### Form 7.1-ABWR Written Examination Outline for Senior Operators Limited to Fuel Handling for Advanced Boiling-Water Reactors

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| **ES-7.1 Form 7.1-ABWR**  **Written Examination Outline for Senior Operators Limited to Fuel Handling for Advanced Boiling-Water Reactors**  **Emergency and Abnormal Plant Evolutions—Tier 1** | | | | | | | | | | |
| E/APE #/Name/Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | IR | # |
| APE2003 Partial or Complete Loss of AC / 6 |  |  |  |  |  |  |  |  |  |
| APE2004 Partial or Total Loss of DC Power / 6 |  |  |  |  |  |  |  |  |  |
| APE2006 Reactor Scram |  |  |  |  |  |  |  |  |  |
| APE2008 High Reactor Water Level |  |  |  |  |  |  |  |  |  |
| APE2013 Inadvertent Reactivity Addition / 1 |  |  |  |  |  |  |  |  |  |
| APE2009 Low Reactor Water Level / 2 |  |  |  |  |  |  |  |  |  |
| APE2016High Offsite Release Rate / 9 |  |  |  |  |  |  |  |  |  |
| APE2017 Partial or Total Loss of CCW Reactor Building Cooling Water / 8 |  |  |  |  |  |  |  |  |  |
| APE2018 Partial or Total Loss of Instrument Air / 8 |  |  |  |  |  |  |  |  |  |
| APE2019 Inadvertent Containment Isolation / 5 & 7 |  |  |  |  |  |  |  |  |  |
| APE2020 Loss of Shutdown Cooling / 4 |  |  |  |  |  |  |  |  |  |
| APE2022 Refueling Accidents / 8 |  |  |  |  |  |  |  |  |  |
| APE2023 Plant Fire On Site / 8 |  |  |  |  |  |  |  |  |  |
| EPE1006 Low Suppression Pool Water Level / 5 |  |  |  |  |  |  |  |  |  |
| EPE1009 High Secondary Containment Area Radiation Levels / 9 |  |  |  |  |  |  |  |  |  |
| EPE1010 Reactor Building HVAC Exhaust High Radiation / 9 |  |  |  |  |  |  |  |  |  |
| EPE1011 Secondary Containment High Differential Pressure / 5 |  |  |  |  |  |  |  |  |  |
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| K/A Category Totals: |  |  |  |  |  |  | Tier Point Total: | | 10 |

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| **ES-7.1 Form 7.1-ABWR**  **Written Examination Outline for Senior Operators Limited to Fuel Handling for Advanced Boiling-Water Reactors**  **Plant Systems—Tier 2** | | | | | | | | | | | | | | | |
| System #/Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | IR | # |
| SF2RHRLPFL RHR: Low‑Pressure Flooder Mode |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF4RHRSDC RHR: Shutdown Cooling Mode |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF5LDIS Leak Detection and Isolation System |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF6EPDS AC Electrical Distribution |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF6VAC Vital AC Power Supply |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF6DC Direct Current Power Supply |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF6DGCTG Emergency Generators (Diesel/CTG) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF7SRNM Startup Range Neutron Monitor |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF7ELCS ESF Logic and Control System |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF7APRM Average Power Range Monitor/Local Power Range Monitor |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF9SGTS Standby Gas Treatment System |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF8IAS Instrument Air |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF8RBCW Reactor Building Cooling Water |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF8RSW Reactor Service Water |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF2RWCU Reactor Water Cleanup |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF5SEC Secondary Containment |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF5PCS Primary Containment and Auxiliary |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF5RPV & SF9RPV Reactor Vessel Internals |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF6I&C Instrumentation and Control Power Supply |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF9HVAC Plant Ventilation Systems |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF7RMS & SF9RMS Radiation Monitoring |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF8FPS Fire Protection |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF8FH Fuel Handling |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| **ES-7.1 Form 7.1-ABWR**  **Written Examination Outline for Senior Operators Limited to Fuel Handling for Advanced Boiling-Water Reactors**  **Plant Systems—Tier 2** | | | | | | | | | | | | | | | |
| System#/Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | IR | # |
| SF9FPC Fuel Pool Cooling/Cleanup |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF9RD Radwaste |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF1 Standby Liquid Control |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF1 Control Rod Drive |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF1 Fine Motion Control Rod Drive Mechanism |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF1 Rod Control and Information System |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SF7 Automated Traversing In‑Core Probe |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| K/A Category Totals: |  |  |  |  |  |  |  |  |  |  |  | Tier Point Total: | | 20 |

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| Facility: Date of Exam: | | | | | | | | | | | | | | | |
| Tier | K/A Category Points | | | | | | | | | | | | | | |
| K1 | K2 | K3 | K4 | K5 | | K6 | | A1 | A2 | | A3 | A4 | G\* | Total |
| 1. Emergency and Abnormal Plant Evolutions |  |  |  |  |  | |  | |  |  | |  |  |  | 10 |
| 2. Plant  Systems |  |  |  |  |  | |  | |  |  | |  |  |  | 20 |
| 3. Generic Knowledge and Abilities Categories | 1 | | 2 | | | 3 | | 4 | | | Fundamentals | | | | 10 |
|  | |  | | |  | |  | | |  | | | |
| Notes:   1. Ensure that at least one topic from every knowledge and ability (K/A) category is sampled within each tier. 2. The point total for each tier in the proposed outline must match that specified in the table. The final point total for each tier may deviate by ±1 from that specified in the table. The final exam must total 40 points. 3. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system (except fuel handling equipment) or evolution (except refueling accident). 4. The shaded areas are not applicable to the category/tier. 5. Select the generic (G\*) K/As in Tiers 1 and 2 from Section 2 of the applicable K/A catalog, but the topics must be relevant to the applicable evolution/system. 6. Systems/evolutions within each tier are identified on the associated outline. Enter the K/A numbers, a brief description of each topic, importance ratings (IRs) for the senior reactor operator license level, and the point totals (#) for each system and category. Enter the tier totals for each category in the table above. 7. For Tier 3, select topics from Sections 2, 5, and 6 of the applicable K/A catalog. A minimum of four Tier 3 questions shall include basic reactor theory, component, and thermodynamic topics from Sections 5 and 6 of the applicable K/A catalog that apply to fuel handling operations (place these items in the “Fundamental” category). Enter the K/A numbers, descriptions, IRs, and point totals (#) on Form 7.1‑GEN. 8. Eliminate inapplicable or inappropriate K/A statements by (1) discarding randomly selected K/As during the outline development process or (2) prescreening the entire K/A catalog to eliminate inappropriate K/As before beginning the random selection process. Use the facility licensee’s job task analysis for fuel handlers as the basis for eliminating or adding testable topics. | | | | | | | | | | | | | | | |