
295013 High Suppression Pool Temp. / 5							Not Randomly Selected		
295014 Inadvertent Reactivity Addition / 1				X			AA1 - Ability to operate and/or monitor the following as they apply to INADVERTENT REACTIVITY ADDITION : AA1.03 - RMCS	3.5	RO23
295015 Incomplete SCRAM / 1							Not Randomly Selected		
295017 High Off-site Release Rate / 9					X		AA2 - Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : AA2.04 - Source of off-site release	3.6	RO24
295020 Inadvertent Cont. Isolation / 5 & 7							Not Randomly Selected		
295022 Loss of CRD Pumps / 1							Not Randomly Selected		
295029 High Suppression Pool Wtr Lvl / 5							Not Randomly Selected		
295032 High Secondary Containment Area Temperature / 5							Not Randomly Selected		
295033 High Secondary Containment Area Radiation Levels / 9						X	2.4.6 - Knowledge of EOP mitigation strategies.	3.7	RO25
295034 Secondary Containment Ventilation High Radiation / 9							Not Randomly Selected		
295035 Secondary Containment High Differential Pressure / 5	X						EK1 - Knowledge of the operational implications of the following concepts as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE : EK1.01 – Secondary containment integrity	3.9	RO26

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 2 (RO / SRO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G 3	K/A Topic(s)	IR	#
295036 Secondary Containment High Sump/Area Water Level / 5							Not Randomly Selected		
500000 High CTMT Hydrogen Conc. / 5		X					EK2 - Knowledge of the interrelations between HIGH CONTAINMENT HYDROGEN CONCENTRATIONS the following : EK2.06 – Wet Well Spray system	3.0	RO27
K/A Category Totals:	1	2	1	1	1	1	Group Point Total:		7

ES-401		BWR Examination Outline Plant Systems – Tier 2/Group 1 (RO / SRO)										Form ES-401-1		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection Mode							X	X				K6 - Knowledge of the effect that a loss or malfunction of the following will have on the RHR/LPCI: INJECTION MODE: K6.11 - ADS A1 - Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: INJECTION MODE controls including : A1.04 - System Pressure	4.1/ 3.6	RO 28 RO 49
205000 Shutdown Cooling								X				A1 - Ability to predict and/or monitor changes in parameters associated with operating the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) controls including : A1.09 - SDC/RHR pump/system discharge pressure	2.8	RO 29
206000 HPCI									X			A2 - Ability to (a) predict the impacts of the following on the HIGH PRESSURE COOLANT INJECTION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations : A2.09 - Low condensate storage tank level	3.5	RO 30
207000 Isolation (Emergency) Condenser												DELETED (See ES-401-4)	N/A	N/A
209001 LPCS									X		X	A4 - Ability to manually operate and/or monitor in the control room : A4.05 - Manual initiation controls A2 - Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations : A2.02 - Valve closures	3.8/ 3.2	RO 31 RO 50
209002 HPCS												DELETED (See ES-401-4)	N/A	N/A
211000 SLC											X	2.4.35 - Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	3.8	RO 32
212000 RPS		X									X	K1 - Knowledge of the physical connections and/or cause-effect relationships between REACTOR PROTECTION SYSTEM and the following : K1.11 - Condenser vacuum A3 - Ability to monitor automatic operations of the REACTOR PROTECTION SYSTEM including : A3.06 - Main turbine trip	3.3/ 4.2	RO 33 RO 51
215003 IRM			X								X	K2 - Knowledge of electrical power supplies to the following : K2.01 - IRM channels/detectors A4 - Ability to manually operate and/or monitor in the control room : A4.01 - IRM recorder indication	2.5/ 3.3	RO 34 RO 52

ES-401		BWR Examination Outline Plant Systems – Tier 2/Group 1 (RO / SRO)											Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
215004 Source Range Monitor			X									K3 - Knowledge of the effect that a loss or malfunction of the SOURCE RANGE MONITOR (SRM) SYSTEM will have on following : K3.02 - Reactor manual control	3.4	RO 35
215005 APRM / LPRM				X								K4 - Knowledge of AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM design feature(s) and/or interlocks which provide for the following : K4.07 - Flow biased trip setpoints	3.7	RO 36
217000 RCIC					X							K5 - Knowledge of the operational implications of the following concepts as they apply to REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) : K5.06 - Turbine operation	2.7	RO 37
218000 ADS						X						K6 - Knowledge of the effect that a loss or malfunction of the following will have on the AUTOMATIC DEPRESSURIZATION SYSTEM : K6.06 - D.C. power	3.4	RO 38
223002 PCIS/Nuclear Steam Supply Shutoff							X					A1 - Ability to predict and/or monitor changes in parameters associated with operating the PRIMARY CONTAINMENT ISOLATION SYSTEM/ NUCLEAR STEAM SUPPLY SHUT-OFF controls including : A1.01 - System indicating lights and alarms	3.5	RO 39
239002 SRVs								X				A2 - Ability to (a) predict the impacts of the following on the RELIEF/SAFETY VALVES ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations : A2.03 – Stuck Open SRV	4.1	RO 40
259002 Reactor Water Level Control									X			A3 - Ability to monitor automatic operations of the REACTOR WATER LEVEL CONTROL SYSTEM including : A3.06 Reactor water level setpoint setdown following a reactor scram	3.0	RO 41
261000 SGTS										X		A4 - Ability to manually operate and/or monitor in the control room : A4.03 - Fan	3.0	RO 42
262001 AC Electrical Distribution											X	2.1.28 Knowledge of the purpose and function of major system components and controls.	4.1	RO 43
262002 UPS (AC/DC)	X											K1 - Knowledge of the physical connections and/or cause - effect relationships between UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) and the following : K1.03 - Rod position information	2.7	RO 44
263000 DC Electrical Distribution		X										K2 - Knowledge of electrical power supplies to the following : K2.01 - Major D.C. loads	3.1	RO 45

ES-401		BWR Examination Outline Plant Systems – Tier 2/Group 1 (RO / SRO)											Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
264000 EDGs			X									K3 - Knowledge of the effect that a loss or malfunction of the EMERGENCY GENERATORS (DIESEL/JET) will have on following : K3.01 - Emergency core cooling systems	4.2	RO 46
300000 Instrument Air				X							X	K4 - Knowledge of (INSTRUMENT AIR SYSTEM) design feature(s) and or interlocks which provide for the following : K4.02 - Cross-over to other air systems 2.4.2 Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions	3.0/ 4.5	RO 47 RO 53
400000 Component Cooling Water						X						K6 - Knowledge of the effect that a loss or malfunction of the following will have on the CCWS : K6.05 - Pumps	3.0	RO 48
K/A Category Totals:	2	2	2	2	1	3	3	3	2	3	3	Group Point Total:		26

ES-401		BWR Examination Outline Plant Systems – Tier 2/Group 2 (RO / SRO)											Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
201001 CRD Hydraulic												Not Randomly Selected		
201002 RMCS	X											K1 - Knowledge of the physical connections and/or cause effect relationships between REACTOR MANUAL CONTROL SYSTEM and the following : K1.02 – Control rod drive mechanism	3.0	RO 54
201003 Control Rod and Drive Mechanism			X									K3 - Knowledge of the effect that a loss or malfunction of the CONTROL ROD AND DRIVE MECHANISM will have on following : K3.01 – Reactor power	3.2	RO 55
201004 RSCS												DELETED (See ES-401-4)		
201005 RCIS												DELETED (See ES-401-4)		
201006 RWM												Not Randomly Selected		
202001 Recirculation		X										K2 - Knowledge of electrical power supplies to the following : K2.02 – MG sets	3.2	RO 56
202002 Recirculation Flow Control				X								K4 - Knowledge of RECIRCULATION FLOW CONTROL SYSTEM design feature(s) and/or interlocks which provide for the following : K4.07 - Minimum and maximum pump speed setpoints	2.9	RO 57
204000 RWCU					X							K5 - Knowledge of the operational implications of the following concepts as they apply to REACTOR WATER CLEANUP SYSTEM : K5.05 - Flow controllers	2.6	RO 58
214000 RPIS												Not Randomly Selected		
215001 Traversing In-core Probe												Not Randomly Selected		
215002 RBM												Not Randomly Selected		
216000 Nuclear Boiler Inst.												Not Randomly Selected		
219000 RHR/LPCI: Torus/Pool Cooling Mode						X						K6 - Knowledge of the effect that a loss or malfunction of the following will have on the RHR/LPCI: TORUS/ SUPPRESSION POOL COOLING MODE : K6.09 – Nuclear Boiler Instrumentation	3.0	RO 59
223001 Primary CTMT and Aux.												Not Randomly Selected		

ES-401		BWR Examination Outline Plant Systems – Tier 2/Group 2 (RO / SRO)											Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
226001 RHR/LPCI: CTMT Spray Mode												Not Randomly Selected		
230000 RHR/LPCI: Torus/Pool Spray Mode							X					A1- Ability to predict and/or monitor changes in parameters associated with operating the RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE controls including: A1.02 – Suppression pool temp.	3.7	RO 60
233000 Fuel Pool Cooling/Cleanup												Not Randomly Selected		
234000 Fuel Handling Equipment												Not Randomly Selected		
239001 Main and Reheat Steam								X				A2 - Ability to (a) predict the impacts of the following on the MAIN AND REHEAT STEAM SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations : A2.07 - Main steam area high temperature or differential temperature high	3.8	RO 61
239003 MSIV Leakage Control												DELETED (See ES-401-4)		
241000 Reactor/Turbine Pressure Regulator												Not Randomly Selected		
245000 Main Turbine Gen. / Aux.												Not Randomly Selected		
256000 Reactor Condensate									X			A3 - Ability to monitor automatic operations of the REACTOR CONDENSATE SYSTEM including : A3.03 – System pressure	2.9	RO 62
259001 Reactor Feedwater										X		A4 - Ability to manually operate and/or monitor in the control room : A4.05 – Reactor water level	4.0	RO 63
268000 Radwaste												Not Randomly Selected		
271000 Offgas												Not Randomly Selected		
272000 Radiation Monitoring												Not Randomly Selected		
286000 Fire Protection											X	2.4.46 - Ability to verify that the alarms are consistent with the plant conditions.	4.2	RO 64
288000 Plant Ventilation	X											K1 - Knowledge of the physical connections and/or cause effect relationships between PLANT VENTILATION SYSTEMS and the following : K1.03 – Standby gas treatment	3.7	RO 65
290001 Secondary CTMT												Not Randomly Selected		
290003 Control Room HVAC												Not Randomly Selected		
290002 Reactor Vessel Internals												Not Randomly Selected		
K/A Category Totals:	2	1	1	1	1	1	1	1	1	1	1	Group Point Total:		12

Facility: Fermi 2														Date of Exam: 3/16/09				
Tier	Group	RO K/A Category Points											SRO-Only Points					
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total		
1. Emergency & Abnormal Plant Evolutions	1														3	4	7	
	2				N/A					N/A				2	1	3		
	Tier Totals													5	5	10		
2. Plant Systems	1													3	2	5		
	2													1	1	1	3	
	Tier Totals													5	3	8		
3. Generic Knowledge and Abilities Categories					1	2	3	4						1	2	3	4	7
														1	2	2	2	

Note:

- Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO 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 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.

ES-401	BWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO / SRO)						Form ES-401-1		
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295018 Partial or Total Loss of CCW / 8						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	SRO1
295038 High Off-site Release Rate / 9					X		EA2 - Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE : EA2.03 – Radiation Levels	4.3	SRO2
295023 Refueling Acc / 8						X	2.2.40 - Ability to apply Technical Specifications for a system.	4.7	SRO3
295028 High Drywell Temperature / 5					X		EA2 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : EA2.02 – Reactor pressure	3.9	SRO4
295024 High Drywell Pressure / 5						X	2.2.37 - Ability to determine operability and/or availability of safety related equipment.	4.6	SRO5
600000 Plant Fire On Site / 8					X		AA2 - Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE : AA2.03 – Fire alarm	3.2	SRO6
295026 Suppression Pool High Water Temp. / 5						X	2.4.18 - Knowledge of the specific bases for EOPs.	4.0	SRO7
K/A Category Totals:					3	4	Group Point Total:		7

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 2 (RO / SRO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295020 Inadvertent Cont. Isolation / 5 & 7					X		AA2 - Ability to determine and/or interpret the following as they apply to INADVERTENT CONTAINMENT ISOLATION : AA2.06 - Cause of isolation	3.8	SRO 8
295022 Loss of CRD Pumps / 1						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.	4.4	SRO 9
295009 Low Reactor Water Level / 2					X		AA2 - Ability to determine and/or interpret the following as they apply to LOW REACTOR WATER LEVEL : AA2.01 Reactor water level.	4.2	SRO 10
K/A Category Totals:					2	1	Group Point Total:		3

ES-401	BWR Examination Outline Plant Systems – Tier 2/Group 1 (RO / SRO)											Form ES-401-1		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
205000 Shutdown Cooling								X				A2 - Ability to (a) predict the impacts of the following on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations : A2.10 - Valve operation	2.9	SRO 11
218000 ADS											X	2.1.20 - Ability to interpret and execute procedure steps.	4.6	SRO 12
259002 Reactor Water Level Control								X				A2 - Ability to (a) predict the impacts of the following on the REACTOR WATER LEVEL CONTROL SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations : A2.02 – Loss of any number of feed water flow inputs.	3.4	SRO 13
261000 SGTS											X	2.2.42 - Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	4.6	SRO 14
264000 EDGs								X				A2 - Ability to (a) predict the impacts of the following on the EMERGENCY GENERATORS (DIESEL/JET) ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations : A2.06 - Opening normal and/or alternate power to emergency bus	3.4	SRO 15
K/A Category Totals:								3			2	Group Point Total:		5

ES-401		BWR Examination Outline Plant Systems – Tier 2/Group 2 (RO / SRO)										Form ES-401-1		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
241000 Reactor / Turbine Pressure Regulator								X				A2 - Ability to (a) predict the impacts of the following on the REACTOR/TURBINE PRESSURE REGULATING SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A2.01 Loss of turbine inlet pressure signal	3.7	SRO 16
216000 Nuclear Boiler Inst											X	2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc.	4.2	SRO 17
234000 Fuel Handling Equipment								X				A2 - Ability to (a) predict the impacts of the following on the FUEL HANDLING EQUIPMENT ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations : A2.01 - Interlock failure	3.7	SRO 18
K/A Category Totals:								2			1	Group Point Total:		3

Facility:Fermi-2		Date of Exam: 3/16/2009				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.8	Ability to coordinate personnel activities outside the control room.	3.4	66		
	2.1.32	Ability to explain and apply system limits and precautions.	3.8	67		
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	68		
	2.1.13	Knowledge of facility requirements for controlling vital/controlled access.			3.2	19
	Subtotal			3		1
2. Equipment Control	2.2.6	Knowledge of the process for making changes to procedures.	3.0	69		
	2.2.25	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	3.2	70		
	2.2.17	Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator.			3.8	20
	2.2.38	Knowledge of conditions and limitations in the facility license.			4.5	21
	Subtotal			2		2
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	71		
	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2	72		
	2.3.11	Ability to control radiation releases.			4.3	22
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.			3.8	23
	Subtotal			2		2
4. Emergency Procedures / Plan	2.4.14	Knowledge of general guidelines for EOP usage.	3.8	73		
	2.4.31	Knowledge of annunciator alarms, indications, or response procedures.	4.2	74		
	2.4.20	Knowledge of the operational implications of EOP warnings, cautions, and notes.	3.8	75		
	2.4.23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.			4.4	24
	2.4.29	Knowledge of the emergency plan.			4.4	25
	Subtotal			3		2
Tier 3 Point Total				10		7

Facility:	Fermi 2	Scenario No.	1	Op-Test No:	2009-1
Examiners:	C. Moore C. Zoia C. Phillips	Operators:			
Initial Conditions: IC-99, MOC, 89% Rx. Power					
Turnover: The plant is currently operating at 89% power at MOC following a power reduction for replacement of the #3 LPSV Unitized Actuator. B CRD Pump is out of service for pump rebuild. Expected return to service is 4 days. Center SAC is NON-PREFERRED USE due to oil leaks on the Compressor. Plans for the shift are to shift GSW pumps to run #6 GSW and shutdown #2 GSW to repair leaks on the discharge strainer. Also the shift is to raise power with flow to 95% and hold to validate Power vs Steam Flow per GOP 22.000.03.					
NOTE: The crew's Pre-job Briefing for the reactor power increase is to be conducted prior to entering the simulator. (Suggested time 30 minutes prior to beginning the scenario.)					
Event No.	Malf. No.	Event Type*	Event Description		
1	N/A	N(BOP) N(SRO)	BOP Transfers GSW Pumps per 23.131 section 4.3. Run #6 GSW and shutdown #2 GSW		
2	N/A	R(ATC) R(SRO)	ATC Raises Recirculation Flow to raise Power to 95% per 22.000.03		
3	C32MF0027	I(ATC) I(SRO)	"A" FW Flow Instrument Failure. ATC shifts to Single Element		
4	D11MF0021	N/A	"A" Fuel Pool Radiation Monitor Upscale – SRO enters TS LCO 3.3.6.2		
5	T41MF0002	C(BOP) C(SRO)	D1 CCHVAC Return Fan Trip – AOP 20.413.01 entered – SRO enters TS LCO 3.7.3, 3.7.4 – BOP starts D2 CCHVAV		
6	P50MF0014 P50MF0017	C(BOP) C(SRO)	West Station Air Compressor unloads. East Compressor trips on Auto Start. AOP 20.129.01 entered. BOP manually starts Center Station Air Compressor.		
7	B31MF0066	M(ALL)	Small recirculation loop leak in Drywell. ATC places Mode switch in SHUTDOWN due to rising Drywell Pressure. EOP 29.100.01 Sheet 1 and 2 entered		
8	C11MF0001 C71MF0006	M(ALL) C(ATC) C(SRO)	Failure to Scram (ATWS). Rods Stuck and RPS Total Scram Failure. EOP 29.100.01 Sheet 1A entered. BOP inhibits ADS (CT). ATC performs FSQ 1 thru 8. SRO directs 29.ESP11.		
9	C41MF0003 C41MF0004	C(ATC) C(SRO)	SRO directs SLC injection. ATC Injects SLC. First Pump started immediately trips. Second pump started runs. (CT)		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Facility: <u>Fermi 2</u> Scenario No. <u>1</u> Op-Test No: <u>2009-1</u>			
Examiners: <u>C. Moore</u> Operators: _____ <u>C. Zoia</u> _____ <u>C. Phillips</u> _____			
Initial Conditions: <u>IC-99, MOC, 89% Rx. Power</u>			
NOTE: Continued from page 1			
Event No.	Malf. No.	Event Type*	Event Description
10	EOPRF0011 thru EOPRF0014	ALL	SRO directs 29.ESP.03. ATC manually inserts Control Rods per 29.ESP.03(CT) SRO directs 29.ESP.10. ATC resets ARI to perform scram-reset-scram per 29.ESP.03. All rods insert when ARI is re-initiated multiple times (twice).
11	EOPRF0007 EOPRF0010	ALL	SRO directs Terminate and Prevent. BOP performs Terminate and Prevent for Level to lower RPV level <114 inches. Maintain RPV level 50 to 100 inches (CT).
12	E51MF0002	C(BOP) C(SRO)	RCIC isolates on high exhaust diaphragm pressure. BOP utilizes alternate systems to maintain level.
13	EABQFU_T R1CC	C(BOP) C(SRO)	BOP initiates Torus Cooling/Torus Sprays. BOP initiates Drywell Sprays. (CT) E1150-F028A fails during Torus Cooling Lineup BOP utilizes Division 2 for Containment Cooling
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Fermi 2 Scenario No. 2 Op-Test No: 2009-1

Examiners: C. Moore Operators: _____
C. Zoia _____
C. Phillips _____

Initial Conditions: IC-20, MOL, 100% Rx. Power

Turnover: The plant is currently operating at 100% Power at EOC. The # 6 GSW Pump is out of service for motor replacement. Expected return to service is 4 days. Plans for the shift are to shift MTLO Pumps to South Pump running and North Pump in automatic. Also crew will lower power with Recirc flow to <93% power in preparation for the next shift to perform 24.109.02, "Turbine Bypass Valve Operability Test".

NOTE: The crew's Pre-job Briefing for the reactor power decrease is to be conducted prior to entering the simulator. (Suggested time 30 minutes prior to beginning the scenario.)

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N(BOP) N(SRO)	BOP Shifts MTLO Pumps per 23.114.01 sect 11.0
2	NA	R(ATC) R(SRO)	ATC Lowers Reactor Power to <93% using Recirc flow. Preparation for performance of 24.109.02 on next shift
3	C97MF1087	NA	Seismic Event. at 0.02g H and V. AOP 20.000.01 entry
4	C11MF1027	C(ATC) C(SRO)	CR 54-19 Drifts into Core. SRO enters AOP 20.106.07. Control Rod fully inserted and disarmed. SRO enters TS LCO 3.1.3.
5	P43MF0025	C(BOP) C(SRO)	Trip of N TBCCW Pump. AOP 20.128.01 entered. BOP start standby pump.
6	C97MF1087	NA	Aftershock - Seismic Event. at 0.04g H and V. AOP 20.000.01 entered
7	C51MF0002	I(ATC) I(SRO)	APRM 2 Downscale. ATC bypasses APRM 2. SRO enters TS LCO 3.3.1.1 Tracking LCO
8	BB01B3103 C001C_MT FSEIZUR	C(ATC) C(SRO)	B1 RR Oil Pump Failure. B RRMG Trip. AOP 20.138.01 entry. Loss of HD. BOP evaluates for potential Loss of Feedwater Heating per AOP 20.107.02.
9	NA	R(ATC) R(SRO)	ATC Inserts Cram Array <65% power. SRO enters TS LCO 3.4.1
10	C97MF1087	NA	Aftershock - Seismic Event. at 0.08g H and V. AOP 20.000.01 entered

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

Facility: <u>Fermi 2</u> Scenario No. <u>3</u> Op-Test No: <u>2009-1</u>			
Examiners: <u>C. Moore</u>		Operators: _____	
<u>C. Zoia</u>		_____	
<u>C. Phillips</u>		_____	
Initial Conditions: <u>IC-20, MOL, 100% Rx. Power</u>			
Turnover: <u>The plant is currently operating at 100% Power at MOC. South Main Turbine Lube Oil Pump is out of service for motor replacement. Expected return to service is 3 days. Plans for the shift are to shift TBCCW Pumps to South and Center TBCCW running and North TBCCW shutdown. Severe Thunderstorms are forecast throughout the day. Monroe County is under a Severe Thunderstorm Warning until 6PM today.</u>			
NOTE: The crew's Pre-job Briefing for the reactor power decrease is to be conducted prior to entering the simulator. (Suggested time 30 minutes prior to beginning the scenario.)			
Event No.	Malf. No.	Event Type*	Event Description
1	NA	N(BOP) N(SRO)	BOP Shifts TBCCW Pumps per 23.128 sect 6.0. South and Center Pumps running.
2	D11MF0015	ALL	B MSL Radiation Monitor Fails Downscale. SRO enters TS LCOs 3.3.1.1 and 3.3.6.1
3	P41MF0006	C(BOP) C(SRO)	Trip of #2 GSW Pump. AOP 20.131.01 entered. BOP starts a standby pump
4	N21MF0029	C(BOP) C(SRO)	Trip of North RFP. RR Runback. Loss of HD. AOP 20.107.01 entered. BOP Injects into RPV with SBFW at 1200 gpm.
5	NA	R(ATC) R(SRO)	ATC Inserts Cram Array to <65% Power. BOP shutdown SBFW pumps.
6	B21MF0023	I(BOP) I(SRO)	SRV "A" spuriously opens. AOP 20.000.25 entered. Fuses for SRV "A" pulled. SRV closes. SRO enters TS LCO 3.4.3, 3.6.1.6
7	C11MF0004	C(ATC) C(SRO)	A CRD FCV fails closed. AOP 20.106.03 entered. ATC shifts to B FCV.
8	B21MF0102 B21MF0023 NACDN22M 801ATVSP	M(ALL)	Spurious MSIV Closure. Reactor Scram. EOP entry – 29.100.1 Sheet 1. Loss of HFPs. "A" SRV sticks partially open. BOP/ATC restore and maintain RPV level.
9	E41MF0005	C(ATC) C(SRO)	HPCI isolates upon receipt of start signal at L2. BOP uses alternate injection systems
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Fermi 2 Scenario No. 4 Op-Test No: 2009-1

Examiners: C. Moore Operators: _____
C. Zoia _____
C. Phillips _____

Initial Conditions: IC-19, EOC, 100% Rx. Power

Turnover: The plant is currently operating at 100% Power at EOC. The Center Heater Drain Pump is out of service for pump rebuild. Expected return to service is 5 days. Plans for the shift are to shift CRD pumps. Grid load is very high due to abnormally high outside air temperatures. SOC has requested plant maintain maximum generation.

NOTE: The crew's Pre-job Briefing is to be conducted prior to entering the simulator. (Suggested time 30 minutes prior to beginning the scenario.)

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N(ATC) N(SRO)	ATC Shifts CRD Pumps per 23.106 Section 5.1. B CRD running
2	P42MF0005	C(BOP) C(SRO)	Trip of Center RBCCW Pump. AOP 20.127.01. BOP starts standby Pumps and restores D1/D2 EECW to standby
3	C51MF0003	I(ATC) I(SRO)	APRM 3 Upscale to 120%. ATC Bypasses APRM 3. TS LCO 3.3.1.1 Tracking LCO
4	NC04LS_L XPN436BZ SOUT N30RF0030	C(BOP) C(SRO)	Problem with 6S FW Heater level transmitter causes momentary High Level signal resulting in Extraction Steam Valve closure. MCC position trips when attempt made to re-open valve. Fuse replacement by Rounds allows valve to be opened.
5	NA	R(ATC) R(SRO)	Loss of FW Heating due to 6S Heater problem. AOP 20.107.02 entry. Power increase from FW temperature decrease. SRO directs power reduction. Rod insertion or flow decrease to lower power by ATC
6	C11MF1117	C(ATC) C(SRO)	Shaft Shear on B CRD Pump. AOP 20.106.01 entry. ATC starts A CRD Pump
7	E41MF0010	I(BOP) I(SRO)	Spurious start on HPCI. BOP shuts down HPCI. SRO enters TS LCO 3.5.1. BOP Verifies RCIC Operable.

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

