

BWR SRO EXAMINATION OUTLINE

Facility: **GRAND GULF NUCLEAR STATION**

Date of Exam: **18 DECEMBER 2000**

| 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 | 5 | 5 | 3 | | | | 4 | 6 | | | 3 | 26 |
| | 2 | 3 | 3 | 5 | | | | 4 | 1 | | | 1 | 17 |
| | TIER TOTAL | 8 | 8 | 8 | | | | 8 | 7 | | | 4 | 43 |
| 2. Plant Systems | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 5 | 1 | 1 | 5 | 1 | 23 |
| | 2 | 2 | 2 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 13 |
| | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 4 |
| | TIER TOTAL | 4 | 3 | 3 | 4 | 2 | 4 | 5 | 4 | 2 | 7 | 2 | 40 |
| 3. Generic Knowledge & Abilities | | | | | CAT 1 | | CAT 2 | | CAT 3 | | CAT 4 | | 17 |
| | | | | | 5 | | 4 | | 2 | | 6 | | |

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

| E/APE #/NAME/SAFETY FUNCTION | K 1 | K 2 | K 3 | A 1 | A 2 | G | TOPIC(S) | IMP | REC # | SRO/RO /BOTH | RELATED K/A | ORIGIN | NOTES: |
|---|--------|--------|--------|--------|--------|---|--|-----|----------|-----------------|---|------------------|---|
| 295003 Partial or Complete Loss of AC Power / 6 CFR41.7 | | | | | 05 | | Given plant conditions, a normal electrical line up, and a loss of power, determine the availability of safe shutdown systems and buses. | 4.2 | 205 | BOTH | AA1.03: 4.4 | BANK NRC 5/00 | |
| 295006 SCRAM / 1 CFR41.5/41.14 | | 02 | | | | | Describe the response of the Reactor Water Level Control System when reactor level reaches level 3, during a reactor scram. | 3.8 | 274 | BOTH | 259002 K4.04: 2.9 A3.06: 3.0 | BANK NRC 5/00 | |
| 295007 High Reactor Pressure / 3 CFR41.1/41.7 | | | | | 02 | | With the reactor operating at 100% power, describe the effects on the reactor, if a MSIV isolates. | 4.1 | 201 | BOTH | AA2.03: 3.7 | BANK NRC 5/00 | Reactor power and reactor level inside shroud |
| 295009 Low Reactor Water Level / 2 CFR41.7 | | | | 02 | | | Describe the reaction of the Reactor Water Level Control System to a failure of a Feedwater Flow Transmitter to an upscale value. | 4.0 | 68 | BOTH | AA2.02: 3.7 259002 K6.04: 3.1 | BANK NRC 3/98 | Digital Feed Control System |
| 295010 High Drywell Pressure / 5 CFR41.4/41.9 | 02 | | | | | | Describe the implications with regard to Drywell Pressure with Suppression Pool level out of specification (high). | 3.1 | | BOTH | | | |
| 295013 High Suppression Pool Water Temp. / 5 CFR41.9 | | | | 02 | | | Given plant conditions, determine the cause for rising Suppression Pool temperature. | 3.9 | 211 | BOTH | | BANK NRC 5/00 | |
| 295014 Inadvertent Reactivity Addition / 1 CFR41.6/41.14/43.6 | | | | | 04 | | Identify thermal limit compliance following a slow opening of a single Recirc Flow Control Valve. | 4.4 | 106 | BOTH | AK1.05: 4.2 AK2.02: 4.2 AA2.05: 4.6 | BANK NRC 3/98 | |
| 295015 Incomplete SCRAM / 1 CFR41.1/41.8/43.6 | 01 | | | | | | Identify the conditions in which the reactor can be considered shutdown, in the event of an incomplete SCRAM. | 3.9 | 33 | BOTH | | BANK NRC 3/98 | |
| 295016 Control Room Abandonment / 7 CFR41.7 | | 01 | | | | | Describe the impact and reason for having two switches for E12-F042A/B, LPCI Injection Valves. | 4.5 | 29 | BOTH | | BANK NRC 3/98 | |
| 295017 High Offsite Release Rate / 9 CFR41.10/43.5 | | 06 | | | | | Given plant conditions and EPPs, determine protective action recommendations per Site Emergency Plan. | 4.6 | 112 | BOTH | | BANK NRC 3/98 | Relates release to actions to protect the public. |
| 295023 Refueling Accidents / 8 CFR41.2/41.10/41.12/43.4/43.5/43.6/43.7 | | | 01 | | | | Describe Refueling Floor personnel response to a fuel handling accident. | 4.3 | 208 | BOTH | | BANK NRC 5/00 | |
| 295024 High Drywell Pressure / 5 CFR41.9 | 01 | | | | | | Describe the implications of exceeding the Drywell maximum design pressure. | 4.2 | 259 | BOTH | | BANK NRC 5/00 | |
| PAGE 1 TOTAL TIER 1 GROUP 1 | 3 | 3 | 1 | 2 | 3 | 0 | PAGE TOTAL # QUESTIONS | 12 | | | | | |

| E/APE #/NAME/SAFETY FUNCTION | K 1 | K 2 | K 3 | A 1 | A 2 | G | TOPIC(S) | IMP | REC # | SRO/RO /BOTH | RELATED K/A | ORIGIN | NOTES: |
|---|--------|--------|--------|--------|--------|----------------|--|-----|----------|-----------------|---|------------------|-----------------------------------|
| 295025 High Reactor Pressure / 3 CFR41.3/43.2 | | | | | | 2. 2. 22 | State the Reactor Vessel pressure Safety Limit and its basis. | 4.1 | 30 | BOTH | EK1.05: 4.7 2.2.25: 3.7 EK1.02: 4.2 | BANK NRC 3/98 | ①Moved from random A2 to Generics |
| 295026 Suppression Pool High Water Temp. / 5 CFR41.7/41.9/41.10/41.14/43.5 | | 01 | | | | | Given plant conditions, determine when Suppression Pool cooling is no longer effective and alternate actions are required. | 4.0 | 301 | BOTH | | MOD NRC 5/00 | |
| 295027 High Containment Temperature / 5 CFR41.9/41.10/43.5 | | | | 03 | | | Determine the Containment Temperature at which Emergency Depressurization is required. | 3.8 | 65 | BOTH | | BANK NRC 3/98 | |
| 295030 Low Suppression Pool Water Level / 5 CFR41.9 | 01 | | | | | | Identify the minimum level to ensure steam condensation from Safety Relief Valve actuation. | 4.1 | | BOTH | | | |
| 295031 Reactor Low Water Level / 2 CFR41.2/41.3/41.10/43.5 | | | | | | 2. 4. 21 | Given plant conditions and a low reactor water level, determine core cooling mechanism and adequacy. | 4.3 | | BOTH | EK1.01: 4.7 2.1.1: 3.8 | | ②Moved from random A2 to Generics |
| 295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1 CFR41.10/41.14/43.5 | | | | | 07 | | Given plant conditions, determine actions to be taken in the event of an ATWS and degrading containment conditions. | 4.2 | | BOTH | | | |
| 295038 High Offsite Release Rate / 9 CFR41.13/43.4 | | 03 | | | | | Describe the means of limiting offsite radiation releases utilizing plant ventilation systems. | 3.8 | 57 | SRO | EA1.06: 3.6 | BANK NRC 3/98 | |
| 500000 High Containment Hydrogen Conc. / 5 CFR41.10/43.5 | | | | | | 2. 4. 6 | Given conditions in Containment and Drywell, determine means of Hydrogen control following LOCA conditions. | 4.0 | | BOTH | 2.1.25: 3.1 2.4.48: 3.8 EA1.03: 3.2 | | ③Moved from random A2 to Generics |
| 295007 High Reactor Pressure / 3 CFR41.5/43.2 | 03 | | | | | | Given a Grid load loss, describe the effects of rising reactor pressure on reactor power. | 3.9 | | SRO | | | GGNS reactor scram 9/00 |
| PAGE 2 TOTAL TIER 1 GROUP 1 | 2 | 2 | 0 | 1 | 1 | 3 | PAGE TOTAL # QUESTIONS | 9 | | | | | |

① 295025 Moved from random selection A2 to Generics.

② 295031 Moved from random selection A2 to Generics.

③ 500000 Moved from random selection A2 to Generics

| E/APE #/NAME/SAFETY FUNCTION | K 1 | K 2 | K 3 | A 1 | A 2 | G | TOPIC(S) | IMP | REC # | SRO/RO /BOTH | RELATED K/A | ORIGIN | NOTES: |
|---|--------|--------|--------|--------|--------|---|--|-----|----------|-----------------|---|--------|--------------------------------------|
| 295003 Partial or Complete Loss of AC Power / 6 CFR41.7 | | | 01 | | | | Given a momentary degraded grid voltage condition, determine the affects on the ESF buses and power supplies. | 3.5 | | SRO | AK3.03: 3.6 AK1.03: 3.2 AK1.04: 3.2 | MOD | Grid fault 9/00 INPO SOER 99-1 |
| 295014 Inadvertent Reactivity Addition / 1 CFR41.1/41.5 | | | | 07 | | | During a reactor startup, determine the effects of level control malfunctions on core reactivity. | 4.1 | | SRO | | | |
| 295015 Incomplete SCRAM / 1 CFR41.2/41.6 | | | | | 02 | | Describe means to obtain indication of a control rod which is stuck at an odd reed switch position in the core following a reactor scram. | 4.2 | | SRO | | | |
| 295026 Suppression Pool High Water Temp. / 5 CFR41.7/41.9/41.10/41.14/43.5 | | | 05 | | | | Given plant conditions, identify actions to be taken and the bases. (For immediately shutting down the reactor for Suppression Pool temperature in excess of 110°F.) | 4.1 | | SRO | 2.1.11: 3.8 2.2.25: 3.7 | | |
| 295023 Refueling Accidents / 8 CFR41.10/41.12/43.4/43.5/43.7 | | | | | 02 | | Describe indications of a lowering water level in the Upper Containment Pool, control room indications, and personnel response. | 3.7 | | SRO | | | |
| PAGE 3 TOTAL TIER 1 GROUP 1 | 0 | 0 | 2 | 1 | 2 | 0 | PAGE TOTAL # QUESTIONS | 5 | | | | | |
| PAGE 1 TOTAL TIER 1 GROUP 1 | 3 | 3 | 1 | 2 | 3 | 0 | PAGE TOTAL # QUESTIONS | 12 | | | | | |
| PAGE 2 TOTAL TIER 1 GROUP 1 | 2 | 2 | 0 | 1 | 1 | 3 | PAGE TOTAL # QUESTIONS | 9 | | | | | |
| K/A CATEGORY TOTALS: | 5 | 5 | 3 | 4 | 6 | 3 | TIER 1 GROUP 1 GROUP POINT TOTAL | 26 | | | | | |

**GRAND GULF NUCLEAR STATION
DECEMBER 2000**

**BWR SRO EXAMINATION OUTLINE
EMERGENCY & ABNORMAL PLANT
EVOLUTIONS - TIER 1 GROUP 2**

ES-401-1

| E/APE #/NAME/SAFETY FUNCTION | K 1 | K 2 | K 3 | A 1 | A 2 | G | TOPIC(S) | IMP | REC # | SRO/RO/ BOTH | RELATED K/A | ORIGIN | NOTES: |
|---|----------|----------|----------|----------|----------|---------------|--|-----------|----------|-----------------|---|------------------|---|
| 295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4 CFR41.10/41.5/43.5 | 02 | | | | | | Given plant conditions and the power to flow map, identify the operational region and any required actions. | 3.5 | 303 | BOTH | AA2.01: 3.8 2.4.4: 4.3 2.4.11: 3.6 | NEW | |
| 295002 Loss of Main Condenser Vacuum / 3 CFR41.4 | 03 | | | | | | Describe the effect on plant operation in the event of a reduction in Condenser vacuum at 100% power. | 3.8 | 40 | BOTH | | BANK NRC 3/98 | Multiple events in GGNS history |
| 295004 Partial or Complete Loss of DC Power / 6 CFR41.7 | | | | | 04 | | Describe the effects of a loss of DC power on the actuation of ECCS systems. | 3.3 | 223 | BOTH | | BANK NRC 5/00 | |
| 295005 Main Turbine Generator Trip / 3 CFR41.4/41.5/41.6 | | | 02 | | | | Describe the basis for a Recirc Pump downshift at the end of cycle with a Main Turbine trip and when it is in effect. | 3.5 | 276 | BOTH | 202001 K4.13: 4.0 K5.05: 3.6 | BANK NRC 5/00 | GGNS Scram 9/00 |
| 295008 High Reactor Water Level / 2 CFR41.4/41.7/41.10/43.5 | | | | 08 | | | Identify conditions that would require RPV High Water Level isolations to be bypassed.(HPCS/RFP) | 3.5 | | BOTH | AA1.06: 2.8 | | |
| 295011 High Containment Temperature / 5 CFR41.4/41.9/41.10/43.5 | | | 01 | | | | Determine conditions requiring additional Containment cooling and means to provide the cooling. | 3.9 | | BOTH | | | |
| 295012 High Drywell Temperature / 5 CFR41.9 | | 02 | | | | | Given plant conditions, determine actions to be taken with Drywell temperature above 200°F and a Containment isolation signal present. | 3.7 | | BOTH | AK2.01: 3.5 | NEW | ⓐMoved from random K1 to K2 |
| 295018 Partial or Complete Loss of CCW / 8 CFR41.4/41.10/43.5 | | | 03 | | | | Given a partial loss of Component Cooling Water, determine actions to be taken and their basis. | 3.3 | | BOTH | | | |
| 295019 Partial or Complete Loss of Inst. Air / 8 CFR41.4/41.13/43.4/43.5 | | 06 | | | | | With a loss of Instrument Air, determine the affects on the Offgas System. | 2.9 | | BOTH | | | |
| 295020 Inadvertent Cont. Isolation / 5 & 7 CFR41.9 | | | 02 | | | | Determine the affects on Containment pressure and temperature with an inadvertent isolation of the Main Steam Lines at power. | 3.5 | | BOTH | AK3.03: 3.2 | | |
| 295021 Loss of Shutdown Cooling / 4 CFR41.5/43.5 | | | | | | 2. 4. 9 | Determine an available method of Alternate decay heat removal. | 3.9 | 226 | BOTH | AA1.04: 3.7 AK3.02: 3.4 AK3.05: 3.8 | MOD NRC 5/00 | Mode 5 ⓑMoved from random K2 to Generics |
| PAGE 1 TOTAL TIER 1 GROUP 2 | 2 | 2 | 4 | 1 | 1 | 1 | PAGE TOTAL # QUESTIONS | 11 | | | | | |

ⓐ 295012 Moved from random selection K1 to K2, due to change in Abnormal Operating Procedure adding caution.

ⓑ 295021 Moved from random selection K2 to Generics.

| E/APE #/NAME/SAFETY FUNCTION | K 1 | K 2 | K 3 | A 1 | A 2 | G | TOPIC(S) | IMP | REC # | SRO/RO/ BOTH | RELATED K/A | ORIGIN | NOTES: |
|--|--------|--------|--------|--------|--------|---|--|-----|----------|-----------------|----------------------------|------------------|--------|
| 295022 Loss of CRD Pumps / 1 CFR41.5 | | | | 04 | | | Describe the affects on reactor water level during a reactor startup with minimal decay heat and a loss of CRD Pumps. (RWCU is lined up to blowdown to the main condenser to compensate for CRD flow.) | 2.6 | 55 | BOTH | AK2.04: 2.7 AK2.05: 2.5 | BANK NRC 3/98 | |
| 295028 High Drywell Temperature / 5 | | | | | | | | | | | | | |
| 295029 High Suppression Pool Water Level / 5 | | | | | | | | | | | | | |
| 295032 High Secondary Containment Area Temperature / 5 CFR41.4/41.10/43.5 | | 02 | | | | | Given plant conditions, determine the operation of the Auxiliary Building Ventilation System. | 3.7 | | BOTH | EK2.01: 3.6 | | |
| 295033 High Secondary Containment Area Radiation Levels / 9 CFR41.11/41.12/43.4 | | | | 01 | | | Given an area radiation monitor alarming, determine the possible cause. | 4.0 | | BOTH | EA2.03: 4.2 | | |
| 295034 Secondary Containment Ventilation High Radiation / 9 CFR41.4/41.11/41.12/41.13/43.4 | 02 | | | | | | Given plant conditions and an offsite release of radiation from the Secondary Containment, determine monitoring methods. | 4.4 | | BOTH | | | |
| 295035 Secondary Containment High Differential Pressure / 5 | | | | | | | | | | | | | |
| 295036 Secondary Containment High Sump/Area Water Level / 5 CFR41.7/41.13/43.5 | | | | 01 | | | Given plant conditions and high-high Floor Drain Transfer tank levels, determine an alternate path for transferring water and the implications of this transfer. | 3.3 | | BOTH | | | |
| 600000 Plant Fire On Site / 8 CFR41.10/43.5 | | | 04 | | | | With a fire on site and news media involvement, determine if the incident is reportable to the NRC. | 3.4 | 150 | SRO | | BANK NRC 3/98 | |
| PAGE 2 TOTAL TIER 1 GROUP 2 | 1 | 1 | 1 | 3 | 0 | 0 | PAGE TOTAL # QUESTIONS | 6 | | | | | |
| PAGE 1 TOTAL TIER 1 GROUP 2 | 2 | 2 | 4 | 1 | 1 | 1 | PAGE TOTAL # QUESTIONS | 11 | | | | | |
| K/A CATEGORY TOTALS: | 3 | 3 | 5 | 4 | 1 | 1 | TIER 1 GROUP 2 GROUP POINT TOTAL | 17 | | | | | |

**GRAND GULF NUCLEAR STATION
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**BWR SRO EXAMINATION OUTLINE
PLANT SYSTEMS - TIER 2 GROUP 1**

ES-401-1

| SYSTEM #/NAME | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | TOPIC(S) | IMP | REC # | SRO/RO/ BOTH | RELATED K/A | ORIGIN | NOTES: |
|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---|----------|----------|-----------------|--|------------------|---|
| 201005 RCIS CFR41.6/41.7 | | | | | | | | | | 01 | | Describe the indications of a single Control Rod Scram. | 3.7 | 14 | BOTH | | BANK NRC 3/98 | |
| 202002 Recirculation Flow Control CFR41.6/41.7 | | | 06 | | | | | | | | | Describe the operation of the Recirc Flow Control Valves during a Flow Control Valve Runback when a HPU trips. | 3.7 | | BOTH | | | @Moved from random K2 to K3 |
| 203000 RHR/LPCI: Injection Mode CFR41.7 | | | | | | | | | | 01 | | State the basis for monitoring reactor pressure when aligning the RHR system for injection into the reactor in the LPCI mode. | 4.1 | 60 | BOTH | K1.17: 4.0 K4.02: 3.4 A3.01: 3.7 A3.08: 4.1 A4.08: 4.3 | BANK NRC 3/98 | Where is press. sensed on LPCI for ops of inj. Valve. |
| 209001 LPCS CFR41.7/41.8 | | | | | | 08 | | | | | | When the LPCS Jockey Pump trips, describe the actions to be taken with regard to the Low Pressure Core Spray System. | 3.0 | | BOTH | K4.02: 3.2 | | |
| 209002 HPCS CFR41.7/41.8 | | 03 | | | | | | | | | | Describe the operation of HPCS following an initiation with a loss of AC power. | 2.9 | 238 | BOTH | K2.01: 3.3 | BANK NRC 5/00 | |
| 211000 SLC CFR41.6/41.7 | | | | 02 | | | | | | | | Describe the response of the SLC system when aligned for test tank operation with a SLC initiation signal. | 3.2 | 239 | BOTH | A2.06: 3.3 A2.07: 3.2 | BANK NRC 5/00 | CR at GGNS |
| 212000 RPS CFR41.6 | | | | | | | 08 | | | | | Identify the impact a Reactor Protection System actuation has on the Control Rod Drive Hydraulic System. | 3.4 | 302 | BOTH | A2.20: 4.2 K1.06: 3.6 201001 K1.07: 3.4 | MOD NRC 3/98 | |
| 215004 Source Range Monitor CFR41.6/41.5 | | | | | | | 04 | | | | | Describe the affects SRMs have on RCIS Rod Blocks when withdrawing SRM detectors from the core during a reactor startup. | 3.5 | 71 | BOTH | A3.04: 3.6 201005 K4.03: 3.5 | BANK NRC 3/98 | |
| PAGE 1 TOTAL TIER 2 GROUP 1 | 0 | 1 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | PAGE TOTAL # QUESTIONS | 8 | | | | | |

© 202002 Moved from random selection K2 to K3, due to low importance values of K2 topics.

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**BWR SRO EXAMINATION OUTLINE
PLANT SYSTEMS - TIER 2 GROUP 1 CONT.**

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| SYSTEM #/NAME | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | TOPIC(S) | IMP | REC # | SRO/RO/ BOTH | RELATED K/A | ORIGIN | NOTES: |
|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------------|---|----------|----------|-----------------|--|------------------|---------------|
| 215005 APRM / LPRM CFR41.6/41.7 | | | | | | 03 | | | | | | Determine the affects on APRMs with reduced LPRM inputs. | 3.3 | | BOTH | A1.02: 4.0 A1.03: 3.6 A1.04: 4.1 | | |
| 216000 Nuclear Boiler Instrumentation CFR41.7 | | | | | | | | | | 01 | | Describe the inputs to the Post Accident RPV Level and Pressure Chart Recorders and actions that will identify changing plant parameters. | 3.1 | | BOTH | | | |
| 217000 RCIC CFR41.5/41.7/41.10 | | | | | | | 01 | | | | | Given plant conditions, determine the operation of RCIC and indications of injection. | 3.7 | | BOTH | | | |
| 218000 ADS CFR41.5/41.7/41.8 | | | | | | | | 01 | | | | Given plant conditions, determine the operation of ADS. | 4.3 | 248 | BOTH | K5.01: 3.8 K4.02: 4.0 K4.03: 4.0 A4.04: 4.1 | BANK NRC5/00 | |
| 223001 Primary CTMT and Auxiliaries CFR41.5/41.7 | | | | | 01 | | | | | | | Identify the purpose of relief devices installed in chilled water piping on the Containment side of Containment penetrations. | 3.3 | | BOTH | 2.1.28: 3.3 | | Design change |
| 223002 PCIS / Nuclear Steam Supply Shutoff CFR41.7/41.9/41.10/43.5 | | | | | | | | | | | 2. 4. 49 | Given isolation conditions, evaluate indications to determine whether appropriate actions have occurred. | 4.0 | 270 | BOTH | A1.01: 3.5 A2.01: 3.5 A3.01: 3.4 2.4.46: 3.6 2.4.48: 3.8 | BANK NRC 5/00 | |
| 226001 RHR/LPCI: CTMT Spray Mode CFR41.5/41.9 | | | | | | | 02 | | | | | Identify when Containment Spray is used and the response of Containment temperature. | 3.5 | 304 | BOTH | | MOD NRC 5/00 | |
| 239002 SRVs CFR41.3 | 05 | | | | | | | | | | | Describe the operation of the Safety Relief Valves in different modes of operation. (system air pressure or reactor pressure) | 3.3 | | BOTH | | | |
| 241000 Reactor / Turbine Pressure Regulator CFR41.5/41.7 | | | 02 | | | | | | | | | Predict the impact on reactor pressure and heatup/cooldown if a Turbine Pressure input signal fails low during a reactor startup. | 4.3 | | BOTH | K3.01: 4.1 K3.24: 3.2 K3.25: 3.3 | | |
| PAGE 2 TOTALS TIER 2 GROUP 1 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | PAGE 2 TOTAL # QUESTIONS | 9 | | | | | |

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**BWR SRO EXAMINATION OUTLINE
PLANT SYSTEMS - TIER 2 GROUP 1 CONT.**

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| SYSTEM #/NAME | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | TOPIC(S) | IMP | REC # | SRO/RO/ BOTH | RELATED K/A | ORIGIN | NOTES: | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|--|-----|----------|-----------------|--|------------------|---------------------------------------|--|
| 259002 Reactor Water Level Control CFR41.5 | | | | | | | 03 | | | | | Describe the operation of the Feedwater Level Control System as reactor power is lowered. | 3.8 | | BOTH | K4.09: 3.1 K4.10: 3.4 | | 3-element vs 1 element | |
| 261000 SGTS CFR41.7/41.11 | | | | | | | | | | 07 | | Determine the operation of the SGTS when placed in standby with sealed in initiation and system flow changes and building pressure changes. | 3.2 | | BOTH | A2.01: 3.1 A3.02: 3.1 | | | |
| 262001 AC Electrical Distribution CFR41.4/41.7 | | | | | | | | | | 03 | | Describe the indications for a circuit breaker returned to service following local maintenance. | 3.4 | | BOTH | 2.1.29: 3.3 | | SOER 98-2 | |
| 264000 EDGs CFR41.8 | | | | 02 | | | | | | | | Identify signals that will result in a loss of the Division I diesel generator when operating in response to a LOCA signal. | 4.2 | | BOTH | | | | |
| 290001 Secondary CTMT CFR41.7/41.9 | | | | | | 09 | | | | | | Describe the ability of Auxiliary Building Fire Protection system to be restored following an Auxiliary Building Isolation in conjunction with a loss of AC Power. | 3.6 | 264 | BOTH | A2.06: 4.0 286000 A2.09: 2.8 | BANK NRC 5/00 | | |
| 203000 RHR/LPCI: Injection Mode CFR41.7/41.10/43.5 | | | | | | | | | 01 | | | A LOCA occurs with the plant aligned for shutdown cooling. Describe the alignment of RHR for LPCI operation. | 3.7 | 272 | BOTH | A3.08: 4.1 A4.02: 4.1 K4.01: 4.2 | BANK NRC 5/00 | Manual realignment requirement. | |
| PAGE 3 TOTALS TIER 2 GROUP 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | PAGE TOTAL # QUESTIONS | 6 | | | | | | |
| PAGE 1 TOTALS TIER 2 GROUP 1 | 0 | 1 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | PAGE TOTAL # QUESTIONS | 8 | | | | | | |
| PAGE 2 TOTALS TIER 2 GROUP 1 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | PAGE TOTAL # QUESTIONS | 9 | | | | | | |
| K/A CATEGORY TOTALS: | 1 | 1 | 2 | 2 | 1 | 3 | 5 | 1 | 1 | 5 | 1 | TIER 2 GROUP 1 GROUP POINT TOTAL | 23 | | | | | | |

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**BWR SRO EXAMINATION OUTLINE
PLANT SYSTEMS - TIER 2 GROUP 2**

ES-401-1

| SYSTEM #/NAME | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | TOPIC(S) | IMP | REC # | SRO/RO / BOTH | RELATED K/A | ORIGIN | NOTES: |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------------|--|-----|----------|------------------|---------------------------|---------------------|-----------------------------------|
| 201001 CRD Hydraulic CFR41.6/41.7 | | | | | | | | 09 | | | | Recognize the effects of a loss of Instrument air on the operation of the Control Rod Drive Hydraulic System. | 3.1 | | BOTH | | | |
| 202001 Recirculation CFR41.5/41.6/43.6 | | | 08 | | | | | | | | | Evaluate the effects of isolating the Recirculation System on the ability to operate Shutdown Cooling. | 2.9 | | BOTH | | | |
| 204000 RWCU CFR41.10/41.12/41.13/43.4/43.5 | | | | | | | | | | | 2. 1. 32 | Determine the impact of excessive RWCU blowdown during reactor startup without a filter-demineralizer in service. | 3.8 | | BOTH | A1.07: 2.9 2.3.10: 3.3 | | Ⓣ Moved from random A4 to Generic |
| 205000 Shutdown Cooling CFR41.7/41.10/43.5 | | | | 03 | | | | | | | | Describe the operation of the RHR Shutdown Cooling System in the event of a lowering reactor water level. | 3.8 | 5 | BOTH | A2.09: 3.8 A2.05: 3.7 | BANK NRC 3/98 | |
| 215003 IRM | | | | | | | | | | | | | | | | | | |
| 219000 RHR /LPCI Suppression Pool Cooling Mode | | | | | | | | | | | | | | | | | | |
| 234000 Fuel Handling Equipment CFR41.4/43.7 | | | | | | 03 | | | | | | Describe the interlocks between the Refueling Bridge and RC&IS that prevent movement of fuel in unacceptable conditions. | 3.6 | 16 | BOTH | A3.02: 3.7 | BANK NRC 3/98 | |
| 239003 MSIV Leakage Control | | | | | | | | | | | | | | | | | | |
| 245000 Main Turbine Gen., and Auxiliaries | | | | | | | | | | | | | | | | | | |
| 259001 Reactor Feedwater CFR41.4/41.10/43.5 | | | | | | | | | 10 | | | Determine system configuration following a Feed Pump trip on low lube oil pressure. | 3.4 | | BOTH | A4.04: 2.9 | | |
| PAGE 1 TOTAL TIER 2 GROUP 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | PAGE TOTAL # QUESTIONS | 6 | | | | | |

Ⓣ 204000 Moved from random selection A4 to Generic, identifies precaution associated with the system during startup operations.

| GRAND GULF NUCLEAR STATION DECEMBER 2000 | | BWR SRO EXAMINATION OUTLINE PLANT SYSTEMS - TIER 2 GROUP 2 | | | | | | | | | | CONT. | ES-401-1 | | | | | |
|---|--------|---|--------|--------|--------|--------|--------|--------|--------|--------|---|--|----------|----------|-----------------|--------------------------|------------------|---------------------------------------|
| SYSTEM #/NAME | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | TOPIC(S) | IMP | REC # | SRO/RO/ BOTH | RELATED K/A | ORIGIN | NOTES: |
| 262002 UPS (AC/DC) CFR41.4/41.10/43.5 | 01 | | | | | | | | | | | Determine the effect of a loss of UPS power on Reactor Water Level Control and Feedwater Systems. | 3.0 | 292 | BOTH | K1.02: 3.0 | BANK NRC 5/00 | INFI 90 CONTROL SYSTEM |
| 263000 DC Electrical Distribution CFR41.4 | | 01 | | | | | | | | | | Identify the power supply to the 250 volt DC bus. | 3.4 | | BOTH | | | Ⓞ Moved random from A1 to K2 |
| 271000 Offgas CFR41.7/41.13 | 08 | | | | | | | | | | | Determine the effects on the Offgas system with a loss of Oxygen injection to Offgas. | 2.3 | | BOTH | K5.09: 2.8 K6.06: 2.5 | | Ⓞ HWC system installed |
| 272000 Radiation Monitoring | | | | | | | | | | | | | | | | | | |
| 286000 Fire Protection CFR41.4/41.7/41.10/43.5 | | 02 | | | | | | | | | | Given a loss of offsite power, determine the affects on the Fire Protection System. | 3.1 | | BOTH | K1.07: 2.9 K6.01: 3.1 | | |
| 290003 Control Room HVAC CFR41.4/41.5/41.7 | | | | | | | | | | 01 | | Given plant conditions, determine the appropriate Control Room HVAC configuration. | 3.2 | 267 | BOTH | A3.01: 3.5 | BANK NRC 5/00 | |
| 300000 Instrument Air CFR41.4/41.10/43.5 | | | | 02 | | | | | | | | Identify the means of providing air to the ADS valves for operation with an extended loss of Instrument Air. | 3.0 | | BOTH | | | |
| 400000 Component Cooling Water CFR41.4/41.7 | | | | | | | | | | 01 | | Describe the operation of the CCW temperature controller when placing ADHR in service. | 3.0 | | BOTH | K1.01: 3.3 | | |
| PAGE 2 TOTALS | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | PAGE 3 TOTAL # QUESTIONS | 7 | | | | | |
| PAGE 1 TOTALS | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | PAGE 1 TOTAL # QUESTIONS | 6 | | | | | |
| K/A CATEGORY TOTALS: | 2 | 2 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | TIER 2 GROUP 2 GROUP POINT TOTAL | 13 | | | | | |

Ⓞ 263000 Moved random selection from A1 to K2, A1 had one topic of battery discharge rates which has little discriminatory value.

Ⓞ 271000 HWC system installed with Oxygen injection to Offgas. This is an increased hazard to the plant with a sudden loss of oxygen injection.

| GRAND GULF NUCLEAR STATION DECEMBER 2000 | | | | BWR SRO EXAMINATION OUTLINE PLANT SYSTEMS - TIER 2 GROUP 3 | | | | | | | | | | ES-401-1 | | | | |
|--|--------|--------|--------|---|--------|--------|--------|--------|--------|--------|---|---|-----|----------|-----------------|---------------------------|--------|------------------------|
| SYSTEM #/NAME | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | TOPIC(S) | IMP | REC # | SRO/RO/ BOTH | RELATED K/A | ORIGIN | NOTES: |
| 201003 Control Rod and Drive Mechanism CFR41.6/41.10/43.5 | | | | | | | | 08 | | | | Given conditions of the HCU, determine its status. | 3.7 | | BOTH | | | ©Original selection K2 |
| 215001 Traversing In-core Probe | | | | | | | | | | | | | | | | | | |
| 233000 Fuel Pool Cooling and Cleanup | | | | | | | | | | | | | | | | | | |
| 239001 Main and Reheat Steam | | | | | | | | | | | | | | | | | | |
| 256000 Reactor Condensate CFR41.4/41.10/43.5 | 02 | | | | | | | | | | | Given plant conditions, determine the affects on the Feedwater System with a single Condensate pump trip. | 3.3 | | BOTH | | | |
| 268000 Radwaste CFR41.13/41.10/43.4/43.5 | | | | | | | | 01 | | | | Given a rupture in the Liquid Radwaste System, determine the actions to be taken. | 3.5 | | BOTH | 2.4.1: 4.6 2.4.11: 3.6 | | Ⓜ see below |
| 288000 Plant Ventilation CFR41.1/41.5/41.7 | | | | | 02 | | | | | | | Determine the method of maintaining Auxiliary Building (Secondary Containment) differential pressure during normal operation. | 3.4 | | BOTH | | | Ⓜ see below |
| 290002 Reactor Vessel Internals | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| K/A CATEGORY TOTALS: | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | TIER 2 GROUP 3 GROUP POINT TOTAL | 4 | | | | | |

Ⓜ 268000 Random selection was K5 which has low discriminatory value, moved to category A2 that only had two topics. System 288000 random selection was A4 which had multiple topics in Tier 2, category K5 needed an additional topic. System 288000 topic was moved to category K5.

© 201003 Original selection K2, K2 for CRD Mechanism is NONE, moved to A2.

| CATEGORY | C1 | C2 | C3 | C4 | TOPIC(S) | IMP | REC # | SRO/RO /BOTH | RELATED K/A | ORIGIN | NOTES: |
|--|--------|--------|-------|----|--|-----|-------|--------------|---|---------------------|-------------|
| CONDUCT OF OPERATIONS – Deviations from Approved documents in emergency conditions CFR41.10/43.3/43.5 | 2.1.1 | | | | Given plant conditions that require a deviation from procedures, describe the process and when this action can be taken. | 3.8 | 135 | SRO | 2.1.2: 4.0 | BANK NRC 3/98 | 50.54x |
| CONDUCT OF OPERATIONS – System lineups CFR41.10/43.2/43.5 | 2.1.29 | | | | Given plant conditions, determine when a complete system lineup is required. | 3.3 | | SRO | | | |
| CONDUCT OF OPERATIONS – Chemistry Limits CFR41.10/43.2/43.5 | 2.1.34 | | | | Given Chemistry report, evaluate plant chemistry analysis against specifications and determine actions. | 2.9 | 197 | SRO | | BANK NRC 5/00 | |
| CONDUCT OF OPERATIONS – Tech Specs CFR43.2 | 2.1.12 | | | | Given Technical Specifications and plant conditions, apply actions for a given situation. (SLC concentrations and conditions) | 4.0 | 185 | SRO | 2.1.10: 3.9 | BANK NRC 5/00 | |
| CONDUCT OF OPERATIONS – Responsibilities and Procedure usage CFR41.10 | 2.1.2 | | | | Given a situation that requires procedure changes to accomplish task, determine the actions to be taken. | 4.0 | 196 | SRO | 2.1.20: 4.2 2.1.21: 3.2 2.1.23: 4.0 | BANK NRC 5/00 | |
| EQUIPMENT CONTROL – Core Loading Procedures & Limitations CFR43.6/43.7 | | 2.2.31 | | | Determine what is a Core Alteration. | 2.9 | 108 | SRO | 2.2.34: 3.3 | BANK NRC 3/98 | |
| EQUIPMENT CONTROL – Tech Spec Bases CFR43.2 | | 2.2.25 | | | Given a value for Fraction of Core Boiling Boundary and plant conditions, evaluate the status of FCBB and its basis. | 3.7 | | SRO | 2.1.11: 3.8 | | |
| EQUIPMENT CONTROL – Maintenance Control CFR43.3/43.2 | | 2.2.24 | | | Evaluate the status of a Limiting Condition for Operation following maintenance on a system. | 3.8 | | SRO | | | |
| EQUIPMENT CONTROL – Refueling CFR41.9/41.10/43.2/43.4/43.6/43.7 | | 2.2.28 | | | Given an evolution to be performed in Containment during fuel handling operations, evaluate the allowances of the evolution. | 3.5 | | SRO | | | |
| RADIATION CONTROL – ALARA CFR41.12/43.4 | | | 2.3.2 | | Given an equipment clearance in a radiologically controlled area, describe the requirements of Independent Verification of Red Tags. | 2.9 | 127 | SRO | 2.2.13: 3.8 | BANK NRC 3/98 | |
| RADIATION CONTROL – Radioactive Material Transfer Requirements CFR41.10/43.4 | | | 2.3.3 | | Describe the Shift Manager responsibility for shipments of Radioactive material offsite. | 2.9 | 200 | SRO | 2.4.30: 3.6 | BANK NRC 5/00 | HAZMAT PLAN |
| PAGE 1 TOTAL TIER 3 | 5 | 4 | 2 | 0 | PAGE TOTAL # QUESTIONS | 11 | | | | | |

| CATEGORY | C1 | C2 | C3 | C4 | TOPIC(S) | IMP | REC # | SRO/RO /BOTH | RELATED K/A | ORIGIN | NOTES: |
|--|----|----|----|--------|---|-----|-------|-----------------|---|--------|---------------------|
| EMERGENCY PROCEDURES / PLAN – EOP Bases CFR41.9/41.10/43.4/43.5 | | | | 2.4.18 | Describe the bases for venting the Containment irrespective of Offsite Release rates with Containment pressure approaching 22.4 psig. | 3.6 | | SRO | | | EOP Bases |
| EMERGENCY PROCEDURES / PLAN – SAPs CFR41.10/43.5 | | | | 2.4.37 | Given plant conditions determine the responsibilities and actions to be taken when transitioning between EOPs and SAPs. | 3.5 | | SRO | 2.4.16: 4.0 | | EOP/SAP |
| EMERGENCY PROCEDURES / PLAN – EAL CFR41.10/43.5 | | | | 2.4.41 | Given plant conditions, determine the Emergency Action Level Classification. | 4.1 | | SRO | | | EPP Implementation |
| EMERGENCY PROCEDURES / PLAN – EOPs CFR41.10/43.5 | | | | 2.4.20 | Given conditions delineated in Caution 1 of the EOPs, determine when EOP transition to contingencies is required. | 4.0 | | SRO | 2.4.18: 3.6 2.4.22: 4.0 2.4.23: 3.8 | | EOP usage |
| EMERGENCY PROCEDURES / PLAN – Security Threat CFR41.10/43.5 | | | | 2.4.4 | Given a security threat to the Control Room, determine actions to be taken. | 4.3 | | SRO | 2.4.49: 4.0 2.1.2: 4.0 2.1.6: 4.3 | | Security Threat AOP |
| EMERGENCY PROCEDURES / PLAN – Shift Manning / Fire Brigade CFR41.10/43.1/43.2/43.5 | | | | 2.4.26 | Given a situation with a fire brigade member unavailable, determine shift manning requirements and actions. | 3.3 | | SRO | 2.1.4: 3.4 2.1.5: 3.4 | | Minimal staffing |
| PAGE 2 TOTAL TIER 3 | 0 | 0 | 0 | 6 | PAGE TOTAL # QUESTIONS | 6 | | | | | |
| PAGE 1 TOTAL TIER 3 | 5 | 4 | 2 | 0 | PAGE TOTAL # QUESTIONS | 11 | | | | | |
| K/A CATEGORY TOTALS: | 5 | 4 | 2 | 6 | TIER 3 GROUP POINT TOTAL | 17 | | | | | |

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GRANDGULF NUCLEAR STATION
NPF 50-416**

**JUSTIFICATIONS FOR DELETIONS ON
WRITTEN EXAMINATION OUTLINE**

SYSTEMS DELETED

- 201002 Reactor Manual Control System - This system is not incorporated into the BWR-6 design. The functions of this system are incorporated into the Rod Control and Information System.
- 201004 Rod Sequence Control System - This system is not incorporated into the BWR-6 design. The functions of this system are incorporated into the Rod Control and Information System.
- 201006 Rod Worth Minimizer System - This system is not incorporated into the BWR-6 design. The functions of this system are incorporated into the Rod Control and Information System.
- 214000 Rod Position Information System - This system is not incorporated into the BWR-6 design. The functions of this system are incorporated into the Rod Control and Information System.
- 215002 Rod Block Monitor System - This system is not incorporated into the BWR-6 design. The functions of this system are incorporated into the Rod Control and Information System.
- 206000 High Pressure Core Injection (HPCI) - This system is not incorporated into the BWR 6 design.
- 207000 Isolation (Emergency) Condenser - This system is not incorporated into the BWR 6 design. This was replaced by the Mark III Containment Suppression Pool.
- 219000 RHR/LPCI: Torus Cooling Mode - The BWR 6 Mark III Containment utilizes a Suppression Pool instead of a Torus.
- 230000 RHR/LPCI: Torus/Pool Spray Mode - This system is not incorporated into the BWR 6 Mark III Containment design.

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WRITTEN EXAMINATION

Knowledge and Abilities which were hit on the random selection which had Importance values < 2.5 were replaced with alternate random selections.

Knowledge and Abilities that were hit on the random selection which in NUREG 1123 listed NONE were replaced with alternate topics for the System or Evolution.

For Tiers 1 and 2, Generic topics were selected from K/As that had more hits and had topics that would be served well in the Generics.

Plant Generics Knowledge and Abilities

Based on 127 topic areas that apply to a single unit BWR.

| | | RO | SRO |
|---------------------------|-----------------|-----------|-----------|
| Conduct of Operations | 34 topics = 27% | 4 | 5 |
| Equipment Control | 32 topics = 25% | 3(2) | 4 |
| Radiation Control | 11 topics = 9% | 1(2) | 2 |
| Emergency Procedures/Plan | 50 topics = 39% | 5 | 6 |
| TOTAL | 127 | 13 | 17 |

BOTH WRITTEN

- 295025 ① Moved from random selection A2 to Generics.
- 295031 ② Moved from random selection A2 to Generics.
- 500000 ③ Moved from random selection A2 to Generics
- 295012 ④ Moved from random selection K1 to K2, due to change in Abnormal Operating Procedure adding caution.
- 295021 ⑤ Moved from random selection K2 to Generics.
- 202002 ⑥ Moved from random selection K2 to K3, due to low importance values of K2 topics.
- 204000 ⑦ Moved from random selection A4 to Generics, identifies precaution associated with the system during startup operations.
- 263000 ⑧ Moved random selection from A1 to K2, A1 had one topic of battery discharge rates which has little discriminatory value.

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WRITTEN EXAMINATION
BOTH (continued)

- 271000 ⑨ HWC system installed with Oxygen injection to Offgas. This is an increased hazard to the plant with a sudden loss of oxygen injection.
- 268000 ⑩ Random selection was K5 that has low discriminatory value, moved to category A2 that only had two topics.
- 288000 ⑩ Random selection was A4 that had multiple topics in Tier 2. Category K5 needed an additional, topic 288000 was moved to category K5.
- 201003 ③ Original selection K2, K2 for CRD Mechanism is NONE, moved to A2.

SENIOR REACTOR OPERATOR WRITTEN

NONE

~~REACTOR OPERATOR WRITTEN~~

WBT 12/14/00

- ~~245000 ⑧ Moved from random selection A2 to Generic, Standing order concerning sustained loss of AC power to Hydrogen Seal Oil with DC Seal Oil Pump undersized requiring degassing of Generator to prevent Hydrogen egress from the Generator.~~