To: Paul Bissett, NRC Chief Examiner

From: Chris Michaels, Peach Bottom Exam Author 9/5/02

CC: Phil Nielsen, MAROG Exam Development Coordinator

Date: 9/5/2002

Re: Initial License Exam NRC review comments for 9/23/02 Peach Bottom Exam.

The revised Peach Bottom Exam for administration the week of 23 September 2002 is attached. The following exam comments were addressed in response to the Peach Bottom NRC Exam preparation and reviews during the week of 26 August 2002.

Written Exam Comment Summary

1. **Question ID#9 (RO/SRO#9) Comment:** Editorial comment for the word Operable which is capitalized.
   Response: The word "Operable" is capitalized in Peach Bottom procedures to denote the reference to Technical Specifications. The word is sometimes written in full caps i.e., "OPERABLE". Either is acceptable.
   Agreed Resolution: No change is required.

2. **Question ID#13 (RO/SRO#13) Comment:** Periods missing in stem.
   Response: Corrected editorial comment as discussed.

3. **Question ID#22 (RO/SRO#22) Comment:** Periods missing in stem and write out the time "15 minutes" as fifteen (15) minutes.
   Response: Corrected as discussed.

4. **Question ID#27 (RO/SRO#27) Comment:** Add the word "the" to expected response.
   Response: Corrected as discussed.

5. **Question ID#32 (RO/SRO#32) Comment:** Two possible answers.
   Response: Agree with comment and changed stem to add a qualifier to rule out one choice.
   Agreed Resolution: Changed stem to *"...and choose the FIRST required course of action".*

6. **Question ID#35 (RO/SRO#35) Comment:** Capitalize the word "after" to draw attention to the time sequence.
   Response: Corrected as discussed to *"AFTER the first ten minutes".*

7. **Question ID#44 (RO/SRO#44) Comment:** Grammatically awkward statement in bullets.
   Response: Statement is consistent with local vernacular but changed to be easier to read. Sentence changed to *"...was started on the drywell and now reads..."* in both bullets 4 and 5.

8. **Question ID#49 (RO/SRO#49) Comment:** In the 6th bullet, the word "All" made Choice 'C' implausible.
   Response: Agree with comment.
   Agreed Resolution: Deleted the word "All" from the 6th bullet. All Choices now plausible.

9. **Question ID#53 (RO/SRO#53) Comment:** In Choice 'D', add the word "in".
   Response: Corrected as discussed to add the word.

10. **Question ID#54 (RO/SRO#54) Comment:** In 4th bullet, word "pumps" appears to be missing.
    Response: Corrected as discussed and added "...pumps..." to enhance statement.

11. **Question ID#55 (RO/SRO#55) Comment:** In stem, is "...operated at rated power" acceptable or should it be operating?
    Response: Corrected and stem changed to *"...operating at rated power"* to enhance sentence.

12. **Question ID#60 (RO/SRO#60) Comment:** Opening statement in stem is grammatically awkward.
    Response: Agree and corrected as discussed to *"Unit 3 was operating at full power when... The following conditions currently exist:".*

13. **Question ID#61 (RO/SRO#61) Comment:** Question seems awkward with the location of "next".
    Response: Corrected as discussed to *"...which area is investigated NEXT as the source of the high radiation."*

14. **Question ID#66 (RO/SRO#66) Comment:** Could we add "heatup rate" to Choice 'D' to identify the LCO of concern.
    Response: Corrected as discussed and added the phrase *"heatup rate"* to both Choices 'C' and 'D' to clarify the limits and balance both statements.

15. **Question ID#67 (RO/SRO#67) Comment:** Two true/false pairs since the oil level is out of spec.
    Response: We understand the comment and although this was a previously approved NRC question from Aug 2001, agree the question should be revised.
    Agreed Resolution: Corrected the stem to remove part 1 of the question and focus the question on the logging action. Answer options have been modified to be consistent with the revised question. This revision significantly improves the question quality and provides direct K/A applicability.

16. **Question ID#84 (RO#84) Comment:** Inconsistent use of procedure title in this question as compared to other questions.
    Response: Corrected as discussed to format the procedure number and title consistently.

17. **Question ID#91 (RO#91) Comment:** In stem, appears that the word "in" is missing.
    Response: Corrected as discussed to *"...was placed in Torus Cooling in accordance with..."*

18. **Question ID#92 (RO#92) Comment:** Bullet 3 doesn't read correctly and adding the procedure requirement would provide stem focus.
    Response: Corrected as discussed. Bullet 3 now reads *"...is in alarm."* and question includes procedure *"...in accordance with SO..."*

19. **Question ID#94 (RO#94) Comment:** Statement not consistent with prior questions.
Response: Corrected as discussed to read *"Which one of the following statements is correct?"*

20. **Question ID#95 (RO#95) Comment:** Choice A(2) doesn't specify the type of isolation.
Response: Corrected as discussed to add the words *"...Group I isolation."* and added *"Reactor Building"* to choice 'B(2)' to balance distractors.

21. **Question ID#96 (RO#96) Comment:** Grammatically awkward and need to add words "if any".
Response: Corrected as discussed to *"...which one of the following manual actions, if any, is required in accordance with..."*

22. **Question ID#97 (RO#97) Comment:** There is duplication in the question and statement can be simplified.
Response: Corrected as discussed. Statement changed to *"Throttle open the:"*

23. **Question ID#98 (RO#98) Comment:** Use of capitalization in Choices not consistent.
Response: Corrected as discussed. Word capitalization changed to be consistent with other questions in the exam.

24. **Question ID#102 (SRO#77) Comment:** Delete the word "and" in Choice 'C'. The words "to monitor" seem redundant.
Response: Corrected as discussed to delete "and" and "to monitor" in the choices.

25. **Question ID#103 (SRO#78) Comment:** Enhancing the justification statements would improve the apparent relevance of the question as SRO only.
Response: Corrected as discussed to enhance the justifications to include the required knowledge of the Tech Spec bases.

26. **Question ID#108 (SRO#83) Comment:** Could we reword the question to focus on Tech Spec Action. Is the phrase "most limiting" acceptable at Peach Bottom?
Response: Stem corrected and revised to *"...select the MOST RESTRICTIVE Tech Spec Action (TSA)?*

27. **Question ID#119 (SRO#94) Comment:** Need to focus the stem to prevent multiple correct answers.
Response: Agree that stem could be focused but believe there is only one correct answer.
Agreed Resolution: Revised the opening statement for the choices to *"RP-AA-460 "Controls for High and Very High Radiation Areas" permits entry into the High Radiation Area during a transient provided that the Operator: "*

28. **Question ID#122 (SRO#97) Comment:** Stem needs to ask what actions, if any, are required.
Response: Corrected as discussed. Question revised to *"...and what additional actions, if any, are required?"*

System JPM Comment Summary

JPM#3: Main Steam Recovery from a Group I Isolation

- Minor change to procedure reference on page 7.

JPM#7: Low CRD Scram Air Header Pressure

- Added Cue to Step #8 "Monitoring Scram Air header pressure and it is below 80 psig."

JPM#10: Closing a Stuck Open MSIV

- For the Examiner, added information regarding fuse locations inside the panel.
- Revised Steps 9 and 10 so that the operator in the field does not need to direct RO actions in the control room. Step 9 now states that the operator will determine that Section 4.1 was not successful, that Section 4.2 cannot be performed and that Section 4.3 will be required to close the MSIVs.
- Added a Cue in Step 9 that the RO has completed Steps 4.3.1 through 4.3.3 and to direct the operator to continue in the procedure starting at Step 4.3.4.
- Step 10 revised to state that the operator will go to the Unit 3 Recirc MG Set Room to perform Step 4.3.4.

Admin JPM Comment Summary

RO Admin#3:

- Revise the Task Initiating Cue to state: *"The Control Room Supervisor directs you to use P&IDs to determine the impact of the damaged PS-0246B on the ESW pumps, ECW pump and ECW Pump Discharge valve (MO-0841) during an automatic Diesel Generator start."*

SRO Admin#1:

- Correct the footers of the Attachments 1,2 and 3 so the examiner knows what attachments are to be provided to the candidate.

SRO Admin#2:

- Revise the Cue on page 6 that identifies the JPM Attachment 3 as the procedure RE C-01 Appendix 7 Attachment 1.

SRO Admin#3:

- Revise the Task Initiating Cue to: *"The attached clearance request for the 'A' Service Water Booster Pump has just been prepared for emergent work. The Shift Manager directs you, the Work Execution Center (WEC) Supervisor, to review and approve the clearance request for immediate application and inform the Control Room Supervisor (CRS) when complete."*

Dynamic Scenario Comment Summary

Scenario #1 Event#2:

- Corrected error from 24 to 12 hours.
- Added Cue to state *"If needed, as Shift Manager, prompt the crewto place the RPS Channel in trip in accordance with GP-25 App 1."*

Scenario #2 Event #1:

- Prior to removing Reactor Feedpump, override off the Hotwell Level High alarm to prevent unnecessary distraction from the normal operating event.

Scenario #3 Event #2:

- Trouble alarm did not flash as expected. Discussed the response with Simulator Support and alarm window is a simulation problem to be corrected as soon as possible. Lead Examiner determined that alarm window problem is minor and would have little impact, if any on scenario.

Facility: Peach Bottom Atomic Power Station Form ES-401-2

Exam Date: 09/23/2002 **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	2	3	3				2	2			1	13
	2	4	6	3				5	0			1	19
	3	1	1	1				1	0			0	4
	Totals Tier	7	10	7				8	2			2	36
2. Plant Systems	1	2	2	3	2	3	3	2	3	2	3	3	28
	2	2	2	2	2	2	1	2	2	1	2	1	19
	3	0	0	1	1	0	1	0	0	0	1	0	4
	Tier Totals	4	4	6	5	5	5	4	5	3	6	4	51

3. Generic Knowledge And Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	3	4	3	3	13

Note:

1. Attempt to distribute topics among all K/A Categories; select at least one topic from every K/A category within each tier.
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.

Facility: Pea. Bottom Atomic Power Stat

BWR RO [illegible] mination Outline

Printed: 09/05/2[illegible]

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

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295005	Main Turbine Generator Trip / 3				X			AA1.04 - Main generator controls	2.7	1
295006	SCRAM / 1			X				AK3.03 - Reactor pressure response	3.8	1
295007	High Reactor Pressure / 3		X					AK2.06 - PCIS/NSSSS: Plant-Specific	3.5	1
295009	Low Reactor Water Level / 2		X					AK2.04 - Reactor water cleanup	2.6	1
295015	Incomplete SCRAM / 1			X				AK3.01 - Bypassing rod insertion blocks	3.4	1
295015	Incomplete SCRAM / 1		X					AK2.04 - RPS	4.0	1
295024	High Drywell Pressure / 5				X			EA1.03 - LPCS: Plant-Specific	4.0	1
295025	High Reactor Pressure / 3	X						EK1.02 - Reactor vessel integrity	4.1	1
295031	Reactor Low Water Level / 2	X						EK1.03 - Water level effects on reactor power	3.7	1
295031	Reactor Low Water Level / 2					X		EA2.01 - Reactor water level	4.6*	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1						X	2.1.27 - Knowledge of system purpose and/or function.	2.8	1
500000	High Containment Hydrogen Concentration / 5			X				EK3.07 - Operation of drywell vent	3.1	1
500000	High Containment Hydrogen Concentration / 5					X		EA2.01 - Hydrogen monitoring system availability	3.1	1

K/A Category Totals: 2 3 3 2 2 1 **Group Point Total:** 13

Facility: Pea. Bottom Atomic Power Stat

BWR RO [illegible] mination Outline

Printed: 09/05/2[illegible]

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

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			AA1.07 - Nuclear boiler instrumentation system	3.1	1
295002	Loss of Main Condenser Vacuum / 3			X				AK3.03 - Reactor feedpump turbine trip: Plant-Specific	3.3	1
295003	Partial or Complete Loss of A.C. Power / 6		X					AK2.01 - Station batteries	3.2	1
295003	Partial or Complete Loss of A.C. Power / 6				X			AA1.02 - Emergency generators	4.2*	1
295008	High Reactor Water Level / 2		X					AK2.08 - Main turbine: Plant-Specific	3.4	1
295012	High Drywell Temperature / 5				X			AA1.01 - Drywell ventilation system	3.5	1
295013	High Suppression Pool Temperature / 5	X						AK1.03 - Localized heating	3.0	1
295016	Control Room Abandonment / 7			X				AK3.01 - Reactor SCRAM	4.1*	1
295017	High Off-Site Release Rate / 9						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.0	1
295017	High Off-Site Release Rate / 9		X					AK2.09 - Condenser air removal system: Plant-Specific	2.8	1
295018	Partial or Complete Loss of Component Cooling Water / 8	X						AK1.01 - Effects on component/system operations	3.5	1
295019	Partial or Complete Loss of Instrument Air / 8			X				AK3.02 - Standby air compressor operation	3.5	1
295022	Loss of CRD Pumps / 1				X			AA1.02 - RPS	3.6	1
295029	High Suppression Pool Water Level / 5		X					EK2.08 - Drywell/suppression chamber ventilation	2.6	1

Facility: Pea Bottom Atomic Power Stat

BWR RO (mination Outline

Printed: 09/05/2(

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

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295030	Low Suppression Pool Water Level / 5	X						EK1.02 - Pump NPSH	3.5	1
295030	Low Suppression Pool Water Level / 5				X			EA1.06 - Condensate storage and transfer (make-up to the suppression pool): Plant-Specific	3.4	1
295033	High Secondary Containment Area Radiation Levels / 9		X					EK2.02 - Process radiation monitoring system	3.8	1
295038	High Off-Site Release Rate / 9		X					EK2.01 - Radwaste	3.1	1
600000	Plant Fire On Site / 8	X						AK1.02 - Fire Fighting	2.9	1

K/A Category Totals: 4 6 3 5 0 1 **Group Point Total:** 19

Facility: Pe. Bottom Atomic Power Stat

BWR RO (mination Outline

Printed: 09/05/2(

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 3** **Form ES-401-2**

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295021	Loss of Shutdown Cooling / 4	X						AK1.04 - Natural circulation	3.6	1
295023	Refueling Accidents / 8				X			AA1.04 - Radiation monitoring equipment	3.4	1
295035	Secondary Containment High Differential Pressure / 5		X					EK2.04 - Blow-out panels: Plant-Specific	3.3	1
295036	Secondary Containment High Sump/Area Water Level / 5			X				EK3.01 - Emergency depressurization	2.6	1

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

BWR RO Ey ination Outline Printed: 09/05/ 12

Facility: Peach Bottom Atomic Power Stat

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

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							K5.02 - Flow indication	2.6	1
201002	Reactor Manual Control System / 1				X								K4.01 - Detection of sequence timer malfunction	2.7	1
201002	Reactor Manual Control System / 1						X						K6.01 - Select matrix power	2.5	1
202002	Recirculation Flow Control System / 1					X							K5.01 - Fluid coupling: BWR-3, 4	2.8	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2		X										K2.03 - Initiation logic	2.7*	1
206000	High Pressure Coolant Injection System / 2											X	2.1.23 - Ability to perform specific system and integrated plant procedures during different modes of plant operation.	3.9	1
211000	Standby Liquid Control System / 1	X											K1.06 - Reactor vessel	3.7	1
211000	Standby Liquid Control System / 1			X									K3.01 - †Ability to shutdown the reactor in certain conditions	4.3*	1
212000	Reactor Protection System / 7										X		A4.09 - SCRAM instrument volume level	3.9	1
215005	Average Power Range Monitor/Local Power Range Monitor System / 7			X									K3.01 - RPS	4.0	1
215005	Average Power Range Monitor/Local Power Range Monitor System / 7				X								K4.08 - Sampling of overall core power in each APRM (accomplished through LPRM assignments and symmetrical rod patterns)	2.7	1

Facility: Peach Bottom Atomic Power Stat

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

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
216000	Nuclear Boiler Instrumentation / 7								X				A2.14 - Recirculation flow: Design-Specific	2.9	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2					X							K5.04 - Testable check valve operation	2.6	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2	X											K1.01 - Condensate storage and transfer system	3.5	1
218000	Automatic Depressurization System / 3											X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
223001	Primary Containment System and Auxiliaries / 5							X					A1.01 - Drywell temperature	3.5	1
223001	Primary Containment System and Auxiliaries / 5										X		A4.05 - Containment/drywell oxygen concentration	3.6	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5								X				A2.06 - Containment instrumentation failures	3.0	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5			X									K3.04 - Reactor building radiation level	3.4	1
239002	Relief/Safety Valves / 3		X										K2.01 - SRV solenoids	2.8*	1
239002	Relief/Safety Valves / 3								X				A2.01 - Stuck open vacuum breakers	3.0	1
259001	Reactor Feedwater System / 2											X	2.1.27 - Knowledge of system purpose and/or function.	2.8	1

Facility: Peach Bottom Atomic Power Stat

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

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
259002	Reactor Water Level Control System / 2						X						K6.04 - Reactor feedwater flow input	3.1	1
259002	Reactor Water Level Control System / 2									X			A3.03 - Changes in main steam flow	3.2	1
261000	Standby Gas Treatment System / 9										X		A4.01 - †Off-site release levels: Plant-Specific	3.2*	1
261000	Standby Gas Treatment System / 9									X			A3.03 - Valve operation	3.0	1
264000	Emergency Generators (Diesel/Jet) / 6						X						K6.02 - Fuel oil pumps	3.6	1
264000	Emergency Generators (Diesel/Jet) / 6							X					A1.09 - Maintaining minimum load on emergency generator (to prevent reverse power)	3.0	1

K/A Category Totals: 2 2 3 2 3 3 2 3 2 3 3 **Group Point Total:** 28

Facility: Peach Bottom Atomic Power Stat

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

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201006	Rod Worth Minimizer System (RWM) (Plant Specific) / 7						X						K6.02 - Reactor water level control input: P-Spec(Not-BWR6)	2.9	1
204000	Reactor Water Cleanup System / 2									X			A3.06 - Lights and alarms	3.1	1
204000	Reactor Water Cleanup System / 2			X									K3.01 - Reactor water quality	3.2	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4		X										K2.02 - Motor operated valves	2.5*	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4							X					A1.02 - SDC/RHR pump flow	3.3	1
215002	Rod Block Monitor System / 7											X	2.4.31 - Knowledge of annunciators alarms and indications, and use of the response instructions.	3.3	1
219000	RHR/LPCI: Torus/Suppression Pool Cooling Mode / 5										X		A4.02 - Valve lineup	3.7*	1
219000	RHR/LPCI: Torus/Suppression Pool Cooling Mode / 5					X							K5.01 - System venting	2.6	1
226001	RHR/LPCI: Containment Spray System Mode / 5				X								K4.12 - Prevention of inadvertent containment spray activation	2.9	1
230000	RHR/LPCI: Torus/Suppression Pool Spray Mode / 5							X					A1.04 - System flow	3.2*	1
239001	Main and Reheat Steam System / 3				X								K4.01 - Automatic isolation of steam lines	3.8	1
245000	Main Turbine Generator and Auxiliary Systems / 4			X									K3.02 - Reactor pressure	3.9	1

Facility: Peach Bottom Atomic Power Stat

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

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
256000	Reactor Condensate System / 2		X										K2.01 - System pumps	2.7*	1
262002	Uninterruptable Power Supply (A.C./D.C.) / 6	X											K1.08 - Containment isolation system: Plant-Specific	2.9	1
272000	Radiation Monitoring System / 7								X				A2.06 - Downscale trips	2.8	1
290001	Secondary Containment / 5	X											K1.02 - Primary containment system: Plant-Specific	3.4	1
290001	Secondary Containment / 5								X				A2.05 - High area temperature	3.1	1
300000	Instrument Air System (IAS) / 8					X							K5.13 - Filters	2.9	1
400000	Component Cooling Water System (CCWS) / 8										X		A4.01 - CCW indications and control	3.1	1

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

Facility: Peach Bottom Atomic Power Stat

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

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
215001	Traversing In-Core Probe / 7						X						K6.04 - Primary containment isolation system: Mark-I&II(Not-BWR1)	3.1	1
233000	Fuel Pool Cooling and Clean-up / 9										X		A4.06 - System temperature	2.5*	1
234000	Fuel Handling Equipment / 8			X									K3.04 - †core modifications/alterations	2.9	1
290002	Reactor Vessel Internals / 5				X								K4.01 - 2/3 core coverage following a DBA LOCA	3.7	1
K/A Category Totals:		**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**1**	**0**		**Group Point Total:**	**4**

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 09/05/2002

BWR RO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	3.7	1
	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	2.9	1
	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.4	1
			Category Total:	**3**
Equipment Control	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0	1
	2.2.11	Knowledge of the process for controlling temporary changes.	2.5	1
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	3.4	1
	2.2.34	Knowledge of the process for determining the internal and external effects on core reactivity.	2.8	1
			Category Total:	**4**
Radiation Control	2.3.11	Ability to control radiation releases.	2.7	1
	2.3.9	Knowledge of the process for performing a containment purge.	2.5	1
	2.3.2	Knowledge of facility ALARA program.	2.5	1
			Category Total:	**3**
Emergency Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	3.0	1
	2.4.43	Knowledge of emergency communications systems and techniques.	2.8	1
	2.4.25	Knowledge of fire protection procedures.	2.9	1
			Category Total:	**3**
			Generic Total:	**13**

Facility: Peach Bottom Atomic Power Station Form ES-401-1

Exam Date: 09/23/2002 **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	5	4				4	5			4	26
	2	3	3	3				2	3			3	17
	Tier Totals	7	8	7				6	8			7	43
2. Plant Systems	1	2	2	2	2	2	2	2	2	2	2	3	23
	2	1	1	2	1	1	2	1	1	1	0	2	13
	3	0	1	0	1	0	1	0	0	0	0	1	4
	Tier Totals	3	4	4	4	3	5	3	3	3	2	6	40
3. Generic Knowledge And Abilities		Cat 1			Cat 2			Cat 3			Cat 4		
		4			5			4			4		17

Note:

1. Attempt to distribute topics among all K/A Categories; select at least one topic from every K/A category within each tier.
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.

Facility: Peach Bottom Atomic Power Stat

BWR SRO (mination Outline

Printed: 09/05/2(

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					AK2.01 - Station batteries	3.2	1
295003	Partial or Complete Loss of A.C. Power / 6				X			AA1.02 - Emergency generators	4.3*	1
295006	SCRAM / 1			X				AK3.03 - Reactor pressure response	3.9*	1
295007	High Reactor Pressure / 3					X		AA2.02 - Reactor power	4.1*	1
295007	High Reactor Pressure / 3		X					AK2.06 - PCIS/NSSSS: Plant-Specific	3.7	1
295009	Low Reactor Water Level / 2		X					AK2.04 - Reactor water cleanup	2.6	1
295010	High Drywell Pressure / 5					X		AA2.03 - Drywell radiation levels	3.6	1
295010	High Drywell Pressure / 5						X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	3.3	1
295013	High Suppression Pool Temperature / 5						X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1
295013	High Suppression Pool Temperature / 5	X						AK1.03 - Localized heating	3.3	1
295015	Incomplete SCRAM / 1			X				AK3.01 - Bypassing rod insertion blocks	3.7	1
295016	Control Room Abandonment / 7			X				AK3.01 - Reactor SCRAM	4.2*	1
295017	High Off-Site Release Rate / 9						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
295017	High Off-Site Release Rate / 9		X					AK2.09 - Condenser air removal system: Plant-Specific	2.9	1

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BWR SRO (mination Outline

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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
295023	Refueling Accidents / 8				X			AA1.04 - Radiation monitoring equipment	3.7	1
295024	High Drywell Pressure / 5				X			EA1.03 - LPCS: Plant-Specific	3.9	1
295025	High Reactor Pressure / 3						X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1
295025	High Reactor Pressure / 3	X						EK1.02 - Reactor vessel integrity	4.2	1
295026	Suppression Pool High Water Temperature / 5					X		EA2.03 - Reactor pressure	4.0	1
295030	Low Suppression Pool Water Level / 5	X						EK1.02 - Pump NPSH	3.8	1
295030	Low Suppression Pool Water Level / 5				X			EA1.06 - Condensate storage and transfer (make-up to the suppression pool): Plant-Specific	3.4	1
295031	Reactor Low Water Level / 2	X						EK1.03 - Water level effects on reactor power	4.1	1
295031	Reactor Low Water Level / 2					X		EA2.01 - Reactor water level	4.6*	1
295038	High Off-Site Release Rate / 9		X					EK2.01 - Radwaste	3.4	1
500000	High Containment Hydrogen Concentration / 5			X				EK3.07 - Operation of drywell vent	3.7	1
500000	High Containment Hydrogen Concentration / 5					X		EA2.01 - Hydrogen monitoring system availability	3.5	1

K/A Category Totals: 4 5 4 4 5 4 **Group Point Total:** 26

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BWR SRO Examination Outline

Printed: 09/05/2

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
295002	Loss of Main Condenser Vacuum / 3			X				AK3.03 - Reactor feedpump turbine trip: Plant-Specific	3.3	1
295008	High Reactor Water Level / 2		X					AK2.08 - Main turbine: Plant-Specific	3.5	1
295012	High Drywell Temperature / 5				X			AA1.01 - Drywell ventilation system	3.6	1
295018	Partial or Complete Loss of Component Cooling Water / 8	X						AK1.01 - Effects on component/system operations	3.6	1
295019	Partial or Complete Loss of Instrument Air / 8						X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
295019	Partial or Complete Loss of Instrument Air / 8			X				AK3.02 - Standby air compressor operation	3.4	1
295020	Inadvertent Containment Isolation / 5					X		AA2.05 - Reactor water level	3.6	1
295021	Loss of Shutdown Cooling / 4	X						AK1.04 - Natural circulation	3.7	1
295022	Loss of CRD Pumps / 1				X			AA1.02 - RPS	3.6	1
295028	High Drywell Temperature / 5						X	2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
295029	High Suppression Pool Water Level / 5		X					EK2.08 - Drywell/suppression chamber ventilation	2.9	1
295032	High Secondary Containment Area Temperature / 5					X		EA2.02 - Equipment operability	3.5	1
295032	High Secondary Containment Area Temperature / 5						X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	3.3	1
295033	High Secondary Containment Area Radiation Levels / 9		X					EK2.02 - Process radiation monitoring system	4.1	1

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BWR SRO (mination Outline

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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
295034	Secondary Containment Ventilation High Radiation / 9					X		EA2.01 - Ventilation radiation levels	4.2	1
295036	Secondary Containment High Sump/Area Water Level / 5			X				EK3.01 - Emergency depressurization	2.8	1
600000	Plant Fire On Site / 8	X						AK1.02 - Fire Fighting	3.1	1

K/A Category Totals: 3 3 3 2 3 3 **Group Point Total:** 17

Facility: Peach Bottom Atomic Power Stat

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
202002	Recirculation Flow Control System / 1											X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	1
202002	Recirculation Flow Control System / 1					X							K5.01 - Fluid coupling: BWR-3, 4	2.8	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2											X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2		X										K2.03 - Initiation logic	2.9*	1
211000	Standby Liquid Control System / 1			X									K3.01 - †Ability to shutdown the reactor in certain conditions	4.4*	1
211000	Standby Liquid Control System / 1	X											K1.06 - Reactor vessel	3.7	1
212000	Reactor Protection System / 7										X		A4.09 - SCRAM instrument volume level	3.8	1
215005	Average Power Range Monitor/Local Power Range Monitor System / 7			X									K3.01 - RPS	4.0	1
215005	Average Power Range Monitor/Local Power Range Monitor System / 7				X								K4.08 - Sampling of overall core power in each APRM (accomplished through LPRM assignments and symmetrical rod patterns)	3.1	1
216000	Nuclear Boiler Instrumentation / 7								X				A2.14 - Recirculation flow: Design-Specific	2.9	1

Facility: Peach Bottom Atomic Power Stat

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
217000	Reactor Core Isolation Cooling System (RCIC) / 2					X							K5.04 - Testable check valve operation	2.7	1
223001	Primary Containment System and Auxiliaries / 5							X					A1.01 - Drywell temperature	3.6	1
223001	Primary Containment System and Auxiliaries / 5										X		A4.05 - Containment/drywell oxygen concentration	3.6	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5								X				A2.06 - Containment instrumentation failures	3.2	1
226001	RHR/LPCI: Containment Spray System Mode / 5				X								K4.12 - Prevention of inadvertent containment spray activation	2.9	1
239002	Relief/Safety Valves / 3		X										K2.01 - SRV solenoids	3.2*	1
239002	Relief/Safety Valves / 3											X	2.2.25 - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1
259002	Reactor Water Level Control System / 2						X						K6.04 - Reactor feedwater flow input	3.1	1
259002	Reactor Water Level Control System / 2									X			A3.03 - Changes in main steam flow	3.2	1
261000	Standby Gas Treatment System / 9									X			A3.03 - Valve operation	2.9	1
264000	Emergency Generators (Diesel/Jet) / 6						X						K6.02 - Fuel oil pumps	3.6	1

Facility: Peach Bottom Atomic Power Stat

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
264000	Emergency Generators (Diesel/Jet) / 6							X					A1.09 - Maintaining minimum load on emergency generator (to prevent reverse power)	3.1	1
290001	Secondary Containment / 5	X											K1.02 - Primary containment system: Plant-Specific	3.6	1

K/A Category Totals: 2 2 2 2 2 2 2 2 2 2 3 **Group Point Total:** 23

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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
201002	Reactor Manual Control System / 1				X								K4.01 - Detection of sequence timer malfunction	2.7	1
201002	Reactor Manual Control System / 1						X						K6.01 - Select matrix power	2.6	1
201006	Rod Worth Minimizer System (RWM) (Plant Specific) / 7						X						K6.02 - Reactor water level control input: P-Spec(Not-BWR6)	2.9	1
204000	Reactor Water Cleanup System / 2									X			A3.06 - Lights and alarms	3.1	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4							X					A1.02 - SDC/RHR pump flow	3.2	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4		X										K2.02 - Motor operated valves	2.7*	1
214000	Rod Position Information System / 7											X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
234000	Fuel Handling Equipment / 8			X									K3.04 - †core modifications/alterations	3.8	1
245000	Main Turbine Generator and Auxiliary Systems / 4			X									K3.02 - Reactor pressure	4.0	1
259001	Reactor Feedwater System / 2											X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
262002	Uninterruptable Power Supply (A.C./D.C.) / 6	X											K1.08 - Containment isolation system: Plant-Specific	3.1	1

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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
272000	Radiation Monitoring System / 7								X				A2.06 - Downscale trips	2.9	1
300000	Instrument Air System (IAS) / 8					X							K5.13 - Filters	2.9	1

K/A Category Totals: 1 1 2 1 1 2 1 1 1 0 2 **Group Point Total:** 13

Facility: Peach Bottom Atomic Power Stat

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
215001	Traversing In-Core Probe / 7						X						K6.04 - Primary containment isolation system: Mark-I&II(Not-BWR1)	3.4	1
256000	Reactor Condensate System / 2		X										K2.01 - System pumps	2.8	1
288000	Plant Ventilation Systems / 9											X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
290002	Reactor Vessel Internals / 5				X								K4.01 - 2/3 core coverage following a DBA LOCA	3.9	1

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

Generic Knowledge and Abilities Outline (Tier 3)

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BWR SRO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.32	Ability to explain and apply system limits and precautions.	3.8	1
	2.1.13	Knowledge of facility requirements for controlling vital / controlled access.	2.9	1
	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1
	2.1.18	Ability to make accurate, clear and concise logs, records, status boards, and reports.	3.0	1
			Category Total:	**4**
Equipment Control	2.2.29	Knowledge of SRO fuel handling responsibilities.	3.8	1
	2.2.21	Knowledge of pre and post maintenance operability requirements.	3.5	1
	2.2.2	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	3.5	1
	2.2.11	Knowledge of the process for controlling temporary changes.	3.4*	1
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.1	1
			Category Total:	**5**
Radiation Control	2.3.6	Knowledge of the requirements for reviewing and approving release permits.	3.1	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
	2.3.11	Ability to control radiation releases.	3.2	1
	2.3.9	Knowledge of the process for performing a containment purge.	3.4	1
			Category Total:	**4**

Generic Knowledge and Abilities Outline (Tier 3)

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BWR SRO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Emergency Plan	2.4.36	Knowledge of chemistry / health physics tasks during emergency operations.	2.8	1
	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures.	4.0	1
	2.4.43	Knowledge of emergency communications systems and techniques.	3.5	1
	2.4.25	Knowledge of fire protection procedures.	3.4	1

Category Total: **4**

Generic Total: **17**