

# **BYRON INITIAL LICENSE EXAM**

**OCTOBER 29 and  
NOVEMBER 5-9, 2001**

**ES-201-2**

**"Examination Outline Quality Checklist,"  
along with the operating test outline(s).**

**(See the October, 2001 Braidwood post-  
exam retention package for the written  
exam outlines)**

Facility:		Date of Examination:		
Item	Task Description	Initials		
		a	b*	c#
1. W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model per ES-401.	GLW	RM	DP
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all KA categories are appropriately sampled.	GLW	RM	DP
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	GLW	RM	DP
	d. Assess whether the justification for deselected or rejected K/A statements are appropriate.	GLW	RM	DP
2. S I M	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, and major transients.	GLW	RM	DP
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity; ensure each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s)*, and scenarios will not be repeated over successive days.	GLW	RM	DP
	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.	GLW	RM	DP
3. W / T	a. Verify that: (1) the outline(s) contain(s) the required number of control room and in-plant tasks, (2) no more than 30% of the test material is repeated from the last NRC examination, (3)* no tasks are duplicated from the applicants' audit test(s), and (4) no more than 80% of any operating test is taken directly from the licensee's exam banks.	GLW	RM	DP
	b. Verify that: (1) the tasks are distributed among the safety function groupings as specified in ES-301, (2) one task is conducted in a low-power or shutdown condition, (3) 40% of the tasks require the applicant to implement an alternate path procedure, (4) one in-plant task tests the applicant's response to an emergency or abnormal condition, and (5) the in-plant walk-through requires the applicant to enter the RCA.	GLW	RM	DP
	c. Verify that the required administrative topics are covered, with emphasis on performance-based activities.	GLW	RM	DP
	d. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on successive days.	GLW	RM	DP
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.	GLW	RM	DP
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	GLW	RM	DP
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	GLW	RM	DP
	d. Check for duplication and overlap among exam sections.	GLW	RM	DP
	e. Check the entire exam for balance of coverage.	GLW	RM	DP
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	GLW	RM	DP
a. Author <u>Gary L. Wolfe / G.L. Wolfe</u> b. Facility Reviewer (*) <u>RICHARD M. WILLIAMS / R.M. Williams</u> c. NRC Chief Examiner (#) <u>DAVID L. PELTON / D.L. Pelton</u> d. NRC Supervisor <u>DAVID E. HICK / D.E. Hick</u>		Printed Name / Signature Date 7-5-01 7-10-01 8/8/01 8/8/01		
NOTE: * Not applicable for NRC-developed examinations. # Independent NRC Reviewer initial items in Column "c" chief examiner concurrence required.				

Facility: <u>Byron</u>		Date of Examination: _____
Examination Level (circle one): <u>RO</u> / SRO		Operating Test Number: <u>2001</u>
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Conduct of Operations/ Plant Parameter Verification	1. NEW JPM - K/A 2.1.19 - RO rating 3.0 Description - Perform PDMS Operability Weekly Surveillance
	Conduct of Operations/ Plant Notification of Fire	1. NEW JPM - K/A 2.1.14 - RO rating 2.5 Description - Respond to a Deluge Alarm
A.2	Equipment Control/ Surveillance Testing	1. NEW JPM - K/A 2.2.12 - RO rating 3.0 Description - Perform Valve Stroke Test of Containment Isol. Vlv.
A.3	Radiation Control/ Guard Against Personnel Exposure	1. NEW JPM - K/A 2.3.10 - RO rating 2.9 Description - Respond to Hi Radiation in Aux Building
A.4	Emergency Plan/ RO Knowledge and Responsibilities	Question #1 - K/A 2.4.39 - RO rating 3.3 Description - Actions for performing a Site Assembly
		Question #2 - K/A 2.4.29 - RO rating 2.6 Description - Assembly location and title for operators

Facility: <u>Byron</u>		Date of Examination: _____
Examination Level (circle one): RO / <u>SRO</u>		Operating Test Number: <u>2001</u>
	Administrative Topic/Subject Description	Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Conduct of Operations/ Operability Determination	1. NEW JPM - K/A 2.1.7 - SRO rating 4.4 Description - Review Quadrant Power Tilt Ratio Surveillance
	Conduct of Operations/ Apply Technical Specifications	1. NEW JPM - 2.1.12 - SRO rating 4.0 Description – Initiate a LCOAR
A.2	Equipment Control/ Surveillance Testing Requirements	1. NEW JPM - K/A 2.2.21 - SRO rating 3.5 Description – Determine Post Maintenance Testing Requirements
A.3	Radiation Control/ Control of Radiation Releases	1. Byron 2000 NRC - K/A 2.3.6 - SRO rating 3.1 Description – Review & Approve a Gas Release Package
A.4	Emergency Plan/ Emergency Classifications	1. NEW JPM - K/A 2.4.41 SRO - rating 4.1 Description – Classify Event and fill out NARS Form

Facility: Byron

Date of Examination: \_\_\_\_\_

Exam Level (circle one): RO / SRO(I) SRO(U)Operating Test Number: 2001**B.1 Control Room Systems**

System / JPM Title	Type Code*	Safety Function
a.		
b. Emergency Core Cooling System (ECCS) / 1A Safety Injection Pump ASME Startup with High Motor Amps	N, A, S, L	3
c. Residual Heat Removal System / Place Shutdown Cooling in Service (JPM N-20)	D, S, L	4
d.		
e.		
f.		
g.		

**B.2 Facility Walk-Through**

a. Engineered Safety Features Actuation System / Local Reset of Feedwater Isolation Signal (JPM N-43)	D, L	2
b. Hydrogen Recombiner / Startup of a Hydrogen Recombiner (JPM N-31)	D, R	5
c. Fire Protection System / Operate the Fire Detection & Alarm System, Manual Initiation of CO2 to DG Room (JPM N-49a)	D, A	8

\* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow Power, (R)CA

Facility: Byron

Date of Examination: \_\_\_\_\_

Exam Level (circle one): RO / SRO(I) SRO(U)Operating Test Number: 2001**B.1 Control Room Systems**

System / JPM Title	Type Code*	Safety Function
a. Chemical and Volume Control System / Perform Emergency Boration (Plugged RC Filter) (JPM N-27b)	D, A, S	1
b. Emergency Core Cooling System (ECCS) / 1A Safety Injection Pump ASME Startup with High Motor Amps	N, A, S, L	3
c. Residual Heat Removal System / Place Shutdown Cooling in Service (JPM N-20)	D, S, L	4
d. Containment Spray System / Align Containment Spray System for Cold Leg Recirculation	N, S, L	5
e. Emergency Diesel Generators (DG) / Remove DG from Parallel Operation (JPM N-06)	D, S	6
f. Engineered Safety Features Actuation System / Align for Containment Vent Release (failure of ESFAS isolation signal)	N, A, S	2
g. Liquid Rad Waste System / Perform Process Rad Monitor Adjustment for Liquid Release	N, S	9

**B.2 Facility Walk-Through**

a. Engineered Safety Features Actuation System / Local Reset of Feedwater Isolation Signal (JPM N-43)	D, L	2
b. Hydrogen Recombiner / Startup of a Hydrogen Recombiner (JPM N-31)	D, R	5
c. Fire Protection System / Operate the Fire Detection & Alarm System, Manual Initiation of CO2 to DG Room (JPM N-49a)	D, A	8

\* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow Power, (R)CA

Facility: Byron Scenario No.: 1 Op-Test No.: 2001  
 Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_ SRO  
 \_\_\_\_\_ RO  
 \_\_\_\_\_ BOP

Initial Conditions: IC-16; 50% power, BOL, equilibrium Xenon, steady state, 1B Diesel Generator (DG) OOS, 1C HD pump OOS, U-2 SAC OOS.

Turnover: The Unit is at 50% power, BOL, equilibrium Xenon, steady state. The 1B Diesel Generator is OOS for replacement of Turbo Charger. The DG has been OOS for 18 hours and is expected to be returned to service by the end of the shift. 1C Heater Drain Pump (HD) is OOS for motor bearing replacement. Unit 2 Station Air Compressor (SAC) is OOS for an oil change and is expected to be returned to service by the end of the shift. Electrical Operations has requested a ramp to full power at 5 MW/min.

Event No.	Malf. No.	Event Type*	Event Description
Preload	RF EG09 MAINT_O		1B DG OOS
1		N BOP SRO R RO	Raise turbine load to full power at 5 MW/min. Raise reactor power using rods and/or dilution.
2	RX13A	I RO SRO	Controlling Pressurizer (PZR) level channel fails low.
3	TP01B, RF TP14 OPEN	C BOP SRO	Stator Cooling (GC) Water Pump trip with failure of standby pump to auto start.
4	CC03B CC01C CC02A	I BOP SRO	Component Cooling (CC) Surge Tank level transmitter level tree leak results in auto makeup and 1B CC pump trip with failure of 1A CC pump auto start on low header pressure.
5	TH10A&B, OR ZDI1PK455C	C RO SRO	PZR Spray Valves 1RY455B&C failed open (TH10A&B, 100, 10) PZR Spray Valve controller failed in auto (IOR ZDI1PK455C AUTO with manual control for 1RY455B available).
6	RP02A&B TC03 RP35 & 61	M RO BOP SRO	ATWS with failure of main turbine to auto trip and failure of MSIVs to auto close. <b>Coincident with next event.</b>
7	OR ZDI1MS001B MS03B&F	M RO BOP SRO	Pressure transient causes steam break (1B MSIV fails closed causes Steam Break on the 1B SG - 2 MS safeties stuck open).

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

Facility: <u>Byron</u>	Scenario No.: <u>2</u>	Op-Test No.: <u>2001</u>
Examiners: _____	Operators: _____	<u>SRO</u>
_____	_____	<u>RO</u>
_____	_____	<u>BOP</u>

Initial Conditions: IC-18; 75% power BOL, Equilibrium Xenon, 1B Diesel Generator OOS, 1C HD pump OOS, U-2 SAC OOS.

Turnover: The Unit is at 75% power. The 1B Diesel Generator is OOS for replacement of Turbo Charger. The DG has been OOS for 18 hours and is expected to be returned to service by the end of the shift. 1C Heater Drain Pump is OOS for motor bearing replacement. Unit 2 SAC is OOS for an oil change and is expected to be returned to service by the end of the shift. Directions have been received to increase power to 100% at 5 MW/min.

Event No.	Malf. No.	Event Type*	Event Description
Preload	RF EG09 MAINT_O		1B DG OOS
1		N BOP SRO R RO	Raise Turbine load to full power at 5 MW/min  Raise reactor power using rods and/or dilution
2	NI09A	I RO SRO	Power Range N41 fails high <b>Coincident with next event</b>
3	RD09	I RO SRO	Auto Rod Speed failure to 0, Rods fail to move in AUTO
4	FW16	I BOP SRO	FW Header Discharge Pressure PT-508 fails low on a 5 second ramp
5	FW02B, FW01	C BOP SRO	1C Main Feedwater pump trips with failure of 1A Motor Driven Feedwater pump failure to start
6	RF TC03	M BOP RO SRO	Inadvertent turbine trip
7	ED15D	C BOP RO SRO	Loss of Offsite Power (Switchyard Bus 6 fault)
8	EG08A	M BOP RO SRO	Loss of all AC power due to 1A DG failure 90 sec after start

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



Facility: <u>Byron</u>	Scenario No.: <u>3</u>	Op-Test No.: <u>2001</u>
Examiners: _____	Operators: _____	<u>SRO</u>
_____	_____	<u>RO</u>
_____	_____	<u>BOP</u>
Initial Conditions: <u>IC-21; 100% power, BOL, equilibrium Xenon, steady state, 1B Diesel Generator OOS, 1C HD pump OOS, U-2 SAC OOS.</u>		
Turnover: <u>100% power, BOL, equilibrium Xenon, steady state. The 1B Diesel Generator is OOS for replacement of Turbo Charger. The DG has been OOS for 18 hours and is expected to be returned to service by the end of the shift. 1C Heater Drain Pump is OOS for motor bearing replacement. Unit 2 SAC is OOS for an oil change and is expected to be returned to service by the end of the shift.</u>		

  

Event No.	Malf. No.	Event Type*	Event Description
Preload	RF EG09 MAINT_O		1B DG OOS
1	TH03C	C RO BOP SRO	Steam Generator 1C Tube Leak (25 gpm)
2		N BOP SRO R RO	Reduce Turbine Load for Unit Shutdown due to SG leakage > Tech Spec Lower reactor power using rods and/or boration
3	RX18A	I RO SRO	1A RCS loop Tcold RTD failed High
4	EG03	C BOP SRO	Voltage Regulator malfunction Field Forcing
5	RX06L	I BOP SRO	Steam Generator 1C controlling level channel 1LT558 Failed High on a 3 sec ramp.
6	CV01A	C RO SRO	Centrifugal Charging Pump Trip
7	TH03C	M RO BOP SRO	Steam Generator 1C Tube Rupture (460 gpm)
8	ED11A	C RO BOP SRO	Loss of Instrument Bus 111 coincident with Reactor Trip
9	RF RP84 RP15D	C RO BOP SRO	1B SI Pump fails to start automatically, Manually start an SI pump and Manually Align train A ECCS for Injection due to failure to auto start from loss of instrument bus 111

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

Facility: <u>Byron</u>	Scenario No.: <u>4</u>	Op-Test No.: <u>2001</u>
Examiners: _____	Operators: _____	<u>SRO</u>
_____	_____	<u>RO</u>
_____	_____	<u>BOP</u>

Initial Conditions: IC-21; 100% power, BOL, equilibrium Xenon, steady state, 1B Diesel Generator OOS, 1C HD pump OOS, U-2 SAC OOS. PZR PORV 1RY456 control switch is in CLOSE and Block Valve 1RY8000B is closed and deenergized.

Turnover: The Unit is at 100%, BOL, equilibrium Xenon, steady state. The block valve 1RY8000B) for Pressurizer (PZR) PORV 1RY456 is closed and deenergized. A leak had developed on PORV 1RY456. When the block valve was closed it tripped after the closed indication was observed. Electrical Maintenance is investigating. The Block valve has been de-energized closed for 11 hours. The 1B Diesel Generator is OOS for replacement of Turbo Charger. The DG has been OOS for 18 hours and is expected to be returned to service by the end of the shift. 1C Heater Drain (HD) Pump is OOS for motor bearing replacement. Unit 2 Station Air Compressor (SAC) is OOS for an oil change and is expected to be returned to service by the end of the shift.

Event No.	Malf. No.	Event Type*	Event Description
Preload	RF EG09 MAINT_O		1B DG OOS
Preload	RF ED065D OPEN		PZR PORV 1RY456 Block Valve 1RY8000B breaker tripped.
1	TH11A & RF ED058C OPEN	C RO SRO	PZR PORV 1RY455A fails open requiring the block valve 1RY8000A to be closed and the breaker for 1RY8000A will trip when closed.
2	CV16	I RO SRO	Volume Control Tank (VCT) level channel 1LT-CV112 fails high
3		N BOP SRO R RO	Reduce Turbine Load for Unit Shutdown due to inoperable PZR PORVs Lower reactor power using rods and/or boration
4	RX01K	I BOP SRO	Steam Generator 1D controlling Steam Pressure channel fails low.
5	PA0123	C BOP SRO RO	Essential Service Water Pump oil pressure malfunction.
6	TH03D	M RO BOP SRO	Steam Generator 1D Tube Rupture – 400 gpm ramped over 60 sec. requiring a reactor trip and SI.
7	RF RP78, 79, RF FW150 & FW151, REMOVED	I BOP SRO	Feedwater Isolation signal fails requiring manual operation of FW components
8	MS07D	M BOP SRO	1D SG faulted (steam break) inside containment on Reactor trip

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