INITIAL SUBMITTAL OF EXAMINATION

FOR THE BRAIDWOOD INITIAL EXAMINATION - OCTOBER 2000

Commonwealth Edison Company
Braidwood Generating Station
Route #1, Box 84
Braceville, IL 60407-9619
Tel 815-458-2801

ComEd

June 15, 2000
BW000066

James E. Dyer
Regional Administrator
U.S. NRC Region III Administrator
801 Warrenville Road
Lisle, IL 60532-4351

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. 50-456 and 50-457

Subject: Submittal of Integrated Initial License Training Examination Materials

Enclosed are the examination materials that Braidwood Station is submitting in support of the Initial License Examination scheduled for the weeks of October 23 and October 30, 2000, at Braidwood Station.

This submittal includes the Senior Reactor Operator and Reactor Operator Written Examinations, Job Performance Measures, and Integrated Plant Operation Scenario Guides.

These examination materials have been developed in accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 8, Supplement 1. Please note that reference materials are attached to each individual examination question or item.

Some minor modifications have been made to the Integrated Examination Outline with regards to the written examinations, administrative walkthroughs, and operational scenarios in order to improve balance and content. These changes improve examination quality and are in compliance with NUREG-1021.

Some modifications or adjustments to the examination material may be required due to procedural changes.

In accordance with NUREG 1021, please ensure that these materials are withheld from public disclosure until after the examinations are complete.

Should you have any questions concerning this letter, please contact Mr. Terry Simpkin at (815) 458-2801, extension 2980. For questions concerning examination materials, please contact Bill Spahr at (815) 458-7500, extension 7650 .

Respectfully,

Tim Tulon
Site Vice President
Braidwood Nuclear Power Station

Enclosures: (Hand delivered to Mr. Bielby, Lead Examiner, NRC Region III)

Updated RO Written Exam Sample Plan
Updated SRO Written Exam Sample Plan
Updated Operational Scenarios Sample Plan
Updated Administrative Walkthrough Job Performance Measures Sample Plan
RO/SRO Composite Examination with references attached
Job Performance Measures with references attached
Integrated Plant Operation Scenario Guides
Completed Checklists: ES-301-3
ES-301-4
ES-301-5
ES-301-6
ES-301-7
Examination Security Agreements (ES-201-3)
Listing of Submitted Sample Plan Changes

Facility: Braidwood Unit 1 and 2 Date of Examination: 10/23/00
Examination Level (circle one): RO Operating Test Number: 1

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	JPM (Replacement/ New) KA 2.1.33 3.4/4.0
	Conduct of Operations / Manual Entry of a Late Log Entry	JPM (N-142) KA 2.1.18 2.9/3.0
A.2	Equipment Control / Perform a QPTR Surveillance	JPM (N-102 Modified) – KA 2.2.12 3.0/3.4
A.3	Radiation Control / Entry and Exit from a RCA	JPM (N-144) KA 2.3.1 2.6/3.0 Evaluated while performing JPM B.2.a
A.4	Emergency Plan / Emergency Plan Directions	2. a. K/A 2.4.39 3.3/3.1 Emergency Exposures
		2. b. K/A 2.4.29 2.6/4.0 Emergency facilities

Facility: Braidwood Unit 1 and 2	Date of Examination: 10/23/00
Examination Level (circle one): SRO	Operating Test Number: 1

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	JPM (Replacement/ New) KA 2.1.33 3.4/4.0
	Conduct of Operations / Manual Entry of a Late Log Entry	JPM (N-142) KA 2.1.18 2.9/3.0
A.2	Equipment Control / Perform a QPTR Surveillance	JPM (N-102 Modified) – KA 2.2.12 3.0/3.4
A.3	Radiation Control / Entry and Exit from a RCA	JPM (N-144) KA 2.3.1 2.6/3.0 Evaluated while performing JPM B.2.a
A.4	Emergency Plan / GSEP Classification	JPM (New) – KA 2.4.41 2.3/4.1

Facility: Braidwood Unit 1 and 2 Date of Examination: 10/23/00
Exam Level (circle one): RO / SRO(I) Operating Test No.: 1

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. CVCS / Place Excess L/D in Service with Failure of Cooling to 1A L/D Hx. (N-11) KA 004A4.05	M A S	2
b. Pressurizer Relief Tank / Drain PRT with failure of 1B RCDT pump. (N-119) KA 007A1.01	M A S	5
c. Component Cooling Water System / Swap CC pumps with high current on started pump. (N-140) KA 008A3.01	N A S	8
d. Liquid Radwaste System / Perform a Radwaste Liquid Release Radiation Monitor Valve interlock check. (N-32) KA 068A4.02	D S	9
e. A.C. Electrical Distribution / Respond to Loss of 4KV ESF Bus. (N-99) KA 062A2.12	D S	6
f. Residual Heat Removal System / Place RH in recirculation for sampling. (N-139) KA 005K5.09	N S L	4
g. Nuclear Instrumentation System / Source Range Instrument failure in Mode 4. (N-141) KA 015A2.01)	N S L A	7
B.2 Facility Walk-Through		
a. CVCS / Local Emergency Boration with Emergency Boration Valve failed closed. (N-89) **Unit 2** (KA APE068AA1.08)	M A R	1
b. Service Water System / Emergency Control of 2A SX Pump. (N-67) High PRA (47.2%) **Unit 2** (KA 013A4.01)	D	4
c. Reactor Protection System / Local Rest of SI. (N-85) **Unit 2** (KA E02EA1.1)	D	7

* 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: Braidwood Unit 1 & 2 Date of Examination: 10/20-10/31/00 Operating Test Number: 1,2,3

	1. GENERAL CRITERIA	Initials a	b	c
a.	The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR 55.45, operational importance, safety function distribution).	✓	✓	MFB
b.	Repetition from operating tests used during previous licensing examinations is within acceptable limits (30% for the walk-through) and should not compromise test integrity.	✓	✓	MFB
c.	Day-to-day repetition between this and other operating tests to be administered is within acceptable limits (30% of bank JPMs for the walk-through; none for the simulator).	✓	✓	MFB
d.	Overlap with the written examination and between operating test categories is within acceptable limits.	✓	✓	MFB
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.	✓	✓	MFB
	2. WALK-THROUGH (CATEGORY A & B) CRITERIA	---	---	---
a.	Each JPM includes the following, as applicable: · initial conditions · initiating cues · references and tools, including associated procedures · validated time limits (average time allowed for completion) and specific designation if deemed to be time critical by the facility licensee · specific performance criteria that include: - detailed expected actions with exact criteria and nomenclature - system response and other examiner cues - statements describing important observations to be made by the applicant - criteria for successful completion of the task - identification of critical steps and their associated performance standards - restrictions on the sequence of steps, if applicable	✓	✓	MFB
b.	Prescripted (Administrative and JPM follow-up) questions are predominantly open reference and meet the criteria in Appendix C.	✓	✓	MFB
c.	There are no direct look-up questions; memory level questions do not permit the use of references.	✓	✓	MFB
d.	At least 20 percent of the JPMs and questions on each test are new or significantly modified.	✓	✓	MFB
	3. SIMULATOR (CATEGORY C) CRITERIA	---	---	---
a.	The associated simulator operating tests (scenario sets) have been reviewed in accordance with Form ES-301-4 and a copy is attached.	✓	✓	MFB

	Printed Name / Signature	Date
a. Author	William J. Spahr	~~6-14-00~~ 6-16-00 ✓
b. Facility Reviewer(*)	John E. Browning	~~6-14-00~~ 10-16-00 ✓
c. NRC Chief Examiner (*)	Michael E. Bielby	10/13/00
d. NRC Supervisor (*)	David T. Hills	10/13/00

(*) The facility signature is not applicable for NRC-developed tests; two independent NRC reviews are required.

ES-401 **PWR RO Examination Outline** Printed: 05/03/2000

Facility: Braidwood Form ES-401-4

Exam Date: 10/20/2000 **Exam Level:** RO

Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	4	4	2				3	2			1	16
	2	3	3	5				4	1			1	17
	3	1	1	0				1	0			0	3
	Totals Tier	8	8	7				8	3			2	36
2. Plant Systems	1	2	2	2	4	2	1	2	2	2	2	2	23
	2	2	2	2	4	1	2	2	2	1	1	1	20
	3	0	1	2	1	1	0	0	2	1	0	0	8
	Tier Totals	4	5	6	9	4	3	4	6	4	3	3	51
3. Generic Knowledge And Abilities		Cat 1			Cat 2			Cat 3			Cat 4		
		3			3			3			4		13

Note:
1. Ensure that at least two topics from every K/A category are sampled within each teir (i.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline
5. The shaded areas are not applicable to the category /tier.
6. The generic 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 05/03/200

PWR RO Examination Outline

Form ES-401-5

Facility: Braidwood

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.9	Ability to direct personnel activities inside the control room.	2.5	1
	2.1.22	Ability to determine Mode of Operation.	2.8	1
	2.1.8	Ability to coordinate personnel activities outside the control room.	3.8	1
			Category Total:	**3**
Equipment Control	2.2.30	Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area, communication with fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation.	3.5	1
	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1
	2.2.33	Knowledge of control rod programming.	2.5	1
			Category Total:	**3**
Radiation Control	2.3.11	Ability to control radiation releases.	2.7	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5	1
	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	2.6	1
			Category Total:	**3**
Emergency Procedures/Plan	2.4.13	Knowledge of crew roles and responsibilities during EOP flowchart use.	3.3	1
	2.4.17	Knowledge of EOP terms and definitions.	3.1	1
	2.4.26	Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.	2.9	1
	2.4.19	Knowledge of EOP layout, symbols, and icons.	2.7	1
			Category Total:	**4**
			Generic Total:	**13**

Facility: Braidwood

PWR RO E[illegible]ination Outline

Printed: 05[illegible]000

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-4**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
001	Control Rod Drive System / 1					X							K5.54 - Definition and units of reactivity	2.8	1
001	Control Rod Drive System / 1				X								K4.09 - Recovery of dropped rod	3.9	1
003	Reactor Coolant Pump System (RCPS) / 4		X										K2.02 - CCW pumps	2.5*	1
003	Reactor Coolant Pump System (RCPS) / 4			X									K3.01 - RCS	3.7	1
004	Chemical and Volume Control System (CVCS) / 1	X											K1.29 - Effect and detection of leaking PORV or relief on PZR level and pressure, including VCT makeup activity in automatic mode	3.4	1
004	Chemical and Volume Control System (CVCS) / 1						X						K6.04 - Pumps	2.8	1
013	Engineered Safety Features Actuation System (ESFAS) / 2				X								K4.03 - Main Steam Isolation System	3.9	1
013	Engineered Safety Features Actuation System (ESFAS) / 2										X		A4.01 - ESFAS-initiated equipment which fails to actuate	4.5	1
015	Nuclear Instrumentation System / 7				X								K4.05 - Reactor trip	4.3	1
015	Nuclear Instrumentation System / 7							X					A1.01 - NIS calibration by heat balance	3.5	1
017	In-Core Temperature Monitor (ITM) System / 7								X				A2.01 - Thermocouple open and short circuits	3.1	1

Facility: Braidwood

PWR RO E[illegible]ination Outline

Printed: 05[illegible]00

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-4**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
017	In-Core Temperature Monitor (ITM) System / 7										X		A4.01 - Actual in-core temperatures	3.8	1
022	Containment Cooling System (CCS) / 5				X								K4.02 - Correlation of fan speed and flowpath changes with containment pressure	3.1*	1
022	Containment Cooling System (CCS) / 5		X										K2.01 - Containment cooling fans	3.0*	1
056	Condensate System / 4	X											K1.03 - MFW	2.6*	1
059	Main Feedwater (MFW) System / 4											X	2.1.12 - Ability to apply technical specifications for a system.	2.9	1
059	Main Feedwater (MFW) System / 4			X									K3.03 - S/Gs	3.5	1
061	Auxiliary / Emergency Feedwater (AFW) System / 4									X			A3.04 - Automatic AFW isolation	4.1	1
061	Auxiliary / Emergency Feedwater (AFW) System / 4									X			A3.02 - RCS cooldown during AFW operations	4.0	1
068	Liquid Radwaste System (LRS) / 9								X				A2.04 - Failure of automatic isolation	3.3	1
071	Waste Gas Disposal System (WGDS) / 9											X	2.1.28 - Knowledge of the purpose and function of major system components and controls.	3.2	1
071	Waste Gas Disposal System (WGDS) / 9							X					A1.06 - Ventilation system	2.5	1

ES - 401 Plant Systems - Tier 2 / Group 1 Form ES-401-4

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
072	Area Radiation Monitoring (ARM) System / 7					X							K5.01 - Radiation theory, including sources, types, units, and effects	2.7	1

K/A Category Totals: 2 2 2 4 2 1 2 2 2 2 2 **Group Point Total:** 23

Facility: Braidwood

PWR RO E[illegible]ination Outline

Printed: 05[illegible]000

ES - 401 | Plant Systems - Tier 2 / Group 2 | Form ES-401-4

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
002	Reactor Coolant System (RCS) / 2							X					A1.09 - RCS T-ave	3.7	1
002	Reactor Coolant System (RCS) / 2										X		A4.03 - Indications and controls necessary to recognize and correct saturation conditions	4.3	1
010	Pressurizer Pressure Control System (PZR PCS) / 3											X	2.1.10 - Knowledge of conditions and limitations in the facility license.	2.7	1
010	Pressurizer Pressure Control System (PZR PCS) / 3						X						K6.01 - Pressure detection systems	2.7	1
012	Reactor Protection System / 7					X							K5.01 - DNB	3.3*	1
014	Rod Position Indication System (RPIS) / 1				X								K4.04 - Zone reference lights	2.6*	1
026	Containment Spray System (CSS) / 5								X				A2.09 - Radiation hazard potential of BWST	2.5*	1
033	Spent Fuel Pool Cooling System (SFPCS) / 8								X				A2.02 - Loss of SFPCS	2.7	1
035	Steam Generator System (S/GS) / 4				X								K4.01 - S/G level control	3.6	1
039	Main and Reheat Steam System (MRSS) / 4			X									K3.04 - MFW pumps	2.5*	1
039	Main and Reheat Steam System (MRSS) / 4									X			A3.02 - Isolation of the MRSS	3.1	1

Facility: Braidwood

PWR RO E(ination Outline

Printed: 05(000

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-4**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
055	Condenser Air Removal System (CARS) / 4			X									K3.01 - Main condenser	2.5	1
062	A.C. Electrical Distribution System / 6	X											K1.04 - Off-site power sources	3.7	1
063	D.C. Electrical Distribution System / 6		X										K2.01 - Major DC loads	2.9*	1
063	D.C. Electrical Distribution System / 6				X								K4.04 - Trips	2.6?	1
064	Emergency Diesel Generator (ED/G) System / 6	X											K1.05 - Starting air system	3.4	1
064	Emergency Diesel Generator (ED/G) System / 6						X						K6.08 - Fuel oil storage tanks	3.2	1
073	Process Radiation Monitoring (PRM) System / 7							X					A1.01 - Radiation levels	3.2	1
075	Circulating Water System / 8		X										K2.03 - Emergency/essential SWS pumps	2.6*	1
079	Station Air System (SAS) / 8				X								K4.01 - Cross-connect with IAS	2.9	1

K/A Category Totals: 2 2 2 4 1 2 2 2 1 1 1 **Group Point Total:** 20

ES - 401 Plant Systems - Tier 2 / Group 3 Form ES-401-4

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
005	Residual Heat Removal System (RHRS) / 4		X										K2.01 - RHR pumps	3.0	1
027	Containment Iodine Removal System (CIRS) / 5								X				A2.01 - High temperature in the filter system	3.0*	1
028	Hydrogen Recombiner and Purge Control System (HRPS) / 5			X									K3.01 - Hydrogen concentration in containment	3.3	1
041	Steam Dump System (SDS) and Turbine Bypass Control / 4					X							K5.06 - Effect of power change on fuel cladding	2.5	1
076	Service Water System (SWS) / 4			X									K3.03 - Reactor building closed cooling water	3.5*	1
076	Service Water System (SWS) / 4								X				A2.01 - Loss of SWS	3.5*	1
078	Instrument Air System (IAS) / 8									X			A3.01 - Air pressure	3.1	1
103	Containment System / 5				X								K4.04 - Personnel access hatch and emergency access hatch	2.5	1

K/A Category Totals: 0 1 2 1 1 0 0 2 1 0 0 **Group Point Total:** 8

Facility: Braidwood

PWR RO[illegible]amination Outline

Printed: 05/0[illegible]0

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-4

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
005	Inoperable/Stuck Control Rod / 1		X					AK2.02 - Breakers, relays, disconnects, and control room switches	2.5	1
015	Reactor Coolant Pump (RCP) Malfunctions / 4						X	2.1.20 - Ability to execute procedure steps.	4.3	1
024	Emergency Boration / 1		X					AK2.01 - Valves	2.7	1
024	Emergency Boration / 1					X		AA2.06 - When boron dilution is taking place	3.6	1
027	Pressurizer Pressure Control (PZR PCS) Malfunction / 3				X			AA1.01 - PZR heaters, sprays, and PORVs	4.0	1
051	Loss of Condenser Vacuum / 4				X			AA1.04 - Rod position	2.5*	1
069	Loss of Containment Integrity / 5	X						AK1.01 - Effect of pressure on leak rate	2.6	1
069	Loss of Containment Integrity / 5			X				AK3.01 - Guidance contained in EOP for loss of containment integrity	3.8*	1
074	Inadequate Core Cooling / 4	X						EK1.01 - Methods of calculating subcooling margin	4.3	1
074	Inadequate Core Cooling / 4				X			EA1.13 - Subcooling margin indicators	4.3	1

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-4

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
E06	Degraded Core Cooling / 4		X					EK2.2 - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	3.8	1
E09	Natural Circulation Operations / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with Natural Circulation Operations	3.3	1
E09	Natural Circulation Operations / 4		X					EK2.2 - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	3.6	1
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS / 4	X						EK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the Natural Circulation with Steam Void in Vessel with/without RVLIS	3.3	1
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS / 4			X				EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	3.4	1
E14	High Containment Pressure / 5					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.3	1

K/A Category Totals: 4 4 2 3 2 1 **Group Point Total:** 16

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-4

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
007	Reactor Trip / 1			X				EK3.01 - Actions contained in EOP for reactor trip	4.0	1
007	Reactor Trip / 1					X		EA2.05 - Reactor trip first-out indication	3.4	1
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open) / 3		X					AK2.02 - Sensors and detectors	2.7*	1
029	Anticipated Transient Without Scram (ATWS) / 1			X				EK3.07 - Using local turbine trip lever	3.1*	1
038	Steam Generator Tube Rupture (SGTR) / 3	X						EK1.01 - Use of steam tables	3.1	1
054	Loss of Main Feedwater (MFW) / 4	X						AK1.01 - MFW line break depressurizes the S/G (similar to a steam line break)	4.1	1
054	Loss of Main Feedwater (MFW) / 4				X			AA1.03 - AFW auxiliaries, including oil cooling water supply	3.5	1
059	Accidental Liquid Radwaste Release / 9			X				AK3.01 - Termination of a release of radioactive liquid	3.5	1
060	Accidental Gaseous Radwaste Release / 9		X					AK2.01 - ARM system, including the normal radiation-level indications and the operability status	2.6	1
060	Accidental Gaseous Radwaste Release / 9				X			AA1.01 - Area radiation monitors	2.8	1

ES - 401 Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 Form ES-401-4

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
E01	Rediagnosis / 3				X			EA1.2 - Operating behavior characteristics of the facility	3.3	1
E03	LOCA Cooldown and Depressurization / 4			X				EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	3.9	1
E03	LOCA Cooldown and Depressurization / 4						X	2.1.20 - Ability to execute procedure steps.	4.3	1
E04	LOCA Outside Containment / 3	X						EK1.1 - Components, capacity, and function of emergency systems	3.5	1
E04	LOCA Outside Containment / 3				X			EA1.2 - Operating behavior characteristics of the facility	3.6	1
E05	Loss of Secondary Heat Sink / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.7	1
E11	Loss of Emergency Coolant Recirculation / 4			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with Loss of Emergency Coolant Recirculation	3.5	1

K/A Category Totals: 3 3 5 4 1 1 **Group Point Total:** 17

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Emergency and Abnormal Plant Evolutions - Tier 1 / Group 3

Form ES-401-4

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
036	Fuel Handling Incidents / 8	X						AK1.02 - SDM	3.4	1
036	Fuel Handling Incidents / 8		X					AK2.01 - Fuel handling equipment	2.9	1
E15	Containment Flooding / 5				X			EA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	2.9	1

K/A Category Totals: 1 1 0 1 0 0 **Group Point Total:** 3

ES-401 **PWR SRO Examination Outline** Printed: 05/03/2000

Facility: Braidwood Form ES-401-3

Exam Date: 10/20/2000 **Exam Level:** SRO

Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	4	4	4				4	6			2	24
	2	2	3	3				3	3			2	16
	3	0	1	0				0	1			1	3
	Tier Totals	6	8	7				7	10			5	43
2. Plant Systems	1	2	2	2	3	1	1	2	1	1	2	2	19
	2	2	1	1	2	1	2	2	2	1	1	2	17
	3	0	0	1	0	1	0	0	1	0	0	1	4
	Tier Totals	4	3	4	5	3	3	4	4	2	3	5	40
3. Generic Knowledge And Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					4		4		4		5		17

Note:
1. Ensure that at least two topics from every K/A category are sampled within each teir (i.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6. The generic 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the

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Plant Systems - Tier 2 / Group 1

Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
001	Control Rod Drive System / 1					X							K5.54 - Definition and units of reactivity	3.1	1
001	Control Rod Drive System / 1				X								K4.09 - Recovery of dropped rod	4.1	1
003	Reactor Coolant Pump System (RCPS) / 4			X									K3.01 - RCS	4.0	1
004	Chemical and Volume Control System (CVCS) / 1	X											K1.29 - Effect and detection of leaking PORV or relief on PZR level and pressure, including VCT makeup activity in automatic mode	4.0	1
004	Chemical and Volume Control System (CVCS) / 1						X						K6.04 - Pumps	3.1	1
013	Engineered Safety Features Actuation System (ESFAS) / 2										X		A4.01 - ESFAS-initiated equipment which fails to actuate	4.8	1
014	Rod Position Indication System (RPIS) / 1				X								K4.04 - Zone reference lights	2.9*	1
015	Nuclear Instrumentation System / 7											X	2.1.12 - Ability to apply technical specifications for a system.	4.0	1
015	Nuclear Instrumentation System / 7							X					A1.01 - NIS calibration by heat balance	3.8	1
017	In-Core Temperature Monitor (ITM) System / 7										X		A4.01 - Actual in-core temperatures	4.1	1
022	Containment Cooling System (CCS) / 5											X	2.1.10 - Knowledge of conditions and limitations in the facility license.	3.9	1

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Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
022	Containment Cooling System (CCS) / 5		X										K2.01 - Containment cooling fans	3.1	1
026	Containment Spray System (CSS) / 5								X				A2.09 - Radiation hazard potential of BWST	2.9*	1
056	Condensate System / 4	X											K1.03 - MFW	2.6	1
059	Main Feedwater (MFW) System / 4			X									K3.03 - S/Gs	3.7	1
061	Auxiliary / Emergency Feedwater (AFW) System / 4									X			A3.02 - RCS cooldown during AFW operations	4.0	1
063	D.C. Electrical Distribution System / 6		X										K2.01 - Major DC loads	3.1*	1
063	D.C. Electrical Distribution System / 6				X								K4.04 - Trips	2.9?	1
071	Waste Gas Disposal System (WGDS) / 9							X					A1.06 - Ventilation system	2.8	1

K/A Category Totals: 2 2 2 3 1 1 2 1 1 2 2 **Group Point Total:** 19

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ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-3**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
002	Reactor Coolant System (RCS) / 2							X					A1.09 - RCS T-ave	3.8	1
002	Reactor Coolant System (RCS) / 2										X		A4.03 - Indications and controls necessary to recognize and correct saturation conditions	4.4	1
010	Pressurizer Pressure Control System (PZR PCS) / 3						X						K6.01 - Pressure detection systems	3.1	1
011	Pressurizer Level Control System (PZR LCS) / 2											X	2.1.12 - Ability to apply technical specifications for a system.	4.0	1
012	Reactor Protection System / 7					X							K5.01 - DNB	3.8	1
027	Containment Iodine Removal System (CIRS) / 5								X				A2.01 - High temperature in the filter system	3.3*	1
028	Hydrogen Recombiner and Purge Control System (HRPS) / 5			X									K3.01 - Hydrogen concentration in containment	4.0	1
029	Containment Purge System (CPS) / 8											X	2.1.10 - Knowledge of conditions and limitations in the facility license.	3.9	1
033	Spent Fuel Pool Cooling System (SFPCS) / 8								X				A2.02 - Loss of SFPCS	3.0	1
035	Steam Generator System (S/GS) / 4				X								K4.01 - S/G level control	3.8	1

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Plant Systems - Tier 2 / Group 2

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Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
039	Main and Reheat Steam System (MRSS) / 4									X			A3.02 - Isolation of the MRSS	3.5*	1
062	A.C. Electrical Distribution System / 6	X											K1.04 - Off-site power sources	4.2	1
064	Emergency Diesel Generator (ED/G) System / 6	X											K1.05 - Starting air system	3.9	1
064	Emergency Diesel Generator (ED/G) System / 6						X						K6.08 - Fuel oil storage tanks	3.3	1
073	Process Radiation Monitoring (PRM) System / 7							X					A1.01 - Radiation levels	3.5	1
075	Circulating Water System / 8		X										K2.03 - Emergency/essential SWS pumps	2.7*	1
079	Station Air System (SAS) / 8				X								K4.01 - Cross-connect with IAS	3.2	1

K/A Category Totals: 2 1 1 2 1 2 2 2 1 1 2 **Group Point Total:** 17

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ES - 401 **Plant Systems - Tier 2 / Group 3** **Form ES-401-3**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp	Points
008	Component Cooling Water System (CCWS) / 8											X	2.1.12 - Ability to apply technical specifications for a system.	4.0	1
041	Steam Dump System (SDS) and Turbine Bypass Control / 4					X							K5.06 - Effect of power change on fuel cladding	2.8*	1
076	Service Water System (SWS) / 4			X									K3.03 - Reactor building closed cooling water	3.9*	1
076	Service Water System (SWS) / 4								X				A2.01 - Loss of SWS	3.7*	1

K/A Category Totals: 0 0 1 0 1 0 0 1 0 0 1 **Group Point Total:** 4

Generic Knowledge and Abilities Outline (Tier 3)

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PWR SRO Examination Outline

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Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.22	Ability to determine Mode of Operation.	3.3	1
	2.1.8	Ability to coordinate personnel activities outside the control room.	3.6	1
	2.1.13	Knowledge of facility requirements for controlling vital / controlled access.	2.9	1
	2.1.34	Ability to maintain primary and secondary plant chemistry within allowable limits.	2.9	1
			Category Total:	**4**
Equipment Control	2.2.33	Knowledge of control rod programming.	2.9	1
	2.2.11	Knowledge of the process for controlling temporary changes.	3.4*	1
	2.2.20	Knowledge of the process for managing troubleshooting activities.	3.3	1
	2.2.23	Ability to track limiting conditions for operations.	3.8	1
			Category Total:	**4**
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
	2.3.2	Knowledge of facility ALARA program.	2.9	1
			Category Total:	**4**

Generic Knowledge and Abilities Outline (Tier 3)

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Form ES-401-5

Facility: Braidwood

Generic Category	KA	KA Topic	Imp.	Points
Emergency Procedures/Plan	2.4.19	Knowledge of EOP layout, symbols, and icons.	3.7	1
	2.4.26	Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.	3.3	1
	2.4.22	Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.	4.0	1
	2.4.29	Knowledge of the emergency plan.	4.0	1
	2.4.7	Knowledge of event based EOP mitigation strategies.	3.8	1

Category Total: 5

Generic Total: 17

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Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-3

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
005	Inoperable/Stuck Control Rod / 1		X					AK2.02 - Breakers, relays, disconnects, and control room switches	2.6	1
017	Reactor Coolant Pump (RCP) Malfunctions (Loss of RC Flow) / 4					X		AA2.07 - Calculation of expected values of flow in the loop with RCP secured	2.9	1
024	Emergency Boration / 1		X					AK2.01 - Valves	2.7	1
024	Emergency Boration / 1					X		AA2.06 - When boron dilution is taking place	3.7	1
029	Anticipated Transient Without Scram (ATWS) / 1			X				EK3.07 - Using local turbine trip lever	3.4*	1
051	Loss of Condenser Vacuum / 4				X			AA1.04 - Rod position	2.5*	1
059	Accidental Liquid Radwaste Release / 9			X				AK3.01 - Termination of a release of radioactive liquid	3.9	1
067	Plant Fire on Site / 9					X		AA2.13 - Need for emergency plant shutdown	4.4	1
069	Loss of Containment Integrity / 5	X						AK1.01 - Effect of pressure on leak rate	3.1	1
069	Loss of Containment Integrity / 5			X				AK3.01 - Guidance contained in EOP for loss of containment integrity	4.2	1

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Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
074	Inadequate Core Cooling / 4	X						EK1.01 - Methods of calculating subcooling margin	4.7	1
074	Inadequate Core Cooling / 4				X			EA1.13 - Subcooling margin indicators	4.6	1
E01	Rediagnosis / 3				X			EA1.2 - Operating behavior characteristics of the facility	3.6	1
E01	Rediagnosis / 3						X	2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	4.6	1
E02	SI Termination / 3					X		EA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.2	1
E04	LOCA Outside Containment / 3				X			EA1.2 - Operating behavior characteristics of the facility	3.8	1
E06	Degraded Core Cooling / 4		X					EK2.2 - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	4.1	1
E07	Saturated Core Cooling / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.9	1
E07	Saturated Core Cooling / 4						X	2.1.20 - Ability to execute procedure steps.	4.2	1

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
E09	Natural Circulation Operations / 4	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with Natural Circulation Operations	3.7	1
E09	Natural Circulation Operations / 4		X					EK2.2 - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	3.9	1
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS / 4	X						EK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the Natural Circulation with Steam Void in Vessel with/without RVLIS	3.6	1
E10	Natural Circulation with Steam Void in Vessel with/without RVLIS / 4			X				EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	3.6	1
E14	High Containment Pressure / 5					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.8	1

K/A Category Totals: 4 4 4 4 6 2 **Group Point Total:** 24

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Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
007	Reactor Trip / 1			X				EK3.01 - Actions contained in EOP for reactor trip	4.6	1
007	Reactor Trip / 1					X		EA2.05 - Reactor trip first-out indication	3.9	1
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open) / 3		X					AK2.02 - Sensors and detectors	2.7	1
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open) / 3						X	2.1.20 - Ability to execute procedure steps.	4.2	1
022	Loss of Reactor Coolant Makeup / 2					X		AA2.04 - How long PZR level can be maintained within limits	3.8	1
027	Pressurizer Pressure Control (PZR PCS) Malfunction / 3				X			AA1.01 - PZR heaters, sprays, and PORVs	3.9	1
038	Steam Generator Tube Rupture (SGTR) / 3	X						EK1.01 - Use of steam tables	3.4	1
054	Loss of Main Feedwater (MFW) / 4	X						AK1.01 - MFW line break depressurizes the S/G (similar to a steam line break)	4.3	1
054	Loss of Main Feedwater (MFW) / 4				X			AA1.03 - AFW auxiliaries, including oil cooling water supply	3.7	1
058	Loss of DC Power / 6					X		AA2.01 - That a loss of dc power has occurred; verification that substitute power sources have come on line	4.1	1

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
060	Accidental Gaseous Radwaste Release / 9		X					AK2.01 - ARM system, including the normal radiation-level indications and the operability status	2.9*	1
060	Accidental Gaseous Radwaste Release / 9				X			AA1.01 - Area radiation monitors	3.0	1
E03	LOCA Cooldown and Depressurization / 4			X				EK3.3 - Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations	3.9	1
E03	LOCA Cooldown and Depressurization / 4						X	2.1.20 - Ability to execute procedure steps.	4.2	1
E05	Loss of Secondary Heat Sink / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.9	1
E11	Loss of Emergency Coolant Recirculation / 4			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with Loss of Emergency Coolant Recirculation	4.0	1

K/A Category Totals: 2 3 3 3 3 2 **Group Point Total:** 16

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
028	Pressurizer (PZR) Level Control Malfunction / 2					X		AA2.12 - Cause for PZR level deviation alarm: controller malfunction or other instrumentation malfunction	3.5	1
028	Pressurizer (PZR) Level Control Malfunction / 2						X	2.1.20 - Ability to execute procedure steps.	4.2	1
036	Fuel Handling Incidents / 8		X					AK2.01 - Fuel handling equipment	3.5	1

K/A Category Totals: 0 1 0 0 1 1 **Group Point Total:** 3