2009 QUAD CITIES NUCLEAR POWER STATION

INITIAL EXAMINATION

OUTLINE SUBMITTAL

Exelon Nuclear

www.exeloncorp.com

Exelon Generation Company, LLC
Quad Cities Generating Station
22710 206th Avenue North
Cordova, IL 61242

SVP-09-051

September 8, 2009

Regional Administrator, Region III
U. S. Nuclear Regulatory Commission
2443 Warrenville Road, Suite 210
Lisle, IL 60532-4352

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Submittal of Initial Operator Licensing Examination Outlines

Enclosed are the examination outlines that support the Initial License Examination scheduled for the weeks of November 30, 2009 and December 7, 2009 at Quad Cities Nuclear Power Station.

This submittal includes all appropriate examination standard forms and outlines in accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9 (Supplement 1).

In accordance with NUREG-1021, Revision 9 (Supplement 1), Section ES-201, "Initial Operator Licensing Examination Process," 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. Wally J. Beck, Regulatory Assurance Manager, at (309)-227-2800. For questions concerning examination outlines, please contact Raymond J. Venci at (309)-227-4009.

Respectfully,

Timothy J. Tulon
Site Vice President
Quad Cities Nuclear Power Station

SEP 1 1 2009

Enclosures: (Overnight delivery to Raymond K. Walton, Chief Examiner, NRC Region III)

Examination Security Agreement - Form ES-201-3

Administrative Topics Outline (RO) - Form ES-301-1

Administrative Topics Outline (SRO) - Form ES-301-1

Control Room/In-Plant Systems Outline (RO) - Form ES-301-2

Control Room/In-Plant Systems Outline (SRO) - Form ES-301-2

BWR Examination Outline (RO & SRO) - Forms ES-401-1 and ES-401-3

Record of Rejected K/As - Form ES-401-4

Statement detailing method of Written Exam Outline generation

Scenario Outlines (4) - Forms ES-D-1

Completed Checklists:
- Examination Outline Quality Checklist - Form ES-201-2
- Transient and Event Checklist - Form ES-301-5

cc: Chief, Operations Branch – NRC Region III (w/o enclosures)
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station (w/o enclosures)

Facility: Quad Cities Date of Examination: 11/30/2009

Item		Task Description	Initials a	Initials b*	Initials c#
1. WRITTEN	a.	Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	JPH	C	RKW
	b.	Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.	JPH	C	RKW
	c.	Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	JPH	C	RKW
	d.	Assess whether the justifications for deselected or rejected K/A statements are appropriate.	JPH	C	RKW
2. SIMULATOR	a.	Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.	JPH	C	RKW
	b.	Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and scenarios will not be repeated on subsequent days.	JPH	C	RKW
	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.	JPH	C	RKW
3. W/T	a.	Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form	JPH	C	RKW
	b.	Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) the tasks are distributed among the topics as specified on the form (2) at least one task is new or significantly modified (3) no more than one task is repeated from the last two NRC licensing examinations	JPH	C	RKW
	c.	Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.	JPH	C	RKW
4. GENERAL	a.	Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam section.	JPH	C	RKW
	b.	Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	JPH	C	RKW
	c.	Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	JPH	C	RKW
	d.	Check for duplication and overlap among exam sections.	JPH	C	RKW
	e.	Check the entire exam for balance of coverage.	JPH	C	RKW
	f.	Assess whether the exam fits the appropriate job level (RO or SRO).	JPH	C	RKW

	Printed Name / Signature	Date
a. Author	Raymond J. Venesi / Raymond J. Venesi	9/1/09
b. Facility Reviewer (*)	Thomas T. Cox / [illegible]	9/2/09
c. NRC Chief Examiner (#)	Raymond K. Walton / Raymond K. Walton	9/23/09 ★
d. NRC Supervisor	Hironori Peterson / [illegible]	11/18/09 ★★

NOTE: # Independent NRC Reviewer initial items in Column "c"; chief examiner concurrence required.
* Not applicable for NRC-prepared examination outlines.

★ Rec'd on Sept 8, during OL workshop. Did not review until week of Sept 14

★★ Discussed, but did not sign originally.

Facility: Quad Cities Date of Examination: 11/30/09

Examination Level: RO ☒ SRO ☐ Operating Test Number: ILT 08-1

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	D, S	Perform APRM Flow Biased High Flux (Heat Balance) Calibration Test (Partial for step H.4) K/A 2.1.43 4.1/4.3 Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.
Conduct of Operations	N, S	Operate the Plant Process Computer K/A 2.1.19 3.9/3.8 Ability to use plant computers to evaluate system or component status.
Equipment Control	D, R	Review a Worker Tagout for 2nd Approval K/A 2.2.13 4.1/4.3 Knowledge of tagging and clearance procedures.
Radiation Control	N, R	Perform Whole Body Frisk K/A 2.3.5 2.9/2.9 Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.
Emergency Procedures/Plan	N/A	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 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)

Facility: Quad Cities Date of Examination: 11/30/09

Examination Level: RO ☐ SRO ☒ Operating Test Number: ILT 08-1

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Review QOS 0005-S01 for Start of Daily Refueling Activities K/A 2.1.36 SRO 4.1 Knowledge of procedures and limitations involved in core alterations
Conduct of Operations	N, R	Use Procedures Related to Shift Staffing K/A 2.1.5 SRO 3.9 Ability to use procedures related to shift staffing, such as minimum crew compliment, overtime limitations, etc..
Equipment Control	N, R	Determine On Line Risk K/A 2.2.17 SRO 3.8 Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization and coordination with transmission system operator.
Radiation Control	N, R	Perform Whole Body Frisk K/A 2.3.5 2.9/2.9 Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.
Emergency Procedures/Plan	D, S	Classify Event and Determine Protective Action Recommendations (PARS) K/A 2.4.44 SRO 4.4 Knowledge of emergency plan protective action recommendations.

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

Facility: Quad Cities Date of Examination: 11/30/09

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test Number: ILT 08-1

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. Reactor Recirculation, 202001 A4.01 3.7/3.7 Startup Reactor Recirculation Pump to Exit SLO	D, S	1
b. RWCU, 204000 A4.03 3.2/3.1 RWCU System Coolant Rejection	N, L, S	2
c. Main Steam, 239001 A4.01 4.2/4.0 Pressurize the Main Steam Lines	D, L, S	3
d. RCIC, 217000 A4.07 3.9/3.8 Control Reactor Pressure With RCIC	A, M, L, S	4
e. PCIS/NSSS 223002 A4.03 3.6/3.5 Bypass All Group 1 isolation signals	D, L, S	5
f. AC Electrical, 262001 A4.01 3.4/3.7 Energize Bus 14-1 with Cross-tie Failure and subsequent SBO Startup	A, D, S	6
g. RPS, 212000 A4.02 3.6/3.7 Complete A Manual Scram Functional Test	A, M, S	7
h. Plant Ventilation, 288000 A4.01 3.1/2.9 Unisolate and Start The Reactor Bldg Ventilation System	N, S	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Scram Condition Present and Reactor Power Above APRM Downscale or Unknown: CRD Hydraulic System 295037 EA1.05 3.9/4.0 Depressurize the Scram Air Header	D, E, L, R	1
j. Emergency Generators 264000 2.1.23 4.3/4.4 Perform an Emergency Diesel Shutdown Following a Failure of the Engine Driven Cooling Water Pump	A, D, E, R	6
k. Fire Protection System, 286000 2.1.30 4.4/4.0 Locally Startup the 1/2A Fire Diesel	D	8

@ 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	

Facility: Quad Cities Date of Examination: 11/30/09

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test Number: ILT 08-1

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.		
b. RWCU, 204000 A4.03 3.2/3.1 RWCU System Coolant Rejection	N, L, S	2
c. Main Steam, 239001 A4.01 4.2/4.0 Pressurize the Main Steam Lines	D, L, S	3
d. RCIC, 217000 A4.07 3.9/3.8 Control Reactor Pressure With RCIC	A, M, L, S	4
e. PCIS/NSSS 223002 A4.03 3.6/3.5 Bypass All Group 1 isolation signals	D, L, S	5
f. AC Electrical, 262001 A4.01 3.4/3.7 Energize Bus 14-1 with Cross-tie Failure and subsequent SBO Startup	A, D, S	6
g. RPS, 212000 A4.02 3.6/3.7 Complete A Manual Scram Functional Test	A, M, S	7
h. Plant Ventilation, 288000 A4.01 3.1/2.9 Unisolate and Start The Reactor Bldg Ventilation System	N, S	9
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Scram Condition Present and Reactor Power Above APRM Downscale or Unknown: CRD Hydraulic System 295037 EA1.05 3.9/4.0 Depressurize the Scram Air Header	D, E, L, R	1
j. Emergency Generators 264000 2.1.23 4.3/4.4 Perform an Emergency Diesel Shutdown Following a Failure of the Engine Driven Cooling Water Pump	A, D, E, R	6
k. Fire Protection System, 286000 2.1.30 4.4/4.0 Locally Startup the 1/2A Fire Diesel	D	8

@ 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	

Facility Name: Quad Cities Date of Exam: 11/30/09

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	4	4	3	N/A			3	3	N/A		3	20	3		4		7
	2	1	1	1				2	1			1	7	2		1		3
	Tier Totals	5	5	4				5	4			4	27	5		5		10
2. Plant Systems	1	2	1	2	2	2	3	2	3	3	3	3	26	2		3		5
	2	1	1	2	1	1	1	1	1	1	1	1	12	0	2	1		3
	Tier Totals	3	2	4	3	3	4	3	4	4	4	4	38	4		4		8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		2			3			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.

ES-401	BWR Examination Outline								Form ES-401-1
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4	03						Thermal limits	3.6	1
295003 Partial or Complete Loss of AC / 6		01					Station batteries	3.2	1
295004 Partial or Total Loss of DC Pwr / 6			03				Reactor SCRAM: Plant-Specific	3.1	1
295005 Main Turbine Generator Trip / 3				04			Main generator controls	2.7	1
295006 SCRAM / 1					03		Reactor water level	4.0	1
295016 Control Room Abandonment / 7						01.20	Ability to interpret and execute procedure steps.	4.6	1
295018 Partial or Total Loss of CCW / 8	01						Effects on component/system operations	3.5	1
295019 Partial or Total Loss of Inst. Air / 8		02					Component cooling water	2.9	1
295021 Loss of Shutdown Cooling / 4			01				Raising reactor water level	3.3	1
295023 Refueling Acc / 8				06			Neutron monitoring	3.3	1
295024 High Drywell Pressure / 5					02		Drywell temperature	3.9	1
295025 High Reactor Pressure / 3						04.01	Knowledge of EOP entry conditions and immediate action steps.	4.6	1
295026 Suppression Pool High Water Temp. / 5	02						Steam condensation	3.5	1
295027 High Containment Temperature / 5							Mark 3 Containment not applicable to Quad cities		0
295028 High Drywell Temperature / 5		01					Drywell spray: Mark-I&II	3.7	1
295030 Low Suppression Pool Wtr Lvl / 5	02						Pump NPSH	3.5	1
295031 Reactor Low Water Level / 2		05					Low pressure coolant injection (RHR)	4.2	1
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			06				Maintaining heat sinks external to the containment	3.8	1
295038 High Off-site Release Rate / 9				02			Meteorological instrumentation	3.0	1
600000 Plant Fire On Site / 8					03		Fire alarm	2.8	1
700000 Generator Voltage and Electric Grid Disturbances / 6						04.08	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	3.8	1
K/A Category Totals:	4	4	3	3	3	3	Group Point Total:		20

ES-401	BWR Examination Outline							Form ES-401-1
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)								
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3									0
295007 High Reactor Pressure / 3									0
295008 High Reactor Water Level / 2				08			Feedwater system	3.5	1
295009 Low Reactor Water Level / 2					02		Steam flow/feedflow mismatch	3.6	1
295010 High Drywell Pressure / 5									0
295011 High Containment Temp / 5							Mark 3 Containment not applicable to Quad Cities		0
295012 High Drywell Temperature / 5									0
295013 High Suppression Pool Temp. / 5						01. 30	Ability to locate and operate components, including local controls.	4.4	1
295014 Inadvertent Reactivity Addition / 1									0
295015 Incomplete SCRAM / 1									0
295017 High Off-site Release Rate / 9	02						Protection of the general public	3.8	1
295020 Inadvertent Cont. Isolation / 5 & 7									0
295022 Loss of CRD Pumps / 1		04					Reactor water level	2.5	1
295029 High Suppression Pool Wtr Lvl / 5									0
295032 High Secondary Containment Area Temperature / 5			01				Emergency/normal depressurization	3.5	1
295033 High Secondary Containment Area Radiation Levels / 9				01			Area radiation monitoring system	3.9	1
295034 Secondary Containment Ventilation High Radiation / 9									0
295035 Secondary Containment High Differential Pressure / 5									0
295036 Secondary Containment High Sump/Area Water Level / 5									0
500000 High CTMT Hydrogen Conc. / 5									0
K/A Category Totals:	1	1	1	2	1	1	Group Point Total:		7

ES-401	BWR Examination Outline											Form ES-401-1	
	Plant Systems - Tier 2/Group 1 (RO)												
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection Mode						03						Emergency generator	3.7	1
205000 Shutdown Cooling							09					SDC/RHR pump/system discharge pressure	2.8	1
206000 HPCI								06				Inadequate system flow: BWR-2, 3, 4	3.3	1
207000 Isolation (Emergency) Condenser												N/A, System not utilized at Quad Cities		0
209001 LPCS									03			System pressure	3.5	1
209002 HPCS												N/A, System not utilized at Quad Cities		0
211000 SLC										03		Explosive valves firing circuit status	4.1	1
212000 RPS										01	04, 46	Provide manual SCRAM signal(s) ; Ability to verify that the alarms are consistent with the plant conditions.	4.6; 4.2	2
215003 IRM	02							02				Reactor manual control ; IRM inop condition	3.6; 3.5	2
215004 Source Range Monitor											01, 23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1
215005 APRM / LPRM		02										APRM channels	2.6	1
217000 RCIC				02								Prevent over filling reactor vessel	3.3	1
218000 ADS					01							ADS logic operation	3.8	1
223002 PCIS/Nuclear Steam Supply Shutoff						05						Containment instrumentation	3.0	1
239002 SRVs							04					Reactor pressure	3.8	1
259002 Reactor Water Level Control								06				Loss of controller signal output	3.3	1
261000 SGTS									01			System flow	3.2	1
262001 AC Electrical Distribution										01		All breakers and disconnects (including available switch yard): Plant-Specific	3.4	1
262002 UPS (AC/DC)						02					04, 35	D.C. electrical power; Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	2.8; 3.8	2
263000 DC Electrical Distribution	02											Battery charger and battery	3.2	1
264000 EDGs			02						03			A.C. electrical distribution; Indicating lights, meters, and recorders	3.9; 3.4	2
300000 Instrument Air			02									Systems having pneumatic valves and controls	3.3	1
400000 Component Cooling Water				01								Automatic start of standby pump	3.4	1
(217000) SSMP					02							Flow Indication	3.1	1
K/A Category Totals:	2	1	2	2	2	3	2	3	3	3	3	Group Point Total:		26

ES-401	BWR Examination Outline											Form ES-401-1		
	Plant Systems - Tier 2/Group 2 (RO)													
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
201001 CRD Hydraulic	06											Component cooling water systems: Plant-Specific	2.8	1
201002 RMCS														0
201003 Control Rod and Drive Mechanism														0
201004 RSCS												N/A, System not utilized at Quad Cities		0
201005 RCIS												N/A, System not utilized at Quad Cities		0
201006 RWM			01									Reactor manual control system: P-Spec(Not-BWR6)	3.2	1
202001 Recirculation														0
202002 Recirculation Flow Control			04									Reactor/turbine pressure regulation system	2.9	1
204000 RWCU									05			Reactor water temperature	2.8	1
214000 RPIS														0
215001 Traversing In-core Probe														0
215002 RBM														0
216000 Nuclear Boiler Inst.														0
219000 RHR/LPCI: Torus/Pool Cooling Mode				06								Pump motor cooling: Plant-Specific	2.7	1
223001 Primary CTMT and Aux.														0
226001 RHR/LPCI: CTMT Spray Mode														0
230000 RHR/LPCI: Torus/Pool Spray Mode														0
233000 Fuel Pool Cooling/Cleanup														0
234000 Fuel Handling Equipment														0
239001 Main and Reheat Steam					06							Air operated MSIV's	2.8	1
239003 MSIV Leakage Control												N/A, System not utilized at Quad Cities		0
241000 Reactor/Turbine Pressure Regulator						05						Condenser vacuum	3.4	1
245000 Main Turbine Gen. / Aux.														0
256000 Reactor Condensate							08					System water quality	2.7	1
259001 Reactor Feedwater								03				Loss of condensate pump(s)	3.6	1
268000 Radwaste														0
271000 Offgas														0
272000 Radiation Monitoring		01										Main steamline radiation monitors	2.5	1
286000 Fire Protection														0
288000 Plant Ventilation														0
290001 Secondary CTMT										02		Reactor building area temperatures: Plant-Specific	3.3	1
290003 Control Room HVAC														0
290002 Reactor Vessel Internals											04, 06	Knowledge of EOP mitigation strategies.	3.7	1
														0
K/A Category Totals:	1	1	2	1	1	1	1	1	1	1	1	Group Point Total:		12

ES-401	BWR Examination Outline								Form ES-401-1
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4						04. 04	Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.7	1
295003 Partial or Complete Loss of AC / 6									0
295004 Partial or Total Loss of DC Pwr / 6						01. 07	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	1
295005 Main Turbine Generator Trip / 3									0
295006 SCRAM / 1									0
295016 Control Room Abandonment / 7					0 7		Suppression chamber pressure	3.4	1
295018 Partial or Total Loss of CCW / 8						04. 11	Knowledge of abnormal condition procedures.	4.2	1
295019 Partial or Total Loss of Inst. Air / 8									0
295021 Loss of Shutdown Cooling / 4									0
295023 Refueling Acc / 8									0
295024 High Drywell Pressure / 5									0
295025 High Reactor Pressure / 3									0
295026 Suppression Pool High Water Temp. / 5									0
295027 High Containment Temperature / 5							Mark 3 Containment not applicable to Quad Cities		0
295028 High Drywell Temperature / 5					0 4		Drywell pressure	4.2	1
295030 Low Suppression Pool Wtr Lvl / 5									0
295031 Reactor Low Water Level / 2									0
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1									0
295038 High Off-site Release Rate / 9					0 1		Off-site	4.3	1
600000 Plant Fire On Site / 8						04. 30	Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.	4.1	1
700000 Generator Voltage and Electric Grid Disturbances / 6									0
K/A Category Totals:	0	0	0	0	3	4	Group Point Total:		7

ES-401	BWR Examination Outline								Form ES-401-1
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3									0
295007 High Reactor Pressure / 3									0
295008 High Reactor Water Level / 2									0
295009 Low Reactor Water Level / 2									0
295010 High Drywell Pressure / 5									0
295011 High Containment Temp / 5							**Mark 3 Containment not applicable to Quad Cities**		**0**
295012 High Drywell Temperature / 5									0
295013 High Suppression Pool Temp. / 5									0
295014 Inadvertent Reactivity Addition / 1					0 1		Reactor power	4.2	1
295015 Incomplete SCRAM / 1									0
295017 High Off-site Release Rate / 9									0
295020 Inadvertent Cont. Isolation / 5 & 7									0
295022 Loss of CRD Pumps / 1									0
295029 High Suppression Pool Wtr Lvl / 5						04. 50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.0	1
295032 High Secondary Containment Area Temperature / 5									0
295033 High Secondary Containment Area Radiation Levels / 9									0
295034 Secondary Containment Ventilation High Radiation / 9									0
295035 Secondary Containment High Differential Pressure / 5									0
295036 Secondary Containment High Sump/Area Water Level / 5									0
500000 High CTMT Hydrogen Conc. / 5					0 1		Hydrogen monitoring system availability	3.5	1
K/A Category Totals:	0	0	0	0	2	1	Group Point Total:		3

ES-401	BWR Examination Outline											Form ES-401-1	
	Plant Systems - Tier 2/Group 1 (SRO)												
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection														0
205000 Shutdown Cooling Mode														0
206000 HPCI											04. 04	Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.7	1
207000 Isolation (Emergency) Condenser												N/A, System not utilized at Quad Cities		0
209001 LPCS														0
209002 HPCS												N/A, System not utilized at Quad Cities		0
211000 SLC														0
212000 RPS														0
215003 IRM														0
215004 Source Range Monitor														0
215005 APRM / LPRM														0
217000 RCIC											01. 32	Ability to explain and apply system limits and precautions.	4.0	1
218000 ADS								0 3				Loss of air supply to ADS valves: Plant-Specific	3.6	1
223002 PCIS/Nuclear Steam Supply Shutoff														0
239002 SRVs														0
259002 Reactor Water Level Control														0
261000 SGTS														0
262001 AC Electrical Distribution								0 4				Types of loads that, if deenergized, would degrade or hinder plant operation	4.2	1
262002 UPS (AC/DC)														0
263000 DC Electrical Distribution														0
264000 EDGs														0
300000 Instrument Air											04. 45	Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	1
400000 Component Cooling Water														0
														0
K/A Category Totals:	0	0	0	0	0	0	0	2	0	0	3	Group Point Total:		5

ES-401	BWR Examination Outline											Form ES-401-1	
	Plant Systems - Tier 2/Group 2 (SRO)												
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
201001 CRD Hydraulic														0
201002 RMCS														0
201003 Control Rod and Drive Mechanism														0
201004 RSCS												**N/A, System not utilized at Quad Cities**		**0**
201005 RCIS												**N/A, System not utilized at Quad Cities**		**0**
201006 RWM														0
202001 Recirculation								06				Inadvertent recirculation flow decrease	3.8	1
202002 Recirculation Flow Control														0
204000 RWCU														0
214000 RPIS														0
215001 Traversing In-core Probe														0
215002 RBM														0
216000 Nuclear Boiler Inst.														0
219000 RHR/LPCI: Torus/Pool Cooling Mode														0
223001 Primary CTMT and Aux.														0
226001 RHR/LPCI: CTMT Spray Mode														0
230000 RHR/LPCI: Torus/Pool Spray Mode														0
233000 Fuel Pool Cooling/Cleanup														0
234000 Fuel Handling Equipment														0
239001 Main and Reheat Steam														0
239003 MSIV Leakage Control												**N/A, System not utilized at Quad Cities**		**0**
241000 Reactor/Turbine Pressure Regulator														0
245000 Main Turbine Gen. / Aux.														0
256000 Reactor Condensate														0
259001 Reactor Feedwater														0
268000 Radwaste														0
271000 Offgas														0
272000 Radiation Monitoring														0
286000 Fire Protection								05				Fire protection diesel trips	3.3	1
288000 Plant Ventilation														0
290001 Secondary CTMT														0
290003 Control Room HVAC											02.44	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.	4.4	1
290002 Reactor Vessel Internals														0
														0
K/A Category Totals:	0	0	0	0	0	0	0	2	0	0	1	Group Point Total:		3

Facility Name: Date of Exam:

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1. 04	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.	3.3	1		
	2.1. 18	Ability to make accurate, clear, and concise logs, records, status boards, and reports.	3.6	1		
	2.1. 25	Ability to interpret reference materials, such as graphs, curves, tables, etc.			4.2	1
	2.1. 34	Knowledge of primary and secondary plant chemistry limits.			3.5	1
	2.1.					
	2.1.					
	Subtotal			2		2
2. Equipment Control	2.2. 15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.	3.9	1		
	2.2. 25	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	3.2	1		
	2.2. 37	Ability to determine operability and/or availability of safety related equipment.	3.6	1		
	2.2. 14	Knowledge of the process for controlling equipment configuration or status.			4.3	1
	2.2. 38	Knowledge of conditions and limitations in the facility license.			4.5	1
	2.2.					
	Subtotal			3		2
3. Radiation Control	2.3. 11	Ability to control radiation releases.	3.8	1		
	2.3. 13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.4	1		
	2.3. 04	Knowledge of radiation exposure limits under normal or emergency conditions.			3.7	1
	2.3. 15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.			3.1	1
	2.3.					
	2.3.					
	Subtotal			2		2
4. Emergency Procedures / Plan	2.4. 32	Knowledge of operator response to loss of all annunciators.	3.6	1		
	2.4. 23	Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.	3.4	1		
	2.4. 42	Knowledge of emergency response facilities.	2.6	1		
	2.4. 16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.			4.4	1
	2.4.					
	2.4.					
	Subtotal			3		1
Tier 3 Point Total				10		7

Facility: Quad Cities Scenario No.: NRC Scenario **1** Op-Test No.: ILT 08-1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
100% power

Turnover: Perform QCOS 1400-01, "Quarterly Core Spray System Flow Rate Test", for the 1A Core Spray Pump.

Event No.	Malf. No.	Event Type*	Event Description
1	None	**BOP N**	QCOS 1400-01, Quarterly Core Spray System Flow Rate Test ("A" Pump only)
2	RD04R	**ATC/SRO I/C**	Control rod drift out (TS)
3	None	**ATC R**	"B" RFP steam leak resulting in Emergency Power Reduction to ≤ 9.8 Mlb/hr Feedwater flow.
4	None	**BOP/SRO I/C**	T-12 Oil leak /transfer Aux power to T-11 (TS)
5	DIFC1064018I1 RAISE	**ATC I/C**	FRV master controller failure (High)
6	RR11A	**Crew M**	LOOP/LOCA (A Recirc Pump Discharge Line Break)
7	DG04A	**BOP IC**	EDG-1 auto start failure
8	HP01	**Crew M**	Malfunction after EOP entry: HPCI Trip
9	None	**Crew M**	Contingencies: Blowdown at TAF and Restore RPV water level

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

ES-301-4 Quantitative attributes:	ES-301-5 Quantitative attributes:
Total Malfunctions (5-8): 5	BOP Normal: E1
Malfunction(s) after EOP (1-2): E7, E8	ATC Reactivity (1 per set): E3
Abnormal Events (2-4): E2, E5	BOP I/C (4 / set): E4 & E7
Major Transient(s) /E-Plan entry (1-2): E6	ATC I/C (4 / set): E2 & E5
EOPs (1-2): 100/200	SRO-I I/C (4 / set inc 2 as ATC): E2,E4,E5,E7
EOP Contingencies (0-2): 500-1	SRO Tech Spec (2 per set): E2 & E4
Critical Tasks (2-3): 4	ALL Maior Transients (2 per set): 1

Facility: Quad Cities Scenario No.: NRC Scenario **2** Op-Test No.: ILT 08-1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
85 % power
Turnover: Reverse Main Condenser Flow per QCOP 4400-09, then return to rated power by increasing core flow in accordance with QCGP 3-1 and the REMA.

Event No.	Malf. No.	Event Type*	Event Description
1	None	BOP N	Reverse Main Condenser flow
2	ED01C	BOP IC	GCB 4-6 trip / reclose
3	RM05A	SRO TS	DW Rad Mon fails upscale (TS)
4	FW08A	ATC IC	FRV Lockup
5	HP15	BOP/SRO IC	HPCI Steam leak / failure to isolate (TS)
6	MC08	ATC R	Main Condenser Vacuum leak / Emergency Power Reduction, (attempt to maintain Main Condenser backpressure < 6.5 in Hg.)
7	RD13A	Crew M	Manual Scram / ATWS (Hydraulic)
8	DIHS11130301	ATC IC	Malfunction after Major: Start failure of 1st SBLC Pump
9	MC08	Crew M	Complete Loss of Main Condenser Vacuum
10	None	Crew M	Contingencies: Power Level Control QGA 101

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

ES-301-4 Quantitative attributes:
Total Malfunctions (5-8): 7
Malfunction(s) after EOP (1-2): E8
Abnormal Events (2-4): E2, E4, E5, E6
Major Transient(s) /E-Plan entry (1-2): E7
EOPs (1-2): 100,
EOP Contingencies (0-2): 101 ATWS
Critical Tasks (2-3): 5

ES-301-5 Quantitative attributes:
BOP Normal: E1
ATC Reactivity (1 per set): E6
BOP I/C (4 per set): E2 & E5
ATC I/C (4 per set): E4 & E8
SRO-I I/C (4/set & 2 as ATC):E2, E4, E5, E8
SRO Tech Spec (2 per set): E3 & E5
ALL Major Transients (2 per set) E7

Facility: Quad Cities Scenario No.: NRC Scenario **3** Op-Test No.: ILT 08-1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
20% Power, MO 1-1001-26B, INBD DW SPRAY ISOL VLV out of service for limitorque replacement.

Turnover:
Perform QCOS 1000-09 RHR Power Operated Valve Test then continue the startup per step 2 of the REMA and QCGP 1-1.

Event No.	Malf. No.	Event Type*	Event Description
1	None	BOP N	Perform QCOS 1000-09 RHR Power Operated Valve Test (Partial)
2	None	ATC R	Normal power up Recirc
3	DIFC10262222 RAISE	ATC IC	Recirc Pump run up/Master Controller fails high
4	NM08F/RP02B/ RP02D	ATC/SRO IC	APRM upscale w no ½ scram (TS)
5	AD01D	BOP/SRO IC	Spurious ERV actuation (TS)
6	SW12A	BOP IC	Degraded TBCCW pump, Start STBY
7	MS05A	Crew M	Steam Line break inside Containment
8	None	Crew M	Contingencies: Blowdown
9	MS16A, MS16B MS16C	Crew M	Malfunction after EOP: Tailpipe rupture
10	None	Crew M	Venting to stay under PCPL

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

ES-301-4 Quantitative attributes:
Total Malfunctions (5-8): _6
Malfunction(s) after EOP (1-2): E9
Abnormal Events (2-4): E3, E4, E5
Major Transient(s) /E-Plan entry (1-2): E7
EOPs (1-2): QGA 100 & 200
EOP Contingencies (0-2): QGA 500-1
Critical Tasks (2-3): 3

ES-301-5 Quantitative attributes:
BOP Normal: E1
ATC Reactivity (1 per set): E2
BOP I/C (4 per set): E5, E6
ATC I/C (4 per set): E3, E4
SRO-I I/C (4 /set inc 2 as ATC): E3,E4,E5,E6
SRO Tech Spec (2 per set): E4, E5
ALL Maior Transients (2 per set) E7

Facility: Quad Cities Scenario No.: NRC Scenario **4** Op-Test No.: ILT 08-1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
100% Power

Turnover: Continue to maintain full load per QCGP 3-1 and the REMA.

Event No.	Malf. No.	Event Type*	Event Description
1	RD07A	**ATC IC**	CRD Pump trip
2	RD03R	**ATC IC**	Rod drift in one notch after CRD Pump Restart
3	DIHS13401A DIHS13403	**ATC R**	Emergency Power Reduction for loss of FW Heater String due to 1A1 Heater Level Switch failure, (maintain Reactor Power < 105% and Flow Control Line ≤ 100%)
4	RP04A/RD05R CR01	**Crew M**	A RPS Trip w 5 rod scram /Manual Scram / Fuel damage
5	RD14A	**Crew M**	Malfunction After EOP: SDV Rupture
6	DIHS10590303	**Crew M**	Scram Reset Switch failure
7	None	**Crew M**	Contingency: Blowdown due to 2 areas > Max Safe Rads

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

ES-301-4 Quantitative attributes:
Total Malfunctions (5-8): _7
Malfunction(s) after EOP (1-2): E5, 6
Abnormal Events (2-4): E1, E2, E3
Major Transient(s) /E-Plan entry (1-2): E4
EOPs (1-2): QGA 300 & 100
EOP Contingencies (0-2): QGA 500-1
Critical Tasks (2-3): 2

ES-301-5 Quantitative attributes:
BOP Normal: None
ATC Reactivity (1 per set): E3
BOP I/C (4 per set): None
ATC I/C (4 per set): E1, E2
SRO-I I/C (4 /set inc 2 as ATC): E1, E2
SRO Tech Spec (2 per set): None
ALL Maior Transients (2 per set): E4