

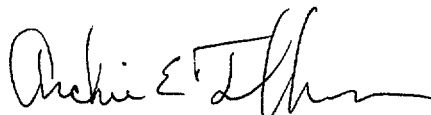
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## HOPE CREEK LIMITED SRO LICENSE EXAMINATION OUTLINE

Enclosed is our proposed outline for the LSRO license examination to be conducted for Hope Creek candidates during the week of September 17, 2001. Included are:

- Form ES-201-2, Examination Outline Quality Checklist: Form ES-201 was pen and ink changed as discussed to reflect LSRO Exam requirements of ES-701.
- Proposed Schedule: Currently there are 5 LSRO candidates. The operating exam is estimated to take 3 days. The written examination will be given the day after completion of the operating exam.
- LSRO Written Examination Outline: The 50 question Written Exam outline for the LSRO exam was randomly generated using the "token method" outlined by ES-401 Attachment 1. Procedure and plant system K/A's that were not consistent with ES-701 Attachment 1 were deleted and then reselected using the random process. Generic KA's in the Plant System Tiers, which were not consistent with the system, were deleted and then reselected using the random process.
- LSRO Administrative Topics Outlines: There are four Admin JPM/question sets outlined on Form ES-301-1
- Discussion Scenario Outlines: There are two scenarios, each outlined on Form ES-D-1 IAW ES-701
- Facility Walk-Through Test Outlines: There are 5 Plant JPMs outlined on Form ES-301-2 IAW ES-701.

The examination team is currently developing the written and operating examination. If you have any questions or comments, please call me at 856-339-3966 or Dave Rein 856-339-3952. For major issues, the Operations Training Manager, Jim Reid, can be reached at 856-339-3896. Jim is on the Examination Security Agreement.



Archie E. Faulkner  
Operations Superintendent /Exam Development

**BWR LSRO Examination Outline**

Facility: Hope Creek		Date of Exam: 9/17/01						Exam Level: LSRO					
Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	0	0	2				2	1			1	6
	2	3	2	2				4	1			2	14
	Tier Totals	3	2	4				6	2			2	20
2. Plant Systems	1	0	1	0	0	0	0	1	0	0	0	0	2
	2	1	1	1	1	1	1	2	1	0	0	0	9
	3	1	0	0	0	1	0	1	0	0	1	0	4
	Tier Totals	2	2	1	1	2	1	4	1	0	1	0	15
3. Reactor and fuel characteristics and physical aspects of core construction important to fuel handling or shutdown activities												8	
4. Health Physics and Radiation Protection for fuel handling activities and general employee responsibilities												7	

Note:

- 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  $\pm 1$  from that specified in the table based on NRC revisions. The final exam must total **50** points.
- 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.
- Systems/evolutions within each group are identified on the associated outline.
- The shaded areas are not applicable to the category/tier.
- \* 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.
- On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

# BWR SRO Examination Outline

Printed: 06/15/2001

Facility: HOPE CREEK

ES - 401

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

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295003	Partial or Complete Loss of A.C. Power / 6			X				AK3.03 - Load shedding	3.6	1
295003	Partial or Complete Loss of A.C. Power / 6				X			AA1.03 - Systems necessary to assure safe plant shutdown	4.4*	1
295014	Inadvertent Reactivity Addition / 1						X	2.1.10 - Knowledge of conditions and limitations in the facility license.	3.9	1
295014	Inadvertent Reactivity Addition / 1					X		AA2.03 - Cause of reactivity addition	4.3	1
295023	Refueling Accidents / 8			X				AK3.03 - Ventilation isolation	3.6	1
295023	Refueling Accidents / 8				X			AA1.02 - Fuel pool cooling and cleanup system	3.1	1

K/A Category Totals: 0 0 2 2 1 1

Group Point Total: 6

# BWR SRO Examination Outline

Facility: HOPE CREEK

Printed: 06/15/2001

ES - 401

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

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295001	Partial or Complete Loss of Forced Core Flow Circulation / 1				X			AA1.02 - RPS	3.3	1
295018	Partial or Complete Loss of Component Cooling Water / 8			X				AK3.05 - Placing standby heat exchanger in service	3.3	1
295018	Partial or Complete Loss of Component Cooling Water / 8				X			AA1.01 - Backup systems	3.4	1
295018	Partial or Complete Loss of Component Cooling Water / 8						X	2.1.6 - Ability to supervise and assume a management role during plant transients and upset conditions.	4.3	1
295021	Loss of Shutdown Cooling / 4	X						AK1.03 - Adequate core cooling.	3.9	1
295021	Loss of Shutdown Cooling / 4				X			AA1.04 - Alternate heat removal methods	3.7	1
295021	Loss of Shutdown Cooling / 4						X	2.1.28 - Knowledge of the purpose and function of major system components and controls.	3.3	1
295022	Loss of CRD Pumps / 1	X						AK1.01 - Reactor pressure vs. rod insertion capability	3.4	1
295022	Loss of CRD Pumps / 1				X			AA1.04 - Reactor water cleanup system: Plant-Specific	2.6	1
295033	High Secondary Containment Area Radiation Levels / 9	X						EK1.02 - Personnel protection	4.2*	1
295033	High Secondary Containment Area Radiation Levels / 9		X					EK2.04 - Standby gas treatment system/FRVS	4.2	1
295034	Secondary Containment Ventilation High Radiation / 9			X				EK3.01 - Isolating secondary containment ventilation	4.1	1
295034	Secondary Containment Ventilation High Radiation / 9					X		EA2.02 - Cause of high radiation levels	4.2*	1

# BWR SRO Examination Outline

Facility: HOPE CREEK

Printed: 06/15/2001

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
600000	Plant Fire On Site / 8		X					AK2.01 - Sensors, detectors and valves	2.7	1

K/A Category Totals: 3 2 2 4 1 2

Group Point Total: 14

# BWR SRO Examination Outline

Printed: 06/15/2001

Facility: HOPE CREEK

ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
215004	Source Range Monitor (SRM) System / 7		X										K2.01 - SRM channels/detectors	2.8	1
261000	Standby Gas Treatment System / 9							X					A1.03 - †Off-site release levels	3.8	1

K/A Category Totals: 0 1 0 0 0 0 1 0 0 0 0

Group Point Total: 2

# BWR SRO Examination Outline

Printed: 06/15/2001

Facility: HOPE CREEK

ES - 401

Plant Systems - Tier 2 / Group 2

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201001	Control Rod Drive Hydraulic System / 1							X					A1.09 - CRD drive water flow	2.8	1
202001	Recirculation System / 1		X										K2.02 - MG sets: Plant-Specific	3.3	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4						X						K6.03 - Recirculation system	3.2	1
215003	Intermediate Range Monitor (IRM) System / 7								X				A2.02 - IRM inop condition	3.7	1
234000	Fuel Handling Equipment / 8				X								K4.02 - †Prevention of control rod movement during core alterations	4.1	1
234000	Fuel Handling Equipment / 8					X							K5.05 - †Fuel orientation	3.7	1
272000	Radiation Monitoring System / 7			X									K3.06 - Reactor building ventilation: Plant-Specific	3.6	1
286000	Fire Protection System / 8	X											K1.03 - Reactor water level: Plant-Specific	3.0	1
400000	Component Cooling Water System (CCWS) / 8							X					A1.01 - CCW flow rate	2.8	1

K/A Category Totals: 1 1 1 1 1 1 2 1 0 0 0

Group Point Total: 9

# BWR SRO Examination Outline

Printed: 06/15/2001

Facility: HOPE CREEK

ES - 401

Plant Systems - Tier 2 / Group 3

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201003	Control Rod and Drive Mechanism / 1										X		A4.02 - CRD mechanism position: Plant-Specific	3.5	1
215001	Traversing In-Core Probe / 7							X					A1.01 - Radiation levels: (Not-BWR1)	2.9	1
233000	Fuel Pool Cooling and Clean-up / 9	X											K1.12 - Radwaste system	2.6	1
290002	Reactor Vessel Internals / 5					X							K5.05 - Brittle fracture	3.3	1

K/A Category Totals: 1 0 0 0 1 0 1 0 0 1 0

Group Point Total: 4



BWR LSRO Examination Outline

Facility: Hope Creek		Date of Exam: 9/17/01		Exam Level: LSRO	
Category	K/A#	Topic	Imp.	Points	
3. Reactor and fuel characteristics and physical aspects of core construction important to fuel handling or shutdown activities	G 2.2.27	Knowledge of the refueling process	3.5	1	
	G 2.2.32	Knowledge of the effects of alterations on core configuration	3.3	1	
	G 2.2.34	Knowledge of the process for determining the internal and external effects on core reactivity	3.2	1	
	6.1 292002 K1.11	Reactor Theory – Neutron Life Cycle Define reactivity	3.3	1	
	6.1 292004 K1.02	Reactor Theory – Reactivity Coefficients Define the effect on the magnitude of the temperature coefficient of reactivity from changes in moderator temperature and core age	2.6	1	
	6.1 292005 K1.01	Reactor Theory – Control Rods Relate notch and rod position	3.3	1	
	6.2 293008 K1.36	Thermodynamics - Thermal Hydraulics Describe means by which the operator can determine if natural circulation flow exists	3.3	1	
	6.2 293007 K1.07	Thermodynamics - Heat Transfer and Heat Exchangers Describe how the presence of gases or steam can affect heat transfer and fluid flow in a heat exchanger	2.9	1	
Total				8	

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BWR LSRO Examination Outline

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Facility: Hope Creek		Date of Exam: 9/17/01		Exam Level: LSRO	
Category	K/A#	Topic	Imp.	Points	
4. Health Physics and Radiation Protection for fuel handling activities and general employee responsibilities	G 2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements	3.0	1	
	G 2.3.2	Knowledge of the facility ALARA program	2.9	1	
	G 2.3.4	Knowledge of the radiation exposure limits and contamination control / including permissible levels in excess of those authorized	3.1	1	
	G 2.3.7	Knowledge of the process for preparing a RWP	3.3	1	
	G 2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1	
	G 2.2.26	Knowledge of refueling administrative requirements	3.7	1	
	G 2.2.29	Knowledge of SRO fuel handling responsibilities	3.8	1	
Total				7	

<b>Facility:</b> Hope Creek <b>Examination Level:</b> SRO(L)		<b>Date of Examination:</b> 9/17/01 <b>Operating Test Number:</b> 1
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Conduct of Operations Questions	2.1.12 (4.0) – Ability to apply Technical Specifications for a system.  Question: Tech Spec requirements for Control Rod Mechanism Removal.
		2.1.10(3.9) – Knowledge of the conditions and limitations in the facility license.  Question: Documenting Tech Spec requirements for Control Rod Mechanism removal.
	Conduct of Operations JPM	2.1.24 (3.1) – Ability to obtain and interpret station electrical and mechanical drawings.  JPM: Demonstrate Emergency Makeup flowpath to the Fuel Pool with Service Water using P+ID's.
A.2	Equipment Control JPM	2.2.11 (3.4) – Knowledge of the process for controlling temporary changes.  JPM: Annunciator Bypass of CRDM High Temp Overhead annunciator. <i>Then for Flood Driven</i>
A.3	Radiation Control Questions	2.3.1 (3.0) – Knowledge of 10 CFR 20 and related facility radiation control requirements.  QUESTION: Drywell access restrictions during fuel transfer.
		2.3.4 (3.1) – Knowledge of radiation exposure limits and contamination control / including permissible levels in excess of those authorized.  QUESTION: Emergency dose authorization.
A.4	Emergency Plan Questions	2.4.40 (4.0) – Knowledge of SRO's responsibilities during emergency plan implementation.  QUESTION: Responsibilities during emergency conditions.
		2.4.29 (4.0) – Knowledge of the emergency plan.  QUESTION: Control of contract personnel during emergency conditions.

Facility: Hope CreekDate of Examination: 9/17/01Exam Level: SRO(L)Operating Test No.: 1**B.1: Control Room Systems**

	System	JPM Description	Type Code*	Safety Function
S.1	234000 Fuel Handling Equipment	Perform Fuel Grapple Functional Test IAW HC.OP-FT.KE-0001 Section 5.2.2.A through 5.2.2.X (Alternate Path)	N, R, A	FHE
S.2	234000 Fuel Handling Equipment	Manually lower Fuel Bundle IAW HC.OP-SO.KE-0001(Q) Attachment 2 (Alternate Path)	N, R, A	FHE
S.3	234000 Fuel Handling Equipment	Perform Mode Switch Refueling Interlock Test IAW HC.OP-ST.KE-0001 Section 5.2.1 through 5.2.6	N, R	FHE
S.4	233000 Fuel Pool Cooling and Cleanup	Respond to loss of Fuel Pool Inventory caused by pool liner leak. Using AB-144, Attachment 2, candidate determines leak source.	N, R, E	DHR/ AUX
S.5	215004 Source Range Monitor	SRM/IRM Rod Block Bypassing during refueling operations IAW HC.OP-SO.SE-0001 Section 5.4. Perform independent verification of installed jumpers	N	IC/RM

**B.2: Facility Walk-Through (Same as RO In-Plant Walkthrough)**

P.1	NA	NA	NA	NA
P.2	NA	NA	NA	NA
P.3	NA	NA	NA	NA

\* **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, (E)OP/AB

**Facility:** Hope Creek**Scenario No.:** 1**Op Test No.:** 1**Examiners:** \_\_\_\_\_**Candidates:** \_\_\_\_\_ LSRO

\_\_\_\_\_

\_\_\_\_\_ LSRO

\_\_\_\_\_

\_\_\_\_\_ LSRO

\_\_\_\_\_ LSRO

\_\_\_\_\_ LSRO

**Objectives:** Response to a dropped irradiated fuel bundle**Initial Conditions:** Operational Condition 5, core offload in progress**Turnover:** You are the Refueling SRO. A fuel bundle is being raised from the reactor core on the Main Fuel Grapple.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	C	The fuel bundle bail handle fails and drops free of the grapple
2	NA	M	The fuel bundle lands on the reactor core and is severely damaged

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

**Facility:** Hope Creek**Scenario No.:** 2**Op Test No.:** 1**Examiners:** \_\_\_\_\_**Candidates:** \_\_\_\_\_ LSRO

\_\_\_\_\_

\_\_\_\_\_ LSRO

\_\_\_\_\_

\_\_\_\_\_ LSRO

\_\_\_\_\_ LSRO

\_\_\_\_\_ LSRO

**Objectives:** Implement alternate core circulation and decay heat removal methods**Initial Conditions:** Operational condition 5, 7 days after shutdown for refueling outage. Reactor head is removed. RPV water level is 1 foot below head flange.**Turnover:** You are the Refueling SRO, preparing to fill the reactor cavity.

Event No.	Malfunction No.	Event Type*	Event Description
1	1	I	Failure of Reactor pressure transmitter causing loss of all RHR Shutdown cooling.
2	2	M	Loss of Shutdown Cooling Decay Heat Removal / Implement alternate core circulation/ implement alternate decay heat removal contingencies

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