

| Facility: | | Pilgrim NRC | | Date of Exam: | | March 2009 | | | | | | | | | | | |
|---|-------------|------------------------|-----|---------------|-----|------------|-----|-----|-----|-----|-----|-----|-----------------|----|----|-------|---|
| 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 & Plant Evolutions | 1 | 4 | 3 | 3 | | | | 3 | 4 | | | 3 | 20 | 3 | 4 | 7 | |
| | 2 | 1 | 1 | 1 | | | | 2 | 1 | | | 1 | 7 | 2 | 1 | 3 | |
| | Tier Totals | 5 | 4 | 4 | | | | 5 | 5 | | | 4 | 27 | 5 | 5 | 10 | |
| 2. Plant Systems | 1 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 26 | 2 | 3 | 5 | |
| | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 12 | 0 | 1 | 3 | |
| | Tier Totals | 5 | 4 | 4 | 4 | 3 | 5 | 3 | 2 | 3 | 3 | 2 | 38 | 3 | 5 | 8 | |
| 3. Generic Knowledge & Abilities Categories | | | | 1 | | 2 | | 3 | | 4 | | 10 | 1 | 2 | 3 | 4 | 7 |
| | | | | 2 | | 3 | | 3 | | 2 | | | 2 | 2 | 1 | 2 | |

- Note:
- 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).
 - 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.
 - 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 elimination of inappropriate K/A statements.
 - 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.
 - Absent a plant specific priority, only those KAs 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.
 - Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
 - * 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/A's
 - On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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.
 - 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 10CFR55.43

Pilgrim NRC
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

| EAPE # / Name Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Q# |
|---|----|----|----|----|----|---|---|------|----|
| 295004 Partial or Total Loss of DC Pwr / 6 | | | | | X | | AA2.01 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : Cause of partial or complete loss of D.C. power | 3.6 | 76 |
| 295031 Reactor Low Water Level / 2 | | | | | X | | EA2.04 - Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL : Adequate core cooling | 4.8 | 77 |
| 295019 Partial or Total Loss of Inst. Air / 8 | | | | | X | | AA2.02 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Status of safety-related instrument air system loads (see AK2.1 - AK2.19) | 3.7 | 78 |
| 295026 Suppression Pool High Water Temp. / 5 | | | | | | X | 2.1.32 - Conduct of Operations: Ability to explain and apply all system limits and precautions. | 4.0 | 79 |
| 295018 Partial or Total Loss of CCW / 8 | | | | | | X | 2.4.30 - Emergency Procedures / Plan: 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 | 80 |
| 295006 SCRAM / 1 | | | | | | X | 2.1.20 - Conduct of Operations: Ability to interpret and execute procedural steps. (Reactor Scram) | 4.6 | 81 |
| 700000 Generator Voltage and Electric Grid Disturbances | | | | | | X | 2.4.4 - Emergency Procedures / Plan: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. | 4.7 | 82 |
| 295026 Suppression Pool High Water Temp. / 5 | X | | | | | | EK1.02 - Knowledge of the operational implications of the following concepts as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE : Steam condensation | 3.5 | 39 |
| 295021 Loss of Shutdown Cooling / 4 | X | | | | | | AK1.01 - Knowledge of the operational implications of the following concepts as they apply to LOSS OF SHUTDOWN COOLING : Decay heat | 3.6 | 40 |
| 600000 Plant Fire On-site / 8 | X | | | | | | AK1.01 - Knowledge of the operation applications of the following concepts as they apply to Plant Fire On Site: Fire Classifications by type | 2.5 | 41 |
| 295006 SCRAM / 1 | | X | | | | | AK2.01 - Knowledge of the interrelations between SCRAM and the following: RPS | 4.3 | 42 |
| 295005 Main Turbine Generator Trip / 3 | | X | | | | | AK2.04 - Knowledge of the interrelations between MAIN TURBINE GENERATOR TRIP and the following: Main generator protection | 3.3 | 43 |
| 295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4 | | X | | | | | AK2.06 - Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION and the following: Reactor power | 3.8 | 44 |
| 295023 Refueling Accidents / 8 | | | X | | | | AK3.01 - Knowledge of the reasons for the following responses as they apply to REFUELING ACCIDENTS : Refueling | 3.6 | 45 |

Pilgrim NRC
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

| EAPE # / Name Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Q# |
|---|----|----|----|----|----|---|--|------|----|
| | | | | | | | floor evacuation | | |
| 295003 Partial or Complete Loss of AC / 6 | | | X | | | | AK3.01 - Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : Manual and auto bus transfer | 3.3 | 46 |
| 295019 Partial or Total Loss of Inst. Air / 8 | | | X | | | | AK3.02 - Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Standby air compressor operation | 3.5 | 47 |
| 295004 Partial or Total Loss of DC Pwr / 6 | | | | X | | | AA1.03 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : A.C. electrical distribution | 3.4 | 48 |
| 295024 High Drywell Pressure / 5 | | | | X | | | EA1.17 - Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: Containment spray: Plant-Specific | 3.9 | 49 |
| 295038 High Off-site Release Rate / 9 | | | | X | | | EA1.01 - Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE: Stack-gas monitoring system: Plant-Specific | 3.9 | 50 |
| 295030 Low Suppression Pool Water Level / 5 | | | | | X | | EA2.02 - Ability to determine and/or interpret the following as they apply to LOW SUPPRESSION POOL WATER LEVEL : Suppression pool temperature | 3.9 | 51 |
| 295037 SCRAM Conditions Present and Reactor Power Above APRM Downscale or Unknown / 1 | | | | | X | | EA2.05 - Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : Control rod position | 4.2 | 52 |
| 295025 High Reactor Pressure / 3 | | | | | X | | EA2.02 - Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: Reactor power | 4.2 | 53 |
| 295028 High Drywell Temperature / 5 | | | | | | X | 2.4.50 - Emergency Procedures / Plan: Ability to verify system alarm setpoints and operate controls identified in the alarm response manual. | 4.2 | 54 |
| 295016 Control Room Abandonment / 7 | | | | | | X | 2.4.35 - Emergency Procedures / Plan: Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects. | 3.8 | 55 |
| 700000 Generator Voltage and Electric Grid Disturbances | | | | | | X | 2.1.20 - Conduct of Operations: Ability to interpret and execute procedure steps. | 4.6 | 56 |
| 295018 Partial or Total Loss of CCW / 8 | X | | | | | | AK1.01 - Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : Effects on component/system operations | 3.5 | 57 |
| 295031 Reactor Low Water Level / 2 | | | | | X | | EA2.04 - Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL : Adequate core cooling | 4.6 | 58 |

Pilgrim NRC
 Written Examination Outline
 Emergency and Abnormal Plant Evolutions – Tier 1 Group 1

| EAPE # / Name Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Q# |
|-------------------------------|----|----|----|----|-----|-----|--------------------|------|------|
| K/A Category Totals: | | | | | | | | | |
| | 4 | 3 | 3 | 3 | 4/3 | 3/4 | Group Point Total: | | 20/7 |

Pilgrim NRC
Written Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1 Group 2

| EAPE # / Name Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Q# |
|---|----|----|----|----|-----|-----|--|------|----|
| 295010 High Drywell Pressure / 5 | | | | | X | | AA2.01 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL PRESSURE : Leak rates | 3.8 | 83 |
| 295034 Secondary Containment Ventilation High Radiation / 9 | | | | | | X | 2.2.22 - Equipment Control: Knowledge of limiting conditions for operations and safety limits. | 4.7 | 84 |
| 295002 Loss of Main Condenser Vac / 3 | | | | | X | | AA2.02 - Ability to determine and/or interpret the following as they apply to LOSS OF MAIN CONDENSER VACUUM : Reactor power: Plant-Specific | 3.3 | 85 |
| 295010 High Drywell Pressure / 5 | X | | | | | | AK1.01 - Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE: Downcomer submergence: Mark-I&II | 3.0 | 59 |
| 295029 High Suppression Pool Water Level / 5 | | X | | | | | EK2.08 - Knowledge of the interrelations between HIGH SUPPRESSION POOL WATER LEVEL and the following: Drywell/suppression chamber ventilation | 2.6 | 60 |
| 295035 Secondary Containment High Differential Pressure / 5 | | | X | | | | EK3.02 - Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: Secondary containment ventilation response. | 3.3 | 61 |
| 295002 Loss of Main Condenser Vac / 3 | | | | X | | | AA1.03 - Ability to operate and/or monitor the following as they apply to LOSS OF MAIN CONDENSER VACUUM : RPS | 3.4 | 62 |
| 295012 High Drywell Temperature / 5 | | | | | X | | AA2.03 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE : Drywell humidity: Plant-Specific | 2.8 | 63 |
| 295008 High Reactor Water Level / 2 | | | | | | X | 2.4.34, Knowledge RO tasks performed outside the main control room during an emergency and resultant operational effects | 3.9 | 64 |
| 295022 Loss of CRD Pumps / 1 | | | | X | | | AA1.02 - Ability to operate and/or monitor the following as they apply to LOSS OF CRD PUMPS: RPS | 3.6 | 65 |
| K/A Category Totals: | 1 | 1 | 1 | 2 | 1/2 | 1/1 | Group Point Total: | 7/3 | |

Pilgrim NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A2 | A 3 | A 4 | G | Imp | Q# |
|-----------------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|---|-----|----|
|-----------------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|---|-----|----|

| | | | | | | | | | | | | | | |
|-----------------------------------|---|---|--|--|--|--|--|---|--|--|---|--|-----|----|
| 209001 LPCS | | | | | | | | X | | | | A2.09 - Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low suppression pool level | 3.3 | 86 |
| 215005 APRM / LPRM | | | | | | | | X | | | | A2.05 - Ability to (a) predict the impacts of the following on the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions: Loss of recirculation flow signal | 3.6 | 87 |
| 215003 IRM | | | | | | | | | | | X | 2.1.23 - Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation. | 4.4 | 88 |
| 300000 Instrument Air | | | | | | | | | | | X | 2.4.6 - Emergency Procedures / Plan: Knowledge of EOP mitigation strategies. | 4.7 | 89 |
| 215004 Source Range Monitor | | | | | | | | | | | X | 2.4.46 - Emergency Procedures / Plan: Ability to verify that the alarms are consistent with the plant conditions. | 4.2 | 90 |
| 262001 AC Electrical Distribution | X | | | | | | | | | | | K1.03 - Knowledge of the physical connections and/or cause effect relationships between A.C. ELECTRICAL DISTRIBUTION and the following: Off-site power sources. | 3.4 | 1 |
| 215004 Source Range Monitor | X | | | | | | | | | | | K1.01 - Knowledge of the physical connections and/or cause- effect relationships between SOURCE RANGE MONITOR (SRM) SYSTEM and the following: Reactor protection system | 3.6 | 2 |
| 206000 HPCI | | X | | | | | | | | | | K2.03 - Knowledge of electrical power supplies to the following: Initiation logic: BWR-2,3,4 | 2.8 | 3 |
| 217000 RCIC | | X | | | | | | | | | | K2.02 - Knowledge of electrical power supplies to the following:- RCIC initiation signals | 2.8 | 4 |

Pilgrim NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A2 | A 3 | A 4 | G | Imp | Q# |
|-----------------------------------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|---|-----|----|
| 215003 IRM | | | X | | | | | | | | | 3.6 | 5 |
| 215005 APRM / LPRM | | | X | | | | | | | | | 3.2 | 6 |
| 262002 UPS (AC/DC) | | | | X | | | | | | | | 3.1 | 7 |
| 205000 Shutdown Cooling | | | | X | | | | | | | | 3.8 | 8 |
| 263000 DC Electrical Distribution | | | X | | | | | | | | | 3.4 | 9 |
| 209001 LPCS | | | | | X | | | | | | | 2.6 | 10 |
| 212000 RPS | | | | | | X | | | | | | 3.5 | 11 |
| 264000 EDGs | | | | | | X | | | | | | 3.3 | 12 |
| 211000 SLC | | | | | | | X | | | | | 3.6 | 13 |

Pilgrim NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A2 | A 3 | A 4 | G | Imp | Q# |
|--|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|---|-----|----|
| 239002 SRVs | | | | | | | X | | | | | 3.8 | 14 |
| 400000 Component Cooling Water | | | | | | | | X | | | | 2.9 | 15 |
| 223002 PCIS/Nuclear Steam Supply Shutoff | | | | | | | | X | | | | 3.6 | 16 |
| 300000 Instrument Air | | | | | | | | | X | | | 2.9 | 17 |
| 261000 SGTS | | | | | | | | | X | | | 3.0 | 18 |
| 217000 RCIC | | | | | | | | | | X | | 3.9 | 19 |
| 203000 RHR/LPCI: Injection Mode | | | | | | | | | | X | | 3.9 | 20 |
| 259002 Reactor Water Level Control | | | | | | | X | | | | | 3.1 | 21 |
| 206000 HPCI | | | | X | | | | | | | | 3.7 | 22 |

Pilgrim NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 1

| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A2 | A 3 | A 4 | G | Imp | Q# |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------|----|
| 215005 APRM / LPRM | X | | | | | | | | | | | 2.6 | 23 |
| 205000 Shutdown Cooling | | X | | | | | | | | | | 2.5 | 24 |
| 261000 SGTS | | | | | | | | | | X | | 4.2 | 25 |
| 218000 ADS | | | | | X | | | | | | | 3.8 | 26 |
| K/A Category Totals: | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2/2 | 2 | 2 | 1/3 | Group Point Total: 26/5 | |

Pilgrim NRC
Written Examination Outline
Plant Systems – Tier 2 Group 2

| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | Imp. | Q# |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|------|----|
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|------|----|

| | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|--|--|---|---|-----|----|
| 215001 Traversing In-core Probe | | | | | | | | X | | | | A2.08 - Ability to (a) predict the impacts of the following on the TRAVERSING IN-CORE PROBE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Failure to retract to shield: (Not-BWR1) | 2.9 | 91 |
| 202002 Recirculation Flow Control | | | | | | | | | | | X | 2.1.19 - Conduct of Operations: Ability to use plant computers to evaluate system or component status. | 3.8 | 92 |
| 202001 Recirculation | | | | | | | | | | | X | 2.4.31 - Emergency Procedures / Plan: Knowledge of annunciator alarms, indications, or response procedures. | 4.1 | 93 |
| 202001 Recirculation | X | | | | | | | | | | | K1.19 - Knowledge of the physical connections and/or cause- effect relationships between RECIRCULATION SYSTEM and the following: Feedwater Flow | 3.4 | 27 |
| 223001 Primary CTMT and Aux. | | X | | | | | | | | | | K2.09 - Knowledge of electrical power supplies to the following: Drywell cooling fans: Plant-Specific | 2.7 | 28 |
| 230000 RHR/LPCI: Torus/Pool Spray Mode | | | X | | | | | | | | | K3.02 - Knowledge of the effect that a loss or malfunction of the RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE will have on following: Suppression pool temperature | 3.3 | 29 |
| 234000 Fuel Handling Equipment | | | | X | | | | | | | | K4.02 - Knowledge of FUEL HANDLING EQUIPMENT design feature(s) and/or interlocks which provide for the following: Prevention of control rod movement during core alterations | 3.3 | 30 |
| 204000 RWCU | | | | | X | | | | | | | K5.07 - Knowledge of the operational implications of the following concepts as they apply to REACTOR WATER CLEANUP SYSTEM : Conductivity measurement | 2.5 | 31 |
| 271000 Off-gas | | | | | | X | | | | | | K6.06 - Knowledge of the effect that a loss or malfunction of the following will have on the OFFGAS SYSTEM : Oxygen injection system: Plant-Specific | 2.5 | 32 |
| 201002 RMCS | | | | | | | X | | | | | A1.02 - Ability to predict and/or monitor changes in parameters associated with operating the REACTOR MANUAL CONTROL SYSTEM controls including: Control Rod Position | 3.4 | 33 |

Pilgrim NRC
 Written Examination Outline
 Plant Systems – Tier 2 Group 2

| System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A2 | A 3 | A 4 | G | Imp. | Q# |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------|----|
| 245000 Main Turbine Gen. / Aux. | X | | | | | | | | | | | 2.6 | 34 |
| 241000 Reactor/Turbine Pressure Regulator | | | | | | | | | X | | | 3.3 | 35 |
| 272000 Radiation Monitoring | | | | | | | | | | X | | 2.5 | 36 |
| 201001 CRD Hydraulic | | | | | | | | | | | X | 3.8 | 37 |
| 214000 RPIS | | | | | | X | | | | | | 2.7 | 38 |
| K/A Category Totals: | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 0/1 | 1 | 1 | 1/2 | Group Point Total: 12/3 | |

| Facility: | | Pilgrim NRC | | Date: | | | |
|--------------------------------|----------|---|-----|-------|----------|-----|--|
| Category | K/A # | Topic | RO | | SRO-Only | | |
| | | | IR | Q# | IR | Q# | |
| 1. Conduct of Operations | 2.1.5 | <i>Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.</i> | | | 3.9 | 94 | |
| | 2.1.37 | <i>Knowledge of procedures, guidelines, or limitations associated with reactivity management.</i> | | | 4.6 | 98 | |
| | | | | | | | |
| | 2.1.18 | Ability to make accurate, clear and concise logs, records, status boards, and reports. | 3.6 | 66 | | | |
| | 2.1.42 | Knowledge of new and spent fuel movement procedures. | 2.5 | 67 | | | |
| | | | | | | | |
| | | | | | | | |
| | Subtotal | | | 2 | | 2 | |
| 2. Equipment Control | 2.2.6 | <i>Knowledge of the process for making changes to procedures.</i> | | | 3.6 | 95 | |
| | 2.2.25 | <i>Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.</i> | | | 4.2 | 99 | |
| | | | | | | | |
| | 2.2.13 | Knowledge of tagging and clearance procedures. | 4.1 | 68 | | | |
| | 2.2.40 | Ability to apply technical specifications for a system. | 3.4 | 69 | | | |
| | 2.2.2 | Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. | 4.6 | 74 | | | |
| | | | | | | | |
| | Subtotal | | | 3 | | 2 | |
| 3. Radiation Control | 2.3.11 | <i>Ability to control radiation releases.</i> | | | 4.3 | 96 | |
| | | | | | | | |
| | 2.3.5 | Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. | 2.9 | 70 | | | |
| | 2.3.7 | Ability to comply with radiation work permit requirements during normal or abnormal conditions. | 3.5 | 71 | | | |
| | 2.3.4 | Knowledge of radiation exposure limits under normal or emergency conditions. | 3.2 | 75 | | | |
| | | | | | | | |
| | Subtotal | | | 3 | | 1 | |
| 4. Emergency Procedures / Plan | 2.4.29 | <i>Knowledge of the emergency plan.</i> | | | 4.4 | 97 | |
| | 2.4.11 | <i>Knowledge of abnormal condition procedures.</i> | | | 4.2 | 100 | |
| | | | | | | | |
| | 2.4.39 | Knowledge of RO responsibilities in emergency plan implementation. | 3.9 | 72 | | | |
| | 2.4.3 | Ability to identify post-accident instrumentation. | 3.7 | 73 | | | |
| | | | | | | | |
| | Subtotal | | | 2 | | 2 | |
| Tier 3 Point Total | | | | | 10 | 7 | |

| Tier / Group | Randomly Selected K/A | Reason for Rejection |
|--------------|-----------------------|---|
| 1 / 1 | 295024 / EA2.02 | RO # 49, Ability to operate and/or monitor the following as they apply to HIGH DRYWELL PRESSURE: HPCS: Plant-Specific. Pilgrim does not have a HPCS. Randomly selected; EA1.17 Containment spray: Plant-Specific |
| 1 / 1 | 295038 / EA1.02 | RO # 50, Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE: Meteorological instrumentation – no capability to monitor for ROs. Randomly selected; EA1.01 Stack-gas monitoring system: Plant-Specific |
| 1 / 1 | 295003 / AK3.04 | RO # 46, Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: Ground isolation. Could not find a suitable reference to write a discriminating question. Randomly selected AK3.01, Manual and auto bus transfer |
| 1 / 1 | 295019 / AK3.03 | RO # 47, Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : Service air isolations: Plant-Specific. Very low discriminatory value. Randomly selected AK3.02, Standby air compressor operation |
| 1 / 1 | 295025 / EA2.05 | RO # 53, Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: Decay heat generation. Double jeopardy with RO # 40 also a decay heat K/A. Randomly selected EA2.02, Reactor power. |
| 1 / 2 | 295010 / AK1.02 | RO # 59, Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE: Submergence vent control: Mark-III. Pilgrim has a Mark I Containment. Randomly selected, AK1.01, Downcomer submergence: Mark-I&II |
| 1 / 2 | 295035 / EK3.01 | RO # 61, Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE : Blow-out panel operation: Plant-Specific. Pilgrim does not have blow-out panels. Randomly selected EK3.02, Secondary containment ventilation response. |
| 1 / 2 | 295008 / 2.4.41 | RO # 64, Emergency Procedures / Plan: Knowledge of the emergency action level thresholds and classifications. There are no emergency action levels for HIGH water level and this is not an RO task. Randomly selected 2.4.34, Knowledge of RO tasks performed outside the main control room during an emergency and resulting operational effects. |
| 2 / 1 | 262001 / K1.06 | RO #1, Knowledge of the physical connections and/or cause- effect relationships between A.C. ELECTRICAL DISTRIBUTION and the following: Alternate shutdown system: Plant-Specific –does not apply at PNPS. Randomly selected K1.03 - Off-site power sources. |
| 2 / 1 | 218000 / K2.01 | RO #4, Knowledge of electrical power supplies to the following: ADS logic –same concept as Q #26. Randomly selected 217000 K2.02 - Knowledge of electrical power supplies to the following: RCIC initiation signals |
| 2 / 1 | 215005 / K3.02 | RO #6, Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on following: Reactor recirculation system: BWR-5,6 –does not apply at PNPS. Randomly selected K3.07 - Rod block monitor |
| 2 / 1 | 205000 / K4.01 | RO #8, Knowledge of SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) design feature(s) and/or interlocks which provide for the following: High temperature isolation: Plant-Specific – does not apply at PNPS Randomly selected K4.03 – Low reactor water level |
| 2 / 1 | 263000 / K5.01 | RO #9, K5.01 - Knowledge of the operational implications of the following concepts as they apply to D.C. ELECTRICAL DISTRIBUTION : Hydrogen generation during battery charging. – low discriminatory value. Randomly selected K3.03 - Knowledge of the effect that a loss or malfunction of the DC ELECTRICAL DISTRIBUTION SYSTEM will have on following: Systems with D.C. components (i.e. valves, motors, solenoids, etc.) |
| 2 / 1 | 259002 / 2.2.44 | RO #21, Equipment Control: Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives effect plant and system conditions. This ability is tested significantly in operating portion of exam. Randomly selected K6.04 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR WATER LEVEL CONTROL SYSTEM: Reactor feedwater flow input |

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| 2 / 1 | 215003 / 2.4.46 | RO #22, Emergency Procedures / Plan: Ability to verify that the alarms are consistent with the plant conditions. System (NIs) oversampled throughout NRC & Audit exams. Randomly selected 206000, Knowledge of HIGH PRESSURE COOLANT INJECTION SYSTEM design feature(s) and/or interlocks which provide for the following: Automatic transfer of HPCI pump suction: BWR-2,3,4 |
| 2 / 2 | 223001 / K2.10 | RO #28, Knowledge of electrical power supplies to the following: Drywell chillers: Plant-Specific – does not apply at Pilgrim. Selected K2.09 - Knowledge of electrical power supplies to the following: Drywell cooling fans: Plant-Specific |
| 2 / 2 | 233000 / A1.03 | RO #33, Ability to predict and/or monitor changes in parameters associated with operating the FUEL POOL COOLING AND CLEAN-UP controls including: Pool temperature: System controls are primarily in the field. Low operational validity for RO. Randomly selected 201002 A1.02 - Ability to predict and/or monitor changes in parameters associated with operating the REACTOR MANUAL CONTROL SYSTEM controls including: Control Rod Position |
| 2 / 2 | 268000 / A2.01 | RO #34, Ability to (a) predict the impacts of the following on the RADWASTE; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: System Rupture – low operational validity for control room operators, could not write a discriminating question. Randomly selected 245000 K1.06 - Knowledge of the physical connections and/or cause effect relationships between MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS and the following: Component cooling water systems |
| 2 / 2 | 241000 / A3.11 | RO #35, Ability to monitor automatic operations of the REACTOR/TURBINE PRESSURE REGULATING SYSTEM including: Combined intermediate valve operation: Plant-Specific. Does not apply at Pilgrim Randomly selected A3.06 - Reactor/turbine pressure regulating system low pressure reactor scram: Plant-Specific. |
| 3 | 2.2.20 | RO #68, Knowledge of the process for managing troubleshooting activities. This process is controlled and managed by the SROs and has a low importance rating for ROs. Randomly selected 2.2.13 - Knowledge of tagging and clearance procedures. |
| 3 | 2.3.11 | RO #71, Ability to control radiation releases. – Same KA as SRO # 96. Randomly selected 2.3.7 - Ability to comply with radiation work permit requirements during normal or abnormal conditions. |
| 3 | 2.4.37 | RO #72, Knowledge of the lines of authority during implementation of the emergency plan. The RO position deals directly with the CRS or SM. There is no delta in lines of authority during e-plan implementation as far as the RO is concerned. No discriminatory value for an RO. Randomly selected 2.4.39 - Knowledge of RO responsibilities in emergency plan implementation. |
| 1 / 1 | 295018 / 2.4.3 | SRO # 80, Emergency Procedures / Plan: Ability to identify post-accident instrumentation. See PNPS 2.2.120, there are no post accident CCW related instruments. Randomly selected 2.4.30, 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. (Partial or Total Loss of CCW). |
| 1 / 1 | 295006 / 2.1.31 | SRO #81, Conduct of Operations: Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. This concept is tested extensively in the operating exam. Randomly selected 2.1.20 - Ability to interpret and execute procedural steps. (Reactor Scram) |
| 2 / 1 | 263000 / A2.02 | SRO #86, Ability to (a) predict the impacts of the following on the D.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of ventilation during charging –limited procedural guidance–non discriminating. DC oversampled in exam. Randomly selected – 209001 -A2.09 - Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Low suppression pool level |
| 2 / 1 | 215005 / A2.10 | SRO # 87, Ability to (a) predict the impacts of the following on the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions: Changes in void concentration. |

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| | | <p><i>Could not find a suitable reference from which to write a discriminating SRO question.</i></p> <p><i>Randomly selected A2.05, Loss of recirculation flow signal</i></p> |
| 3 | 2.1.14 | <p><i>SRO #94, Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc. – This is a task performed by the RO and is not discriminating for the SRO</i></p> <p><i>Randomly selected 2.1.5, Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.</i></p> |
| 3 | 2.2.19 | <p><i>SRO #95, Knowledge of maintenance work order requirements. Limited reference material for discriminating SRO question.</i></p> <p><i>Randomly selected 2.2.6, Knowledge of the process for making changes to procedures.</i></p> |
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| Facility: PNPS NRC | | Date of Examination: 3/2009 |
|---|---------------|--|
| Examination Level (circle one): RO / SRO | | Operating Test Number: NRC 1 |
| Administrative Topic (see Note) | Type Code* | Describe activity to be performed |
| Conduct of Operations | P, S | Verify AOG Recombiner Operation K/A: 2.1.25 (3.9) Ability to obtain and interpret station reference materials such as graphs / monographs / and tables which contain performance data. |
| Conduct of Operations | N, S | Perform Section of Control Room Readings PNPS 2.1.35 ATT.2 K/A: 2.1.18 (3.6) Ability to make accurate, clear, and concise logs, records, status boards, and reports. |
| Equipment Control | N, S | Recirc Pump Speed & Jet Pump Operability Check Perform PNPS 2.1.15 Daily Log Test 17 & 17A – determine if acceptance criteria is met. K/A: 2.2.12 (3.7) Knowledge of surveillance procedures. |
| Radiation Control | N, S | Determine Offsite Release Rate IAW PNPS 2.1.15 Daily Log Test Att.2 #34. K/A: 2.3.11 (3.8) Ability to control radiation releases. |
| Emergency Plan | N/A | |
| NOTE: All items (5 total are required for SROs). RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required. | | |

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: PNPS NRC | | Date of Examination: 3/2009 |
|---|------------|---|
| Examination Level (circle one): RO / SRO | | Operating Test Number: 2009 NRC |
| Administrative Topic (see Note) | Type Code* | Describe activity to be performed |
| Conduct of Operations | P, S | Verify AOG Recombiner Operation/Direct Field Monitoring K/A: 2.1.25 (4.2) Ability to obtain and interpret station reference materials such as graphs / monographs / and tables which contain performance data. (NRC 2007) |
| Conduct of Operations | N, S | Perform & Assess requirements for a Recirc Pump Start Recirc pump start in progress per 2.2.84, perform Att[5] section B for temperature limits. Report if the pump can be started or, if not, requirements not met and actions needed to place the pump in service K/A: 2.1.7 (4.7) Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. |
| Equipment Control | N, S | Review RBCCW Pump "A" System Quarterly Operability PNPS 8.5.3.1 – Determine pump operability K/A: 2.2.12 (4.1) Knowledge of surveillance procedures. |
| Radiation Control | M, R | Respond to unexpected Accumulated Dose Alarm In accordance with EN-OP-100 and EN-OP-105, enter a Radiologically Controlled Area and respond to Electronic Dosimeter accumulated dose alarm. This JPM may be performed in conjunction with an in-plant JPM. 2.3.12 (3.7) Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. |

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| Emergency Plan | D,S | Emergency classification and notifications Respond to emergency conditions caused by an aircraft crash onsite. Complete required paperwork/notifications within required time limits K/A: 2.4.41 (4.6) Knowledge of the emergency action level thresholds and classifications. |
| 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) | | |

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|--|---|-------------------|----------------------|----------|
| Facility: | PILGRIM | NRC | Date of Examination: | 3 / 2009 |
| Exam Level (circle one): | RO / SRO(I) / SRO (U) | | Operating Test No.: | 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 | |
| S-1 | <p><u>Restore CRD to service following a pump trip</u></p> <p>The reactor is at power. The running CRD pump has just tripped. The operator will start the standby pump IAW 2.4.4, Loss of CRD Pumps. During the restoration of CRD system flow, the in-service CRD flow control valve will fail close. The operator is expected to diagnose the condition, and shift to the standby FCV IAW 2.4.11.1 and restore CRD system flow.</p> <p>K/A: 201001 A2.07 3.2/3.1 (Bank 201-15)</p> | D, A, S | 1 | |
| S-2 | <p><u>Placing the first Feedwater Regulating Valve in service</u></p> <p>The reactor is in a normal startup configuration at ~8% power and a main feed regulating valve needs to be placed in service to continue the startup. When the master controller is placed in auto it will fail high. The operator must recognize problem and take manual control of RPV level.</p> <p>K/A 259002 A4.03 3.8/3.6 (Bank 259-02 modified)</p> | M, A, S | 2 | |
| S-3 | <p><u>Restoration of power to Bus 4160V A-5 from the SUT</u></p> <p>Following an initial loss of Off-Site power both diesel generators have started and re-energized their respective safety buses. The operator will perform a dead bus transfer and transfer the A5 bus back to the startup transformer.</p> <p>K/A 262001 A4.04 3.6/3.7 (Bank 262-10)</p> | D, S | 6 | |
| S-4-U | <p><u>Transfer Pressure Regulation from MPR to EPR with EPR Failure</u></p> <p>With the reactor at full power, MHC pressure regulation is being controlled by the MPR following a failure of the EPR. Following repairs to the EPR, pressure regulation will be restored to the EPR. The operator will energize the EPR and place the EPR in service, when EPR is in service the EPR fails. Operator takes actions in accordance with 2.4.37.</p> <p>K/A 241000 A4.19 3.5/3.4 (Bank 248-05)</p> | D, A, S | 3 | |
| S-5-U | <p><u>Restoration of RHR Loop A from Shutdown Cooling</u></p> <p>The reactor was shutdown four (4) hours ago. 'A' loop of RHR shutdown cooling needs to be re-established following a brief shutdown for testing. When it is placed in service, a RHR leak will develop which should cause an auto PCIS isolation, however, the auto action doesn't work and manual action is required by the operator to isolate the leak.</p> <p>K/A 205000 A4.02 3.6/3.5 (Bank 205-07 modified)</p> | M, A, L, S, EN | 4 | |
| S-6-U | <p><u>Inerting the Containment</u></p> <p>The reactor is at about 5%. The operator will line up the CAC system to inert containment IAW PNPS 2.2.70 Att.8 beginning at step 4.0[12]. A cooler will begin leaking causing an annunciator alarm (C7L-A5,6,7) requiring the operator to isolate the flowpath per Att.13 Step 3.0[2]</p> <p>K/A 223001 A4.10 3.2/3.2 (New JPM uses PNPS 2.2.70 Att.8 & Att.13)</p> | N, A, L, S | 5 | |

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| S-7-U | <u>Recover RBCCW Loop 'B' with an Elevated Drywell Temperature</u> A non-LOCA event occurred that caused a reactor scram. Subsequent power and equipment failures have rendered RBCCW Loop 'B' inoperable, causing drywell temperature to exceed 250°F. Electrical faults have been corrected, and it is desired to restore RBCCW Loop 'B' system flow. PNPS 2.4.42. This JPM was randomly selected from bank and previous 2 NRC exams. K/A 400000 AA4.01 3.1/3.2 (Bank NRC 2007) | P, S | 8 |
| S-8 (RO Only) | <u>APRM 'B' Functional Test</u> The operator will perform the APRM 'B' functional test IAW 8.M.1-3.1 Att.2 Steps [6] thru [17] K/A 215005 A4.03 3.2/3.3 (New JPM - uses 8.M.1-3.1 Att.2) | N, L, S | 7 |
| In-Plant Systems[@] (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U) | | | |
| P-1 | <u>Cross-Tie RBCCW</u> With the plant at full power, a loss of 4160 VAC bus A5 occurred. Procedure 2.4.A.5 directs that RBCCW loops be cross-tied. K/A 295018 AA1.01 3.3/3.4 (Bank JPM 200-26) | D,P,E,R | 8 |
| P-2-U | <u>RCIC Start from Alternate Shutdown Panel</u> The operator will place RCIC in service from the alternate shutdown panels for level control following control room abandonment due to a fire. K/A 295016 AA1.06 4.0/4.1 (Bank JPM 217-06 -Ref 2.4.143, Appendix B) | D, E, R | 2 |
| P-3-U | <u>Local Start and Field Flash of EDG</u> Following a loss of all AC power and loss of DC power to the A EDG, the operator is required to start the "A" DG at the air start solenoids and then flash the field with two 12-volt batteries. K/A 295004 AA1.03 3.4/3.6 (Bank 264-05, Ref. 2.4.16, Attachment 3) | D, E | 6 |
| @ 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 (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineering Safeguards Feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator | | 4-6 / 4-6 / 2-3 ≤ 9 / ≤ 8 / ≤ 4 ≥ 1 / ≥ 1 / ≥ 1 - / - / ≥ 1 (control room system) ≥ 1 / ≥ 1 / ≥ 1 ≥ 2 / ≥ 2 / ≥ 1 ≤ 3 / ≤ 3 / ≤ 2 (randomly selected) ≥ 1 / ≥ 1 / ≥ 1 | |

Scenario Event Description
Pilgrim 2009 NRC Scenario 1

ES-D1

| Facility: | PILGRIM | Scenario No.: | 1 | Op Test No.: | 2009 NRC |
|---------------------|--|-------------------------------|---|--------------|----------|
| Examiners: | _____ | Operators: | SRO - | | |
| | _____ | | RO - | | |
| | _____ | | BOP - | | |
| Initial Conditions: | <ul style="list-style-type: none"> • Reactor Power is 100% • APRM C is bypassed while I & C replaces a power supply. • B RHR Pump will be OOS for maintenance. Currently in day1 of a 7 day LCO • B Feedwater Pump has a bad pump seal and must be secured and isolated. | | | | |
| Turnover: | <ul style="list-style-type: none"> • Reduce Reactor Power IAW 2.1.14 Sections 7.11 & 7.9, continue power reduction with the RPR, then remove the B Feedwater Pump from service | | | | |
| Critical Tasks: | <ol style="list-style-type: none"> 1. Restore power to at least one ECCS bus by manually starting the B DG and/or placing the SBO EDG in service. 2. When RPV level cannot be restored and maintained above (-150 inches), Emergency Depressurization is directed and performed. | | | | |
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| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | | R-RO R-SRO | Power reduction required with RPR due to FW pump issue | | |
| 2 | | N – BOP N - SRO | Secure Feedwater Pump "B" (PNPS 2.2.96) | | |
| 3 | RD07 for in sequence rod | I – RO I- SRO TS- SRO | Rod drifts out of the core (Rod 10-27) AOP-2.4.11, Control Rod Positioning Malfunctions, Att 2 ANN C905L-A3 – Rod Drift TS – 3.3.B.1.C – LCO to fully insert within 3 hours, disarm within 4 hours | | |
| 4 | NM21 – APRM 'E' fails downscale | I – RO I – SRO TS - SRO | APRM 'E' failure Downscale ANN-C905L-D8 – APRM Downscale TS 3.1.1 – action A. place in trip condition within 12 hours | | |

Scenario Event Description
 Pilgrim 2009 NRC Scenario 1

ES-D1

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| 5 | HP01 – HPCI inadvertently starts Once HPCI is secured Add sim booth note to prevent HPCI restart/reset | C-BOP C-SRO TS-SRO | HPCI Spurious Initiation C905R & C1L-F5 Enters AOP 2.4.35 step 4.0 [1] to secure HPCI TSs 3.5.A.3, 3.5.B.1.a, 3.5.C.3, 3.5.C.2 is most limiting shutdown/cooldown within 24 hours |
| 6 | ED27- loss of line 355 DG03B & DG02A (5 minutes after loop) | C - ALL | Loss of all offsite power. Diesel B will not auto start, but can be started manually. Diesel A will tie on initially but will shortly trip and lockout. SBO DG must be started. EOP-1 entry Annunciators: C3R-A8 – Line 355 Undervoltage B6 – ACB 105 trip C6 – ACB 102 Trip AOP-2.4.16 - DISTRIBUTION ALIGNMENT ELECTRICAL SYSTEM MALFUNCTIONS PNPS 2.2.146 |
| 7 | PC01 – 1500 gpm Insert after SBO DG starts OR if SBO DG is not started within 5 minutes of trip of DG 'A' | M – ALL | Recirc leak in Drywell leads to Emergency Depressurization on low RPV level. EOP-1 – Hi Drywell Pressure EOP-3 – Hi Drywell pressure |
| 8 | RHR04 | C – BOP C - SRO | MO-1001-29B LPCI Injection Valve #2 fails to auto open |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |

Pilgrim 2009 NRC Scenario #1

The plant is operating at 100% power, End of Cycle. B RHR Pump will be OOS for maintenance and is under clearance. The crew must reduce power and remove the "B" Feedwater Pump from service due to a leaking pump seal.

When the Feedwater Pump is secured a control rod will begin to drift out. The RO will take action IAW AOP-2.4.11 to insert the rod. TS must be addressed and will require disarming the rod after insertion. APRM 'E' will then fail downscale requiring the SRO to address Technical Specification 3.1.1. The RO will be required to insert a half scram on the affected channel.

Once the APRM actions are addressed, a spurious HPCI injection will occur requiring action by the BOP to secure HPCI. The SRO will address Technical Specifications for the system being inoperable.

A Loss of All Offsite Power will occur. The "B" Diesel will fail to auto start but can be started manually. The "A" Diesel will start and tie to the bus initially but will shortly trip and lockout. The SBO DG must be started to supply the bus (**Critical Task**).

Once conditions stabilize following the reactor scram and restoration of power, a leak will occur in the Recirculation piping leading to increasing drywell pressure. The crew will continue taking actions in EOP-01 and enter EOP-03 due to high drywell pressure and other degrading containment parameters. The crew will place Suppression Pool Cooling and Spray in service as well as Drywell Spray as required by EOPs. Due to the unavailability of HPCI and the severity of the leak RPV level will continue to lower and the crew will take actions to Emergency Depressurize (**Critical Task**) and reflood the RPV with low pressure ECCS systems. Complicating the reflood effort will be the failure of LPCI Injection Valve MO-1001-29B to auto-open.

The scenario may be terminated when level has been restored to the required EOP band and containment parameters are improving.

EAL: Alert – 3.4.1.2 – Drywell Pressure >2.2 psig

Scenario Event Description
Pilgrim 2009 NRC Scenario 2

ES-D1

| Facility: | PILGRIM | Scenario No.: | 2 | Op Test No.: | 2009 NRC |
|---------------------|---|--------------------|--|--------------|----------|
| Examiners: | _____ | Operators: | SRO - | | |
| | _____ | | RO - | | |
| | _____ | | BOP - | | |
| Sim Booth | <ul style="list-style-type: none"> • Initialize to IC21 | | | | |
| Initial Conditions: | <ul style="list-style-type: none"> • Power is ~3.5 % reactor pressure ~ 960 psig • APRM C is bypassed while I & C replaces a power supply. • RHR Pump 'B' OOS for maintenance – Day 1 of a 7 day LCO has been entered | | | | |
| Turnover: | <ul style="list-style-type: none"> • Place RWCU in service. RWCU was previously removed from service due to a filter demin holding pump trip. Filter demins have been backwashed and precoated. PNPS 2.2.83 Section 7.2 is complete through Step [4]. Continue at Step [5]. • After RWCU is in service, continue the startup at PNPS 2.1.1 Step [103] | | | | |
| Critical Tasks: | <ol style="list-style-type: none"> 1. Upon failure of RPS & Mode Switch, Actuates ARI to insert control rods 2. Emergency depressurizes when Torus Bottom Pressure cannot be maintained below PSP. 3. Performs Alternate RPV depressurization when 4 SRVs do not open in the control room. | | | | |
| Event Log | | | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | | N – BOP N - SRO | Place RWCU in service PNPS 2.2.83, Section 7.2 | | |
| 2 | | R – RO R - SRO | Continue withdrawing control rods to raise power | | |
| 3 | RD09 – Control Rod 46-15 stuck | C – RO C - SRO | Stuck Rod - 46-15 AOP 2.4.11.1, Att.1 – CRD System Malfunctions Unsticks after drive pressure is raised. | | |
| 4 | RM-02 - RM- 1705-3A Detector Fails | TS-SRO | Air Ejector Off-Gas Process rad monitor RM-1705-3A Fails ANN 600R-C4 TS- ODCM 3.1-2 Action 4 | | |

Scenario Event Description
Pilgrim 2009 NRC Scenario 2

ES-D1

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| 5 | PC-2 - RWCU system leak PC-15 - MO- 1201-5 auto isolation failure | C - BOP C - SRO | RWCU isolates due to leak, outboard isolation valve fails to auto close and must be manually closed from control room. ANN C904RC-B1 - Inlet Flow Hi ANN C904RC-A1 - RWCU Isolated EOP-4 entry AOP 2.4.27 - RWCU Malfunctions |
| 6 | ED19- Y-3 Failure Insert next event after TS and secondary containment are addressed. | I - BOP I - SRO TS - SRO | Loss of power to Y-3 AOP 5.3.18 - Loss of 120VAC Y-3 ANN C905L-C5 - Division 1 Panel Trouble TS 3.5.A - Cold Shutdown within 24 hours 3.9.A, 3.9.B |
| 7 | RP13,14 - RPS A & B Scram Failure Auto & Complete Insert next event once EOP-2 is exited | C - RO C - SRO | A loss of Turbine Lube oil will occur requiring a reactor scram. When the reactor is scrammed a failure of RPS PB & Mode Switch occurs. ARI functions. EOP-1 (in-out-in), EOP-2 (in-out) |
| 8 | MS17 - Safety Valve 4A Leak - 15 minute ramp to max severity PC21 - DW Downcomer Leak - Initially at demanded value of 7.0 and ramped to max severity over 15 minutes | M - All | Leaking Safety Valve, Downcomer break, Containment parameters degrade, ED required. EOP-3 entries |
| 9 | MS15 - SRV 3C fails to open | C - BOP C - SRO | ALL SRVs do not open during ED, Alternate Depressurization Required |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |

Pilgrim 2009 NRC Scenario #2

The plant is at 3.5% power, reactor pressure is about 960 psig and a startup is in progress IAW Startup Procedure 2.1.1. The BOP will place RWCU in service IAW plant operating procedures.

Once the startup continues, as the RO is withdrawing control rods, CR 46-15 will become stuck. The RO will enter the AOP and take actions to unstick the control rod.

Once the startup continues, an Air Ejector Off-Gas Process rad monitor will fail requiring the SRO to enter TS-ODCM 3.1.2 Action 4. Once TS are addressed, a RWCU leak will occur and the system will not fully isolate. The BOP will take action to isolate the system per the AOP. The SRO will enter EOP-04.

Then, a loss of 120 VAC Y-3 will occur. The crew will enter the AOP and take actions which include initiating a Reactor Building Isolation Signal and placing Standby Gas Treatment in service. Additionally, the SRO will enter Technical Specifications and determine that TS 3.5.A, B & F apply. The most limiting TS LCO is being in Cold Shutdown within 24 hours.

After the loss of Y-3 has been addressed, a loss of turbine lube oil due to a trip of the aux oil pump will cause the Turbine Bypass Valves to close. When the reactor is scrammed, a failure of RPS and the mode switch will occur. The control rods will fully insert when the RO manually initiates ARI (**Critical Task**). The SRO will enter EOP-01 due to the scram.

Following the scram, a leaking SRV and downcomer break will result in a loss of pressure suppression. Containment pressure will rise resulting in EOP-03 entry. As torus bottom pressure rises drywell sprays will be required. Eventually containment pressure will exceed the pressure suppression pressure of EOP-03 requiring an emergency depressurization. The crew is expected to emergency depressurize (ED) the reactor IAW EOP-17 (**Critical Task**). All SRVs will not open during the ED requiring Alternate Depressurization methods (**Critical Task**).

The scenario may be terminated when the RPV is depressurized and containment parameters are improving.

EAL: SAE – 3.4.1.3 – Torus Bottom Pressure cannot be maintained below PSP.

Scenario Event Description
NRC Scenario 3

ES-D1

| Facility: | PILGRIM NRC | Scenario No.: | 3 | Op Test No.: | 2009 NRC |
|---------------------|--|-----------------------------|--|--------------|----------|
| Examiners: | _____ | Operators: | _____ | _____ | _____ |
| Initial setup: | B,C,D,E SSW pumps in service | | | | |
| Initial Conditions: | <ul style="list-style-type: none"> • Reactor Power is 100% • APRM C is bypassed while I & C replaces a power supply. • RHR Pump on the B be OOS for maintenance | | | | |
| Turnover: | <ul style="list-style-type: none"> • Daily Screen Wash is in progress • Maintenance has requested that "B" Salt Service Water Pump be tagged out. Start "A" SSW Pump and Place "B" SSW pump in PTL. | | | | |
| Critical Tasks: | <ol style="list-style-type: none"> 1. Terminate and prevent injection except from SBLC and CRD 2. Inject SBLC before Torus Water temperatures reaches the BIIT 3. Insert Control Rods and achieve shutdown under all conditions | | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | | N – BOP N - SRO | Shift Salt Service Water Pumps Place "B" SSW pump in PTL and Start "A" SSW pump IAW PNPS 2.2.32 Section 7.2 | | |
| 2 | RX05 | C – RO C - SRO | CRD Pump trip ANN 905R - A5 – CRD Pump A Trip ANN 905R - G5 – Charging Water Pressure Low AOP 2.4.4 – Loss of CRD pumps | | |
| 3 | Overrides for controllers – | I – BOP R- RO I – SRO | Loss of FW heating caused by failure of the Feedwater Heater Level Controller Power reduction required (Recirc then RPR array) Recirc to 43 mlbm/hr then RPR array Ann C1C-A3 – 1 st Point Heater Level Hi AOP 2.4.150 – Loss of Feedwater Heating | | |
| 4 | CW01- 'A' SSW pump trip | TS-SRO | "A" Salt Service Water Pump Trip –add cue that screens have stopped turning, screen wash pumps have tripped on low pressure TS 3.5.B.4 – Restore SSW to operable status within 72 hours | | |

Scenario Event Description
NRC Scenario 3

ES-D1

| | | | |
|---|--|--------------------|---|
| 5 | <p>RP09A – RPS MTR Gen 'A' Trip</p> <p>RM02 - Refuel Floor Rad Monitor RM-1705- 8A fails downscale</p> | C – ALL TS-SRO | <p>Failure of RPS MG Set "A" requires transfer to alternate power. Ann 905R-C1 – RPS MG Set A Trip 2.2.79 – RPS Section 7.1.5</p> <p>NEED CUE for field operator to transfer RPS A to alternate power</p> <p>Refuel Floor Rad Monitor RM-1705-8A fails requiring entry to TS 3.2.D.1 – no recently irradiated fuel movement unless SBGT is in service</p> |
| 6 | <p>MS-14 – SRV 3B Fails open</p> <p>LHWT (East & West SDIVs 99% full)</p> | M-All | <p>SRV fails open, Scram required, High Powered ATWS ANN 903L-B2, A2</p> <p>AOP 2.4.29 – Stuck Open SRV EOP1, EOP 2</p> |
| 7 | LP01 A & B | C – BOP C - SRO | SBLC fails to inject initially |
| | | | |
| | | | |
| <p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p> | | | |

Pilgrim 2009 NRC Scenario #3

The plant is at 100% power, Maintenance has requested a clearance on Salt Service Water (SSW) Pump "B". The crew must start SSW Pump "A" and secure and isolate "B" SSW Pump.

Once those actions are completed, a trip will occur on the operating CRD pump and the crew will respond per the AOP. The RO will start the standby pump. Then, a failure of a Feedwater Heater level controller will lead to a loss of Feedwater Heating. The crew will enter the AOP and the RO will perform a power reduction as required.

After the power reduction and plant conditions are stable, SSW pump 'A' will trip and the SRO will enter Technical Specification LCO 3.5.B.4 – restore SW to operable status within 72 hours.

The crew will then respond to a failure of the "A" RPS MG set requiring a transfer to alternate power. When that occurs the Refuel Floor Rad Monitor RM-1705-8A fails requiring the SRO to enter Technical Specification LCO 3.2.D.1.

Once TS have been addressed, an SRV fails open and will not initially close requiring a reactor scram. When the manual scram is inserted numerous control rods will fail to insert and EOP-01 then EOP-02 must be entered for the ATWS. The crew will be required to stop and prevent inject injection (except for CRD and SLC) to lower RPV water level (**Critical Task**) and bypass the MSIV isolation to preserve the Main Condenser as a heat sink. Actions will also be required to respond to an SBLC injection failure (**Critical Task**) and to insert control rods after level is lowered to maintain the reactor shutdown under all conditions (**Critical Task**).

The scenario can be terminated once the reactor is shutdown under all conditions.

EAL: SAE -2.3.1.3 – SBLC Injection

Scenario Event Description
 Pilgrim 2009 NRC Scenario 4

ES-D1

| Facility: | PILGRIM | Scenario No.: | 4 | Op Test No.: | 2009 NRC | | | | | | | | | | | | | | | | |
|--|--|--------------------------------|--|--------------|--|-----------|-----------------|-------------|-------------------|---|--|--------------------------------|--|---|--|-------------------|---|---|--|-------------------|--|
| Examiners: | _____ | Operators: | SRO - | | | | | | | | | | | | | | | | | | |
| | _____ | | RO - | | | | | | | | | | | | | | | | | | |
| | _____ | | BOP - | | | | | | | | | | | | | | | | | | |
| Initial Conditions: | | | | | | | | | | | | | | | | | | | | | |
| | | | | | <ul style="list-style-type: none"> • Power is 100 % | | | | | | | | | | | | | | | | |
| | | | | | <ul style="list-style-type: none"> • APRM C is bypassed while I & C replaces a power supply. | | | | | | | | | | | | | | | | |
| | | | | | <ul style="list-style-type: none"> • RHR Pump 'B' OOS for maintenance – Day 1 of a 7 day LCO has been entered | | | | | | | | | | | | | | | | |
| Turnover: | | | | | | | | | | | | | | | | | | | | | |
| | | | | | <ul style="list-style-type: none"> • A control rod pattern adjustment is scheduled; the crew is directed to lower power to 90 %. | | | | | | | | | | | | | | | | |
| | | | | | <ul style="list-style-type: none"> • Place SBTG "A" in service for I&C to check vibrations | | | | | | | | | | | | | | | | |
| Critical Task: | | | | | | | | | | | | | | | | | | | | | |
| | | | | | <ol style="list-style-type: none"> 1. Scram the reactor before one area exceeds max safe temperature 2. Emergency Depressurize when two areas exceed max safe temp | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Event No.</th> <th style="width: 15%;">Malfunction No.</th> <th style="width: 15%;">Event Type*</th> <th style="width: 60%;">Event Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Override AO5041B OPEN after it is opened for evolution</td> <td>N – BOP N – SRO TS - SRO</td> <td>Place "A" SBTG in service for vibration checks IAW 2.2.70 TS 3.7.A.2.B – Deactivate in isolated condition – Torus Vent AO5041B fails in open position.</td> </tr> <tr> <td style="text-align: center;">2</td> <td></td> <td>R – RO R - SRO</td> <td>Lower power to 90% using Recirculation Flow</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Insert Override when operator is adjusting Recirc Pump A Speed - Recirc Pump 'A' controller fails Downscale</td> <td>I – RO I - SRO</td> <td>Recirc Flow Controller 'A' failure fails downscale. ANN 904RC-C7 MG 'A' Deviation High AOP 2.4.20, 2.4.165 TS 3.6.F.1. - 24 hours to have loop flows within 10%</td> </tr> </tbody> </table> | | | | | | Event No. | Malfunction No. | Event Type* | Event Description | 1 | Override AO5041B OPEN after it is opened for evolution | N – BOP N – SRO TS - SRO | Place "A" SBTG in service for vibration checks IAW 2.2.70 TS 3.7.A.2.B – Deactivate in isolated condition – Torus Vent AO5041B fails in open position. | 2 | | R – RO R - SRO | Lower power to 90% using Recirculation Flow | 3 | Insert Override when operator is adjusting Recirc Pump A Speed - Recirc Pump 'A' controller fails Downscale | I – RO I - SRO | Recirc Flow Controller 'A' failure fails downscale. ANN 904RC-C7 MG 'A' Deviation High AOP 2.4.20, 2.4.165 TS 3.6.F.1. - 24 hours to have loop flows within 10% |
| Event No. | Malfunction No. | Event Type* | Event Description | | | | | | | | | | | | | | | | | | |
| 1 | Override AO5041B OPEN after it is opened for evolution | N – BOP N – SRO TS - SRO | Place "A" SBTG in service for vibration checks IAW 2.2.70 TS 3.7.A.2.B – Deactivate in isolated condition – Torus Vent AO5041B fails in open position. | | | | | | | | | | | | | | | | | | |
| 2 | | R – RO R - SRO | Lower power to 90% using Recirculation Flow | | | | | | | | | | | | | | | | | | |
| 3 | Insert Override when operator is adjusting Recirc Pump A Speed - Recirc Pump 'A' controller fails Downscale | I – RO I - SRO | Recirc Flow Controller 'A' failure fails downscale. ANN 904RC-C7 MG 'A' Deviation High AOP 2.4.20, 2.4.165 TS 3.6.F.1. - 24 hours to have loop flows within 10% | | | | | | | | | | | | | | | | | | |

Scenario Event Description
Pilgrim 2009 NRC Scenario 4

ES-D1

| | | | |
|--|---|--------------------------------|---|
| 4 | Manual Stop and Hold RCIC initiation PB | C – BOP C – SRO TS - SRO | Spurious RCIC injection (signal does not clear) – operators trip RCIC. AOP 2.4.35, 2.2.22 Section 7.2 TS 3.5.D.2 – 14 days |
| 5 | RR11 – Recirc Pump 'A' Hi Vibs | C - RO C -SRO | Recirc pump 'A' High Vibration. Requires removing the 'A' Recirculation Pump from service. Trips Pump, Shuts discharge valve ANN 904RC-B6 – Pump Motor A Vibration High AOP 2.4.17 Section 4.1 (End up in Exclusion/Unanalyzed Region, Insert CRs per RPR array). TS 3.6.F.1 |
| 6 | CW05-RBCCW Pump trip RR13-Recirc Pump 'B' seal failure | C - BOP C – SRO | RBCCW Pump Trips, Failure of Pump in auto to start. Recirc Pump 'B' first seal failure. RWCU may isolate due to RBCCW loss. AOP 2.4.42 – Loss of RBCCW AOP 2.4.22 – Failure of a Recirc Pump inboard seal ANN 904RC-G6, 904R-G5 –Seal Cooling Flow Lo (A & B) ANN 904R-D5 –Pump B Seal staging Flow Hi ANN C1R-A5 – Low Discharge pressure |
| 7 | RC06 – initial ramp 15 in 20 minutes <u>OR</u> Overrides for individual area temperatures Insert the next malfunction after scram and initial conditions stabilize | M - All | RCIC steam line break in the Secondary Containment, RCIC Steam line isolation valves fail to close which results in the need to scram (1 area) and eventually 2 areas exceeding max safe requiring a E-Depress. EOP-04 for leak and EOP-01 for scram ANN 904L-A6 – Steam leakage area temp high ANN 903-A1- CRD/Drywell Misc Temp Hi |
| 8 | TFU-114 – Main Turbine Auto trip Failure | C – BOP C - SRO | Failure of the Main Turbine to auto trip on reactor scram. |
| | | | |
| | | | |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |

Pilgrim 2009 NRC Scenario #4

The plant is at 100% power. The crew will place SBTG "A" in service for I&C vibration checks. As the lineup for the evolution is being secured, a primary containment isolation damper will fail to close requiring a Technical Specification (TS) entry by the SRO, TS LCO 3.7.A.2.B.

Once TS are addressed reactor power will be lowered to 90%. As power is being increased, Recirc Flow Controller 'A' will fail low requiring a scoop tube lockup (AOP) by the RO. After plant conditions have stabilized, a spurious RCIC initiation will occur, RCIC must be tripped by the BOP operator. The RCIC initiation will not reset (AOP). A TS entry will be required by the SRO, TS 3.5.D.2 – 14 day LCO

'A' Recirc Pump will then experience high vibrations requiring removal from service. Power to Flow will end up in the exclusion area and control rods must be inserted by the RO. The SRO must address TS for Recirc Loop Flow Mismatch, TS 3.6.F.1. Once power/flow and TS are addressed a RBCCW pump will trip and the pump in auto will fail to start requiring manual action (AOP) by the BOP operator. Additionally, the RO must diagnose one seal failure on the "B" Recirc Pump requiring entry to an AOP.

Then, a RCIC steam line break in the Secondary Containment will occur. The RCIC Steam line isolation valves fail to close resulting in increasing area temperatures and an EOP-04 entry. A reactor scram and entry to EOP-01 will be required before one area reaches its maximum safe operating value (**Critical Task**). Eventually 2 areas will exceed safe operating values and an Emergency Depressurization will be required (**Critical Task**). The crew may anticipate ED and use bypass valves to reduce reactor pressure.

The scenario may be terminated when the ED is complete.

EAL: SAE – 6.2.2.3 – steam line break without isolation AND/OR 4.2.1.3 – 2 areas above max safe