

2009 DAVIS-BESSE NUCLEAR PLANT

INITIAL EXAMINATION

OUTLINE SUBMITTAL

Facility:		Date of Examination:		
Item	Task Description	Initials		
		a	b*	c#
1. W R I T E N	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	BP DM		BP
	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.	DM		BP
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	DM		BP
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	BP DM		BP
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.	RW		BP
	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.	RW		BP
	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.	RW		BP
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.	RW		BP
	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	RW		BP
	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.	RW		BP
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 sections.	RW		BP
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	RW		BP
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	RW		BP
	d. Check for duplication and overlap among exam sections.	RW		BP
	e. Check the entire exam for balance of coverage.	RW		BP
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	RW		BP
a. Author	Written: D. McNeil / B. Palagi / R. Walton Printed Name/Signature: R. Walton / RW		Date: 4/16/09	
b. Facility Reviewer (*)	NA		NA	
c. NRC Chief Examiner (#)	Bruce Palagi / Bruce Palagi		4/16/09	
d. NRC Supervisor	Hironori Palagi / Hironori Palagi		4/16/09	
Note:	# Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required. * Not applicable for NRC-prepared examination outlines			

COMMENTS ON OUTLINE FOR DAVIS BESSE 2009 OPERATING LICENSE EXAMINATION

- 1) On the Written exam out line Form ES-401-2 for Tier 1/ Group 1 choose different K/A Topics for the RO and SRO Questions. This will prevent over-emphasize on the selected K/A's.
- 2) Scenario 2 Event 4 and Scenario 4 Event 6 are both Rapid Power Reductions assure the required actions in the two scenarios differ enough to be considered different events.
- 3) In Scenario 1 add one additional component or instrument malfunction. This will result in the RO getting 2 malfunctions in the scenario.
- 4) In Scenario 2 confirm that we can depend on the BOP getting his second malfunction which is after the major event.

Facility: Davis-Besse

Date of Examination: July 2009

Examination Level (circle one): RO / SRO

Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N C	Review Surveillance: DB-SC-03023, Off-Site Ac Sources Line Up.
Conduct of Operations	N S	Complete, then Review DB-OP-03006, Miscellaneous Shift Check, (SFRCS, SFAS and RPS panels)
Equipment Control	M R	Determine components for tagout of CCW Pump #1
Radiation Control	N +	Don Anti-C clothing for job in radiation/contaminated area
Emergency Plan	M *	Offsite notifications following Loss of Control Room due to large explosion/fire <i>Turbine Damage</i>

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
- (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)
- (S)imulator
- * - B.5.b Muster location
- + - RP Mockup Room

Facility: Davis-Besse
 Examination Level (circle one): RO / SRO

Date of Examination: July 2009
 Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N C	Review Surveillance: DB-SC-03023, Off-Site AC Source Line Up.
Conduct of Operations	N S	Complete, then Review DB-OP-03006, Miscellaneous Shift Check, (SFRCS, SFAS and RPS panels)
Equipment Control	M R	Determine components for tagout of CCW Pump #1
Radiation Control	N +	Don Anti-C clothing for job in radiation/contaminated area
Emergency Plan	N *	Offsite notifications following Loss of Control Room due to large explosion/fire

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
- (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)
- (S)imulator
- * - B.5.b Muster location
- + - RP Mockup Room

Facility: Davis-Besse
 Examination Level (circle one): RO / SRO

Date of Examination: July 2009
 Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations		N/A
Conduct of Operations	N S	Complete, then Review DB-OP-03006, Miscellaneous Shift Check, (SFRCS, SFAS and RPS panels)
Equipment Control	M R	Determine components for tagout of CCW Pump #1
Radiation Control	N +	Don Anti-C clothing for job in radiation/contaminated area
Emergency Plan	N *	Offsite notifications following Loss of Control Room due to large explosion/fire <i>Turbine Damage</i>

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
- (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)
- (S)imulator
- * - B.5.b Muster point
- + - RP Mockup Room

Facility: <u>Davis-Besse</u> Exam Level (circle one): RO / SRO-I / SRO-U	Date of Examination: <u>July 2009</u> Operating Test No.: _____	
Control Room Systems® (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)		
System / JPM Title	Type Code*	Safety Function
a. Transfer a group of Rods to Auxiliary Power supply with rod drop <i>Exerc Group 5 Rod 3</i>	N A S	1
b. Restore Seal Injection and Seal Return <i>Respond to Core Flood Tank A.</i>	D S	2
c. Respond to Low RCS Pressure Condition	N A S	3
d. Restore ICS Feedwater System to Full Auto Control <i>Turb Overspeed test</i>	D S	4S
e. Initiate MU/HPI Cooling	N E A S	4P
f. Spray Containment Post-LOCA	N E A S	5
g. Energize Bus D1 from Bus B	D E L A	6
h. Remove all 4 RPS Channels from Shutdown Bypass Condition <i>Reset Tripped RPS</i>	D L	7
In-Plant Systems® (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i. Emergency Startup of Startup Feedwater Pump	D E	4S
j. Startup Containment Air Cooler 3 as Train 2 <i>Recirc BWST</i>	N R L	5
k. Recover from High Radiation in Spent Fuel Pool	D R	9
@ All control room (and in-plant) systems must be different and serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(L)ow-Power	≥ 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: Davis-Besse Date of Examination: July 2009
 Exam Level (circle one): RO / **SRO-I** / SRO-U Operating Test No.:

Control Room Systems® (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a. Transfer a group of Rods to Auxiliary Power supply with rod drop	N A S	1
b. Restore Seal Injection and Seal Return	D S	2
c. Respond to Low RCS Pressure Condition	N A S	3
d. N/A		
e. Initiate MU/HPI Cooling	N E A S	4P
f. Spray Containment Post-LOCA	N E A S	5
g. Energize Bus D1 from Bus B	D E L A	6
h. Remove all 4 RPS Channels from Shutdown Bypass Condition	D L	7

In-Plant Systems® (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

i. Emergency Startup of Startup Feedwater Pump	D E	4S
j. Startup Containment Air Cooler 3 as Train 2	N R L	5
k. Recover from High Radiation in Spent Fuel Pool	D R	9

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

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 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: Davis-Besse
 Exam Level (circle one): RO / SRO-I / **SRO-U**

Date of Examination: July 2009
 Operating Test No.: _____

Control Room Systems® (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)

System / JPM Title	Type Code*	Safety Function
a. Transfer a group of Rods to Auxiliary Power supply with rod drop	N A S	1
b.		
c. Respond to Low RCS Pressure Condition	N A S	3
d. N/A		
e. Initiate MU/HPI Cooling	N E A S	4P
f.		
g.		
h.		

In-Plant Systems® (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

i.		
j. Startup Containment Air Cooler 3 as Train 2	N R L	5
k. Recover from High Radiation in Spent Fuel Pool	D R	9

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

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 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: Davis Besse Nuclear Power Station												Date of Exam: July 13, 2009						
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	3	N/A		3	18	3	3	6		
	2	1	2	2				2	1			1	9	2	2	4		
	Tier Totals	4	5	5				5	5			4	27	5	5	10		
2. Plant Systems	1	3	2	3	3	2	2	3	2	3	3	2	28	3	2	5		
	2	1	1	1	1	1	1	1	1	1	1	0	10	2	1	3		
	Tier Totals	4	3	4	4	3	3	4	3	4	4	2	38	5	3	8		
3. Generic Knowledge and Abilities Categories				1		2		3		4		10		1	2	3	4	7
				2		3		2		3				2	2	1	2	

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

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

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to ES-401, Attachment 2, 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.

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.

ES-401 PWR Examination Outline							Form ES-401-2		
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1							2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1RO
								4.7	1SR
000008 Pressurizer Vapor Space Accident / 3					0 1		Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: RCS pressure and temperature indicators and alarms	3.9	1RO
								4.2	1SR
000009 Small Break LOCA / 3		0 3					Knowledge of the interrelations between the small break LOCA and the following: S/Gs	3.0	1RO
000011 Large Break LOCA / 3			0 3				Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: Starting auxiliary feed pumps and flow, ED/G, and service water pumps	4.1	1RO
000015/17 RCP Malfunctions / 4		0 7					Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: RCP seals	2.9	1RO
000022 Loss of Rx Coolant Makeup / 2	0 3						Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: Relationship between charging flow and PZR level	3.0	1RO
000025 Loss of RHR System / 4	0 1						Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation.	3.9	1RO
000026 Loss of Component Cooling Water / 8			0 4				Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: Effect on the CCW flow header of a loss of CCW	3.5	1RO
000029 ATWS / 1				0 8			Ability to operate and monitor the following as they apply to an ATWS: Reactor trip switch pushbutton	4.5	1RO
000038 Steam Gen. Tube Rupture / 3					1 0		Ability to determine or interpret the following as they apply to a SGTR: Flowpath for charging and letdown flows	3.1	1RO
								3.3	1SR
								3.6	1RO
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							2.2.37 Ability to determine operability and/or availability of safety related equipment.	4.6	1SR
000054 (CE/E06) Loss of Main Feedwater / 4							2.3.14 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1RO
								3.8	1SR
000055 Station Blackout / 6	0 2						Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Natural circulation cooling	4.1	1RO
000056 Loss of Off-site Power / 6					1 1		Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Operational status of service water booster pump	2.9	1RO
								2.9	1SR
000057 Loss of Vital AC Inst. Bus / 6				1 2			Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual control of components for which automatic control is lost	3.5	1RO
000058 Loss of DC Power / 6			0 1				Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Use of dc control power by D/Gs	3.4	1RO
000065 Loss of Instrument Air / 8				0 3			Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: Restoration of systems served by instrument air when pressure is regained	2.9	1RO
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4		1					Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.7	1RO
K/A Category Totals:	3	3	3	3	3	3	Group Point Total:		18/6

ES-401		PWR Examination Outline						Form ES-401-2	
		Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)							
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1		06					Knowledge of the interrelations between the Continuous Rod Withdrawal and the following: Tave./ref. deviation meter	3.0	1RO
000005 Inoperable/Stuck Control Rod / 1					04		Ability to determine and interpret the following as they apply to the Inoperable / Stuck Control Rod: Interpretation of computer in-core TC map for dropped rod location	3.4	1SR
000028 Pressurizer Level Malfunction / 2				01			Ability to operate and / or monitor the following as they apply to the Pressurizer Level Control Malfunctions: PZR level reactor protection bistables	3.8	1RO
000036 (BW/A08) Fuel Handling Accident / 8					03		Ability to determine and interpret the following as they apply to the Fuel Handling Incidents: Magnitude of potential radioactive release.	3.1	1SR
000051 Loss of Condenser Vacuum / 4			01				Knowledge of the reasons for the following responses as they apply to the Loss of Condenser Vacuum: Loss of steam dump capability upon loss of condenser	2.8	1RO
000061 ARM System Alarms / 7				01			Ability to operate and / or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Automatic actuation	3.6	1RO
000068 (BW/A06) Control Room Evac. / 8						*	2.4.25 Knowledge of fire protection procedures.	3.7	1SR
000076 High Reactor Coolant Activity / 9						*	2.2.22 Knowledge of limiting conditions for operations and safety limits.	4.0	1RO
BW/A01 Plant Runback / 1						*	2.1.39 Knowledge of conservative decision making practices.	4.3	1SR
BW/A02&A03 Loss of NNI-X/Y / 7	3						Knowledge of the operational implications of the following concepts as they apply to the (Loss of NNI-X) Annunciators and conditions indicating signals, and remedial actions associated with the (Loss of NNI-X).	3.8	1RO
BW/A04 Turbine Trip / 4			3				Knowledge of the reasons for the following responses as they apply to the (Turbine Trip) Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	3.4	1RO
BW/A05 Emergency Diesel Actuation / 6			2				Knowledge of the interrelations between (ED Actuation) and the following: 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.	3.5	1RO
BW/E03 Inadequate Subcooling Margin / 4					2		Ability to determine and interpret the following as they apply to the (LOCA Cooldown and Depressurization) Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.5	1RO
K/A Category Point Totals:	1	2	2	2	1 / 2	1 / 2	Group Point Total:		9/4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-2		
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	#
003 Reactor Coolant Pump												2.2.1 Ability to perform pre-startup procedures for the facility, including operating those control associated with plant equipment that could affect reactivity.	4.5	1RO
004 Chemical and Volume Control												2.3.5 Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	1RO
004 Chemical and Volume Control										0 1		Ability to manually operate and/or monitor in the control room: Boron and control rod reactivity effects	3.8	1RO
005 Residual Heat Removal								0 2				Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Pressure transient protection during cold shutdown.	3.5	1SR
005 Residual Heat Removal								0 3				Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR pump/motor malfunction	2.9	1RO
006 Emergency Core Cooling						0 5						Knowledge of the effect of a loss or malfunction on the following will have on the ECCS: HPI/LPI cooling water	3.0	1RO
006 Emergency Core Cooling									0 2			Ability to monitor automatic operation of the ECCS, including: Pumps	4.1	1RO
007 Pressurizer Relief/Quench Tank							0 1					Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank water level within limits.	2.9	1RO
008 Component Cooling Water				0 2								Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Operation of the surge tank, including the associated valves and controls	2.9	1RO
010 Pressurizer Pressure Control							0 1					Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including: PZR and RCS boron concentrations	2.8	1RO
010 Pressurizer Pressure Control				0 2								Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Constant enthalpy expansion through a valve	2.6	1RO
012 Reactor Protection									0 6			Ability to monitor automatic operation of the RPS, including: Trip logic	3.7	1RO
012 Reactor Protection					0 6							Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Sensors and detectors	2.7	1RO
013 Engineered Safety Features Actuation										0 2		Ability to manually operate and/or monitor in the control room: Reset of ESFAS channels	4.3	1RO

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)													Form ES-401-2	
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	#	
013 Engineered Safety Features Actuation			0 3									Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Containment	4.3	1RO	
022 Containment Cooling		0 1										Knowledge of power supplies to the following: Containment cooling fans	3.0	1RO	
026 Containment Spray								0 5				Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of chemical addition tanks to inject	4.1	1SR	
026 Containment Spray	0 2											Knowledge of the physical connections and/or cause-effect relationships between the CSS and the following systems: Cooling water	4.1	1RO	
039 Main and Reheat Steam	0 7											Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: AFW	3.4	1RO	
059 Main Feedwater												2.1.20 Ability to interpret and execute procedure steps.	4.6	1SR	
059 Main Feedwater	0 7											Knowledge of the physical connections and/or cause-effect relationships between the MFW and the following systems: ICS	3.2	1RO	
061 Auxiliary/Emergency Feedwater												2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.	4.1	1SR	
061 Auxiliary/Emergency Feedwater		0 2										Knowledge of bus power supplies to the following: AFW electric drive pumps	3.7	1RO	
062 AC Electrical Distribution			0 2									Knowledge of the effect that a loss or malfunction of the ac distribution system will have on the following: ED/G	4.1	1RO	
063 DC Electrical Distribution								0 1				Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical systems; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Grounds	2.5	1SR	
063 DC Electrical Distribution				0 2								Knowledge of DC electrical system design feature(s) and/or interlock(s) which provide for the following: Breaker interlocks, permissives, bypasses and cross-ties.	2.9	1RO	
064 Emergency Diesel Generator				0 2								Knowledge of ED/G system design feature(s) and/or inter-lock(s) which provide for the following: Trips for ED/G while operating (normal or emergency)	3.9	1RO	
064 Emergency Diesel Generator							0 8					Ability to predict and/or monitor changes in parameters(to prevent exceeding design limits) associated with operating the ED/G system controls including: Maintaining minimum load on ED/G (to prevent reverse power)	3.1	1RO	
073 Process Radiation Monitoring					0 2							Knowledge of the operational implications as they apply to concepts as they apply to the PRM system: Radiation intensity changes with source distance	2.5	1RO	
076 Service Water								0 1				Ability to (a) predict the impacts of the following mal-functions or operations on	3.5	1RO	

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)													Form ES-401-2	
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	#	
												the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SWS.			
078 Instrument Air			0 2									Knowledge of the effect that a loss or malfunction of the IAS will have on the following: Systems having pneumatic valves and controls	3.4	1RO	
078 Instrument Air									0 1			Ability to monitor automatic operation of the IAS, including: Air pressure	3.1	1RO	
103 Containment										0 4		Ability to manually operate and/or monitor in the control room: Phase A and phase B resets.	3.5	1RO	
K/A Category Point Totals:	3	2	3	3	2	2	3	2 / 3	3	3	2 / 2	Group Point Total:		28/5	

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)											Form ES-401-2		
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	#
001 Control Rod Drive							0 4					Ability to predict and/or monitor changes in parameters to prevent exceeding design limits) associated with operating the CRDS controls including: PZR level and pressures	3.7	1RO
002 Reactor Coolant								0 4				Ability to (a) predict the impacts of the following malfunctions or operations on the RCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of heat sinks	4.3	1RO
011 Pressurizer Level Control									0 3			Ability to monitor automatic operation of the PZR LCS, including: Charging and letdown	3.2	1RO
014 Rod Position Indication										0 2		Ability to manually operate and/or monitor in the control room: Control rod mode-select switch	3.4	1RO
015 Nuclear Instrumentation	0 1											Knowledge of the physical connections and/or cause-effect relationships between the NIS and the following systems: RPS	4.1	1RO
016 Non-nuclear Instrumentation			0 1									Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: RCS	3.4	1RO
017 In-core Temperature Monitor								0 2				Ability to (a) predict the impacts of the following malfunctions or operations on the ITM system; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Core damage	3.6	1SR
028 Hydrogen Recombiner and Purge Control												2.1.26 Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen.	3.6	1SR
034 Fuel Handling Equipment								0 3				Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Mispositioned fuel element	3.3	1SR
035 Steam Generator				0 1								Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the following: S/G level control	3.6	1RO
041 Steam Dump/Turbine Bypass Control		0 1										Knowledge of bus power supplies to the following: ICS, normal and alternate power supply	2.8	1RO
068 Liquid Radwaste						1 0						Knowledge of the effect of a loss or malfunction on the following will have on the Liquid Radwaste System: Radiation monitors	2.5	1RO
072 Area Radiation Monitoring					0 1							Knowledge of the operational implications of the following concepts as they apply to the ARM system: Radiation theory, including sources, types, units, and effects	2.7	1RO
K/A Category Point Totals:	1	1	1	1	1	1	1	1	1	1	0 2	Group Point Total:		10/3

Facility: Davis Besse Nuclear Station			Date of Exam: 07/13/09				
	K/A #	Topic	RO		SRO-Only		
			IR	#	IR	#	
1. Category	2.1.4	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.	3.3	1			
	2.1.20	Ability to interpret and execute procedure steps.			4.6	1	
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	1			
	2.1.40	Knowledge of refueling administrative requirements.			3.9	1	
	Subtotal				2		2
	2. Equipment Control	2.2.12	Knowledge of surveillance procedures.	3.7	1		
2.2.19		Knowledge of maintenance work order requirements.			3.4	1	
2.2.22		Knowledge of limiting conditions for operations and safety-limits.			4.7	1	
2.2.35		Ability to determine Technical Specification Mode of Operation.	3.6	1			
2.2.42		Ability to recognize system parameters that are entry-level conditions for Technical Specifications.	3.9	1			
Subtotal				3		2	
3. Radiation Control	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2	1			
	2.3.6	Ability to approve release permits.			3.8	1	
	2.3.15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	1			
	Subtotal				2		1
4. Emergency Procedures / Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps.	4.6	1			
	2.4.6	Knowledge of EOP mitigation strategies.			4.7	1	
	2.4.30	Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.			4.1	1	
	2.4.31	Knowledge of Annunciator alarms, indications, or response procedures.	4.2	1			
	2.4.34	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.	4.2	1			
	Subtotal				3		2
Tier 3 Point Total					10		7

⑤

Facility: Davis-Besse

Scenario No.: 1

Op-Test No.: 2009-01

Examiners: _____ Operators: _____

Initial Conditions: 63% power. HPI #1 OOS for maintenance. Unit has a SG Tube Leak in SG 1.

Turnover: Lower Reactor power then remove MFP #1 from Service

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO)	Reduce Rx Power to <60%
2		N (BOP)	Remove MFP #1 from Service
3		I (RO)	Selected Th fails high
		SRO	TS 3.3.3.6? & TS 3.3.3.5.1?
4		C (BOP)	CCW Pump trip/Failure of Stdbby Pump to Auto Start
		SRO	TS ?
5		C (BOP)	MFP #2 High vibrations – Trip MFP
6		M	SG Tube Rupture – Reactor Trip
7		C (BOP)	HPI Pump #2 fails to auto start. Will manually start.

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

Facility: Davis-Besse

Scenario No.: 2

Op-Test No.: 2009-01

Examiners: _____ Operators: _____

Initial Conditions: 85% power. HPI #1 OOS for maintenance.

Turnover: Swap SWPs.

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP)	Remove SWP #1 from Service, Place SWP #3 in Service.
2		I (RO)	Pzr level instrument fails low (LTRC14-1)
		SRO	TS 3.3.3.6 (DBSC03180, At2) TS 3.3.3.5.1?
3		C (BOP)	FW Temperature Inst. TI SPI-1 fails to 0 over 4 minutes.
4		R (RO)	RCP 2-2 seal failure/Rapid Power reduction to <72% per DB-OP-02504
5		C (RO)	Trip RCP 2-2/FW fails to ratio in ICS.
		SRO	TS
6		M	RCP 2-2 seal LOCA ~200 gpm ramp to 400 gpm in 10 min. Reactor trip
7		C (RO)	Manual Reactor PB failure. Trips Rx MG set bkrs.
8		C (BOP)	SFAS failure to actuate (CCW to RCP 2-1 fails to open) Manually trip SFAS module to open vlv?

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

Facility: Davis-Besse

Scenario No.: 3

Op-Test No.: 2009-01

Examiners: _____ Operators: _____

Initial Conditions: Reactor at low power (startup?).

Turnover: Start first MFP. Then raise reactor power.

Event No.	Malf. No.	Event Type*	Event Description
1		N(BOP)	Start MFP #1
2		R (Ro)	Raise Reactor power
3		I (BOP)	Turbine header press inst. Fails to 850 psi over 45 sec (PT SP16A)
4		I (RO)	Loss of Power Range instrument.
		SRO	TS 3.3.1.1
5		I (BOP)	SFP RE8446(?) fails high, EVS fan 1 fails to Auto Start
		SRO	TS
6		I (RO)	Letdown Temp Xmitter fails High. MU2B fails to close.
7		M	Unisolable steam leak in MPR #4 Reactor trip
8		M	ATWS

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

Facility: Davis-Besse

Scenario No.: 4 (SPARE) Op-Test No.: 2009-01

Examiners: _____ Operators: _____

Initial Conditions: 95% reactor power. EDG 2 running for surveillance test.

Turnover: Shutdown EDG #2

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP)	Shutdown #2 EDG (Done from CR or locally?)
2		I (RO)	RCS Flow Xmitter Fails Low
		SRO	TS 3.3.1.1
3		C (RO)	MUP 1 fails
		SRO	TS 3.1.2.4
4		C (BOP)	Generator Field Voltage Hi, Respond to Annunciator 16-3-B
5		C (BOP)	Circ Water Pump 4 trips
6		R	Rapid Power Reduction
7		M	Vacuum Leak in HP condenser Reactor Trip
8		C (BOP)	TSVs and CVs do not close on Reactor Trip SFRCS Actuation.

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

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Facility: <u>Davis - Besse</u> Date of Exam: <u>July 2009</u> Operating Test No.: <u>2009-1</u>		Scenarios												TOTAL	MINIMUM(*)			
APPLICANT	EVENT TYPE	1			2			3			4				R	I	U	
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		SRO	ATC	BOP														
Spare																		
<input type="checkbox"/> RO	RX	6	6													1	1	0
<input type="checkbox"/> SRO-I	NOR	1		1												1	1	1
<input type="checkbox"/> SRO-U	I/C	2345	45	23												4	4	2
<input type="checkbox"/>	MAJ	7	7	7												2	2	1
<input type="checkbox"/>	TS	23														0	2	2
<input type="checkbox"/> RO	RX				4	A	A									1	1	0
<input type="checkbox"/> SRO-I	NOR				1		1									1	1	1
<input type="checkbox"/> SRO-U	I/C				2357	27	35									4	4	2
<input type="checkbox"/>	MAJ				6	6	6									2	2	1
<input type="checkbox"/>	TS				25											0	2	2
<input type="checkbox"/> RO	RX							1	1							1	1	0
<input type="checkbox"/> SRO-I	NOR							2		2						1	1	1
<input type="checkbox"/> SRO-U	I/C							36.9.10	349	56						4	4	2
<input type="checkbox"/>	MAJ							8	8	8						2	2	1
<input type="checkbox"/>	TS							37								0	2	2
<input type="checkbox"/> RO	RX										5	5				1	1	0
<input type="checkbox"/> SRO-I	NOR										1		1			1	1	1
<input type="checkbox"/> SRO-U	I/C										2-57	23	457			4	4	2
<input type="checkbox"/>	MAJ										6	6	6			2	2	1
<input type="checkbox"/>	TS										32					0	2	2

Instructions:

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