ES-401, Rev. 9 **PWR Examination Outline** **Form ES-401-2**

Facility: Robinson Date of Exam: 2011-302

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	1				1	2			2	9	2	2	4
	Tier Totals	4	5	4				4	5			5	27	5	5	10
2. Plant Systems	1	2	2	3	2	3	3	3	2	3	2	3	28	3	2	5
	2	1	1	1	1	1	1	1	0	1	1	1	10	2	1	3
	Tier Totals	3	3	4	3	4	4	4	2	4	3	4	38	5	3	8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			2			2			3			2	2	2	1	

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 Section D.1.b of ES-401, 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. Refer to Section D.1.b of ES-401 for the applicable K/As.

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.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
038EG2.4.11	Steam Gen. Tube Rupture / 3	4.0	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of abnormal condition procedures.
054AG2.4.11	Loss of Main Feedwater / 4	4.0	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of abnormal condition procedures.
055EA2.01	Station Blackout / 6	3.4	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Existing valve positioning on a loss of instrument air system
058AA2.03	Loss of DC Power / 6	3.5	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	DC loads lost; impact on ability to operate and monitor plant systems
we04EG2.4.3	LOCA Outside Containment / 3	3.7	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to identify post-accident instrumentation.
WE05EA2.1	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	3.4	4.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001AG2.1.28	Continuous Rod Withdrawal / 1	4.1	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the purpose and function of major system components and controls.
068AG2.4.2	Control Room Evac. / 8	4.5	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.
076AA2.05	High Reactor Coolant Activity / 9	2.2	2.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	CVCS letdown flow rate indication
WE09EA2.1	Natural Circ. / 4	3.1	3.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003A2.03	Reactor Coolant Pump	2.7	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Problems associated with RCP motors, including faulty motors and current, winding and bearing temperature problems
007A2.05	Pressurizer Relief/Quench Tank	3.2	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Exceeding PRT high-pressure limits
022G2.4.50	Containment Cooling	4.2	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.
059A2.03	Main Feedwater	2.7	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Overfeeding event
064G2.4.46	Emergency Diesel Generator	4.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify that the alarms are consistent with the plant conditions.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
011G2.2.38	Pressurizer Level Control	3.6	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of conditions and limitations in the facility license.
045A2.11	Main Turbine Generator	2.4	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Control problems in primary, e.g. axial flux imbalance; need to reduce load on secondary
056A2.04	Condensate	2.6	2.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of condensate pumps

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.31	Conduct of operations	4.6	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.
G2.1.41	Conduct of operations	2.8	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the refueling processes
G2.2.35	Equipment Control	3.6	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to determine Technical Specification Mode of Operation
G2.2.42	Equipment Control	3.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize system parameters that are entry-level conditions for Technical Specifications
G2.3.4	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation exposure limits under normal and emergency conditions
G2.3.7	Radiation Control	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to comply with radiation work permit requirements during normal or abnormal conditions
G2.4.43	Emergency Procedures/Plans	3.2	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of emergency communications systems and techniques.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
007EG2.4.11	Reactor Trip - Stabilization - Recovery / 1	4.0	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of abnormal condition procedures.
008AK2.03	Pressurizer Vapor Space Accident / 3	2.5	2.4	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Controllers and positioners
009EK2.03	Small Break LOCA / 3	3	3.3	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	S/Gs
011EK1.01	Large Break LOCA / 3	4.1	4.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Natural circulation and cooling, including reflux boiling.
015AK2.08	RCP Malfunctions / 4	2.6	2.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	CCWS
022AA2.03	Loss of Rx Coolant Makeup / 2	3.1	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Failures of flow control valve or controller
025AK3.01	Loss of RHR System / 4	3.1	3.4	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Shift to alternate flowpath
027AA1.05	Pressurizer Pressure Control System Malfunction / 3	3.3	3.2	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Transfer of heaters to backup power supply
029EG2.4.49	ATWS / 1	4.6	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.
038EK1.04	Steam Gen. Tube Rupture / 3	3.1	3.3	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Reflux boiling
054AA1.04	Loss of Main Feedwater / 4	4.4	4.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	HPI, under total feedwater loss conditions

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
055EG2.1.31	Station Blackout / 6	4.6	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.
056AK1.03	Loss of Off-site Power / 6	3.1	3.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Definition of subcooling: use of steam tables to determine it
057AA2.04	Loss of Vital AC Inst. Bus / 6	3.7	4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	ESF system panel alarm annunciators and channel status indicators
058AA1.02	Loss of DC Power / 6	3.1	3.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Static inverter dc input breaker, frequency meter, ac output breaker and ground fault detector
065AA2.05	Loss of Instrument Air / 8	3.4	4.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	When to commence plant shutdown if instrument air pressure is decreasing
WE05EK3.1	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	3.4	3.8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure and reactivity changes and operating limitations and reasons for these operating characteristics.
WE12EK3.3	Steam Line Rupture - Excessive Heat Transfer / 4	3.5	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Manipulation of controls required to obtain desired operating results during abnormal and emergency situations.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
005AK2.02	Inoperable/Stuck Control Rod / 1	2.5	2.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Breakers, relays, disconnects and control room switches
028AA2.04	Pressurizer Level Malfunction / 2	2.6	3.1	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Ammeters and running indicators for CVCS charging pumps
032AA2.09	Loss of Source Range NI / 7	2.5	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Effect of improper HV setting
033AG2.2.44	Loss of Intermediate Range NI / 7	4.2	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions
060AK1.02	Accidental Gaseous Radwaste Rel. / 9	2.5	3.1	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Biological effects on humans of the various types of radiation, exposure levels that are acceptable for personnel in a nuclear reactor power plant; the units used for radiation intensity measurements and for radiation exposure levels
067AA1.06	Plant Fire On-site / 8	3.5	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Fire alarm
076AK2.01	High Reactor Coolant Activity / 9	2.6	3	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Process radiation monitors
we08EG2.4.2	RCS Overcooling - PTS / 4	4.5	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.
WE10EK3.1	Natural Circ. With Seam Void/ 4	3.4	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure and reactivity changes and operating limitations and reasons for these operating characteristics.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003A1.07	Reactor Coolant Pump	3.4	3.4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	RCS temperature and pressure
004K5.30	Chemical and Volume Control	3.8	4.2	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Relationship between temperature and pressure in CVCS components during solid plant operation
004K6.14	Chemical and Volume Control	2.7	3.0	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Recirculation path for charging pumps
005K3.01	Residual Heat Removal	3.9	4.0	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RCS
006K5.10	Emergency Core Cooling	2.5	2.9	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Theory of thermal stress
007A1.01	Pressurizer Relief/Quench Tank	2.9	3.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Maintaining quench tank water level within limits
007K3.01	Pressurizer Relief/Quench Tank	3.3	3.6	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Containment
010K1.03	Pressurizer Pressure Control	3.6	3.7	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	RCS
010K4.01	Pressurizer Pressure Control	2.7	2.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Spray valve warm-up
012A3.05	Reactor Protection	3.6	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Single and multiple channel trip indicators
013K2.01	Engineered Safety Features Actuation	3.6	3.8	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	ESFAS/safeguards equipment control

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
022A3.01	Containment Cooling	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Initia tion of safeguards mode of operation
022A4.03	Containment Cooling	3.2	3.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Dampers in the CCS
026K1.01	Containment Spray	4.2	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ECCS
026K3.02	Containment Spray	4.2	4.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Recirculation spray system
039K4.06	Main and Reheat Steam	3.3	3.6	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Prevent reverse steam flow on steam line break
059A2.04	Main Feedwater	2.9	3.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Feeding a dry S/G
059A3.02	Main Feedwater	2.9	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Programmed levels of the S/G
061K5.01	Auxiliary/Emergency Feedwater	3.6	3.9	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Relationship between AFW flow and RCS heat transfer
061K6.02	Auxiliary/Emergency Feedwater	2.6	2.7	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Pumps
062A2.10	AC Electrical Distribution	3.0	3.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Effects of switching power supplies on instruments and controls
063A1.01	DC Electrical Distribution	2.5	3.3	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Battery capacity as it is affected by discharge rate

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
063G2.4.41	DC Electrical Distribution	2.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the emergency action level thresholds and classifications.
064K6.07	Emergency Diesel Generator	2.7	2.9	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Air receivers
073G2.2.12	Process Radiation Monitoring	3.7	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of surveillance procedures.
076G2.4.18	Service Water	3.3	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the specific bases for EOPs.
076K2.01	Service Water	2.7	2.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Service water
103A4.09	Containment	3.1	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Containment vacuum system

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001A3.05	Control Rod Drive	3.5	3.5	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Individual vs. group rod position
011K2.02	Pressurizer Level Control	3.1	3.2	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	PZR heaters
015K6.01	Nuclear Instrumentation	2.9	3.2	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Sensors, detectors and indicators
016K3.09	Non-nuclear Instrumentation	3.5	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	ESFAS
028A4.02	Hydrogen Recombiner and Purge Control	3.7	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Location and interpretation of containment pressure indications
041G2.4.11	Steam Dump/Turbine Bypass Control	4.0	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of abnormal condition procedures.
071K1.05	Waste Gas Disposal	2.7	2.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Meteorological tower
072K5.01	Area Radiation Monitoring	2.7	3.0	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Radiation theory, including sources, types, units and effects
079K4.01	Station Air	2.9	3.2	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Cross-connect with IAS
086A1.05	Fire Protection	2.9	3.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	FPS lineups

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.15	Conduct of operations	2.7	3.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of administrative requirements for temporary management directives such as standing orders, night orders, Operations memos, etc.
G2.1.17	Conduct of operations	3.9	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to make accurate, clear and concise verbal reports.
G2.1.27	Conduct of operations	3.9	4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system purpose and or function.
G2.2.6	Equipment Control	3.0	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for making changes to procedures
G2.2.7	Equipment Control	2.9	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for conducting special or infrequent tests
G2.3.13	Radiation Control	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety procedures pertaining to licensed operator duties
G2.3.4	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation exposure limits under normal and emergency conditions
G2.4.25	Emergency Procedures/Plans	3.3	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of fire protection procedures.
G2.4.40	Emergency Procedures/Plans	2.7	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the SRO's responsibilities in emergency plan implementation.
G2.4.9	Emergency Procedures/Plans	3.8	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.

Facility: H B Robinson
Date of Examination: 11/28/11
Examination Level: RO X SRO
Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Perform OMM-024 Rod Position Channel Check
Conduct of Operations	D, R	Calculate the boron addition required prior to initiating a natural circulation cooldown to CSD
Equipment Control	M, R	Perform Section 8.2.3 of OST-020, Shiftly Surveillances
Radiation Control	N, R	Calculate the maximum permissible stay time with emergency dose limits
Emergency Procedures/Plan		N/A

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

2011-2 NRC RO Admin JPM Summary

2011-2 NRC JPM Admin RO A1-1 – Perform OMM-024 Rod Position Channel Check

G2.1.20 Ability to interpret and execute procedure steps (CFR: 41.10 / 43.5 / 45.12) RO 4.6, SRO 4.6

The plant has experienced a load reduction due to a disturbance on the electrical grid. 2 control rods did not move as the remainder of the bank automatically inserted into the core. The plant computer (ERFIS) failed during the transient which resulted in manual logs having to be taken due to the loss of monitoring function. The candidate will be expected to review the individual control rod positions and determine that 2 of the control rods are out of alignment with the bank.

2011-2 NRC JPM Admin RO A1-2 – Calculate the boron addition required prior to initiating a natural circulation cooldown to CSD

G2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12) RO 3.9, SRO 4.2

The candidate will be expected to calculate the boron addition needed for the plant to be placed in the cold shutdown condition while in natural circulation. This boration includes calculating the change in boric acid storage tank level.

2011-2 NRC JPM Admin RO A2 – Perform Section 8.2.3 of OST-020, Shiftly Surveillances

G2.2.37 Ability to determine operability and/or availability of safety related equipment. (CFR: 41.7 / 43.5 / 45.12) RO 3.6, SRO 4.6

The candidate will be directed to complete OST-020, Shiftly Surveillances, Section 8.2.3. Several instruments will be out of tolerance for the parameters measured. The candidate will be expected to identify the out of tolerance instruments and make the appropriate log entries to identify the failures.

2011-2 NRC JPM Admin RO A3 – Calculate the maximum permissible stay time with emergency dose limits

G2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10) RO 3.2, SRO 3.7

The candidate will be given specific tasks to be performed inside the Containment Vessel during a declared emergency event. He will be expected to calculate the dose to be received and apply the proper emergency dose limits to the allowed dose.

ES-301 **Administrative Topics Outline** Form ES-301-1

Facility: H B Robinson
Examination Level: RO SRO X
Date of Examination: 11/28/11
Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Heat Stress Work Limits
Conduct of Operations	N, R	Complete Equipment Inoperable Record
Equipment Control	M, R	Perform Section 8.2.3 of OST-020, Shiftly Surveillances
Radiation Control	M, R	Calculate emergency dose exposure time limits
Emergency Procedures/Plan	M, R	Classify an Emergency Event

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

2011-2 NRC SRO Admin JPM Summary

2011-2 NRC JPM Admin SRO A1-1 – Heat Stress Work Limits

G2.1.26 Knowledge of industrial safety procedures (such as rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen). (CFR: 41.10 / 45.12) RO 3.4, SRO 3.6

The candidate will be expected to evaluate the heat stress work limits IAW AP-020. This determination will include the type of work to be performed, stay time and recovery time period.

2011-2 NRC JPM Admin SRO A1-2 – Complete Equipment Inoperable Record

G2.1.18 Ability to make accurate, clear, and concise logs, records, status boards, and reports. (CFR: 41.10 / 45.12 / 45.13) RO 3.6, SRO 3.8

The candidate will be expected to complete the OMM-007, Equipment Inoperable Record, for Component Cooling Water Pump "B" being inoperable. He will complete the necessary attachments, determine the allowed time to Modes 3 and 5, and determine whether a safety function determination is required for the equipment failure.

2011-2 NRC JPM Admin SRO A2 – Perform Section 8.2.3 of OST-020, Shiftly Surveillances

G2.2.37 Ability to determine operability and/or availability of safety related equipment. (CFR: 41.7 / 43.5 / 45.12) RO 3.6, SRO 4.6

The candidate will be directed to complete OST-020, Shiftly Surveillances, Section 8.2.3. Several instruments will be out of tolerance for the parameters measured. The candidate will be expected to identify the out of tolerance instruments and make the appropriate log entries to identify the failures. Once the out of tolerance instruments are identified, the candidate will be required to identify the applicable Technical Specification action statements for the affected instruments.

2011-2 NRC JPM Admin SRO A3 – Calculate emergency dose exposure time limits.

G2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10) RO 3.2, SRO 3.7

The candidate will be given specific tasks to be performed and will be expected to apply the appropriate emergency exposure limits to the specified jobs.

2011-2 NRC JPM Admin SRO A4 – Classify an Emergency Event.

G2.4.41 Knowledge of the emergency action level thresholds and classifications. (CFR: 41.10 / 43.5 / 45.11) RO 2.9, SRO 4.6

The candidate will be given the necessary plant conditions to classify that an emergency event has occurred. This classification is required to be determined within 15 minutes of the onset of the event. Once the classification is communicated to the examiner, the candidate will be expected to fill out the Emergency Notification Form for communication to the state and counties within 15 minutes. Both portions of this JPM are time critical with a 15 minute completion criteria on each section.

Facility: H B Robinson Date of Examination: 11/28/11

Exam Level: RO X SRO-I X **SRO-U X** Operating Test No.: _____

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a. Withdrawing Control Rod Shutdown Bank B	A, M, S	1
b. **Align SI System for Cold Leg Recirculation** (Time Critical)	D, EN, L, S	2
c. **PZR Pressure Control Malfunction**	A, D, S	3
d. Transfer from Bypass to Main Feedwater Regulating Valves	A, M, S	4S
e. **Respond to RHR Leakage with the Unit on RHR Cooling**	A, EN, L, M, S	4P
f. Restore PRT to Normal Operating Conditions **(RO ONLY)**	A, D, S	5
g. Remove Source Range Instrument From Service	D, L, S	7
h. Respond to a Loss of CCW to the RCP Motor Coolers	D, S	8
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. **Align Deepwell Pump D to Supply Cooling Water to EDG B**	D, E, R	4S
j. **Startup of Dedicated Shutdown UPS Inverter IAW OP-602**	N	6
k. Respond to Control Room Inaccessibility	D, E, L, R	2

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

JPM A: Withdrawing Control Rod Shutdown Bank B

K/A 003 AK3.04 Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod: Actions contained in EOP for dropped control rod.
(CFR: 41.5/ 41.10 / 45.6 / 45.13)

(Control Rod Drive System / 001) The candidate will be directed to withdraw Shutdown Bank B rods to support the upcoming reactor startup. Once the control rods reach 70 steps withdrawn, Group 2 of Shutdown Bank B (4 control rods) will drop into the core. The candidate will be expected to enter AOP-001, Malfunction of Reactor Control System, and take the actions for dropped rods while the plant is in Mode 3. This will require that the remaining shutdown bank rods be driven into the core. (CR-044 Bank JPM modified to drop the 4 control rods during withdrawal).

JPM B: Align SI System for Cold Leg Recirculation

K/A 006 A4.05 Ability to manually operate and/or monitor in the control room: Transfer of ECCS flowpaths prior to recirculation.
(CFR: 41.7 / 45.5 to 45.8)

(Emergency Core Cooling System (ECCS) / 006) Candidate will transfer to cold leg recirculation IAW EPP-9, Transfer to Cold Leg Recirculation. This JPM is time critical. (CR-007 Bank JPM)

JPM C: PZR Pressure Control Malfunction

K/A 010 A2.02 Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Spray valve failures. (CFR: 41.5 / 43.5 / 45.3 / 45.13)

(Pressurizer Pressure Control System (PZR PCS) / 010) Plant is operating in Mode 1 with the candidate directed to respond to plant conditions. The Auxiliary Spray valve will fail open, causing PZR pressure to lower. The candidate will be expected to take the immediate actions of AOP-019, Malfunction of RCS Pressure Control, and enter the procedure to analyze and respond to the lowering pressure. Once the failure is recognized, actions will be taken to isolate letdown and charging flow to isolate the auxiliary spray flow into the PZR. (CR-099 Bank JPM)

JPM D: Transfer from Bypass to Main Feedwater Regulating Valves

K/A 045 A1.05 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: Expected response of primary plant parameters (temperature and pressure) following T/G trip. (CFR: 41.5 / 45.5)

(Main Turbine Generator (MT/G) System / 045) Plant is in Mode 1 with the turbine at a low load and is ready for the Main Feedwater Regulating valves to be placed in service due to the capacity of the Feedwater Regulating Bypass valves. Once the feedwater transfer has been completed, a spurious turbine trip will occur and entry into AOP-007, Turbine Trip Below P-8, will be expected. The actions will reduce reactor power to less than 10% by manual or automatic rod insertion, along with the actions to ensure that the secondary plant is stabilized. AOP-007 and the turbine trip were recently changed so that an automatic reactor trip will not occur unless reactor power is above the P-8 setpoint of 40% power. (CR-045 Bank JPM modified with the turbine trip actions)

JPM E: Respond to RHR Leakage with the unit on RHR Cooling

K/A 025 AA2.02 Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Leakage of reactor coolant from RHR into closed cooling water system or into reactor building atmosphere. (CFR: 43.5 / 45.13)

(Loss of Residual Heat Removal System (RHRS) / 005) Plant is currently in Mode 5 with RHR supplying core cooling. When the RHR pumps are swapped, the RHR discharge relief valve lifts and fails to reseat. This results in a loss of RCS inventory and requires entry into AOP-020, Loss of Residual Heat Removal (Shutdown Cooling). The actions of AOP-020 will require that the RHR Pumps and Reactor Coolant Pumps be secured, along with the isolation of the RHR system. (CR-030 Bank JPM modified to change the leak location from an RCS pipe break to the RHR relief valve).

JPM F: Restore PRT to Normal Operating Conditions **(RO ONLY)**

K/A 007 A1.01 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. (CFR: 41.5 / 45.5)

(Pressurizer Relief Tank / Quench Tank System (PRTS) / 007) Candidate will restore level in the PRT to the normal operating band IAW OP-103, Pressurizer Relief Tank Control System. When securing the PRT fill lineup, Primary Water valve RC-519B will develop a hydraulic lock and will not close when demanded. This will require that actions be taken to relieve the hydraulic pressure using the appropriate section of OP-103. (CR-056 Bank JPM)

JPM G: Remove Source Range Instrument from Service

K/A 015 A4.03 Ability to manually operate and/or monitor in the control room: Trip bypasses. (CFR: 41.7 / 45.5 to 45.8)

(Nuclear Instrumentation System (NIS) / 015) The plant is in Mode 3 when a failure occurs on Source Range Channel N-31. The candidate will be directed to remove the failed channel from service using OWP-011, NI-5. This will remove the channel from scan on the ERFIS computer, bypass the channel trip signal and align the audio count rate channel to the operable Source Range channel. (CR-062 Bank JPM)

JPM H: Respond to a Loss of CCW to the RCP Motor Coolers

K/A 008 K3.03 Knowledge of the effect that a loss or malfunction of the CCWS will have on the following: RCP. (CFR: 41.7)

(Component Cooling Water System (CCWS) / 008) Candidate will respond to a loss of CCW flow to the Containment when supply valve CC-716B inadvertently closes. Attempts to re-open the valve will be unsuccessful and will lead to entry into AOP-014, Component Cooling Water System Malfunction, and result in manually tripping the reactor and securing the Reactor Coolant Pumps. (2008 NRC exam JPM)

JPM I: Align Deepwell Pump D to Supply Cooling Water to EDG B

K/A 076 A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on 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. (CFR: 41.5 / 43.5 / 45.3 / 45.13)

(Service Water System (SWS) / 076) Candidate will be directed to simulate establishing Deepwell Pump B flow to EDG B IAW EPP-28, Loss of Ultimate Heat Sink. This will require that EDG A be locally tripped, power supply for Deepwell Pump D aligned to 480V Bus E-2 (Train B) and flow manually established to EDG B through manual alignment of alternate cooling water valves. (IP-163 Bank JPM)

JPM J: Startup of Dedicated Shutdown UPS Inverter IAW OP-602

K/A 062 G2.1.20 Ability to interpret and execute procedure steps: AC Electrical Distribution System

(AC Electrical Distribution System / 062) Candidate will simulate placing the Dedicated Shutdown UPS Inverter back in service following maintenance activities. (New JPM written for 2011-2 NRC Exam)

JPM K: Respond to Control Room Inaccessibility

K/A 068 AA1.06 Ability to operate and/or monitor the following as they apply to the Control Room Evacuation: Charging pump.
(CFR: 41.7 / 45.5 / 45.6)

(Chemical and Volume Control System / 004) Candidate will simulate performing the breaker manipulations and local controls for inventory control IAW AOP-004, Control Room Inaccessibility, Attachment 1.
(IP-063 Bank JPM)