# 2009 BRAIDWOOD STATION

# INITIAL EXAMINATION

# ADMINISTRATIVE FILES

| ES-201 | Examination Preparation Checklist | Form ES-201-1 |
|---|---|---|

Facility: Braidwood Date of Examination: Oct 2009

Developed by: Written - Facility ☐ NRC ☐ // Operating - Facility ☐ NRC ☐

| Target Date* | Task Description (Reference) | Chief Examiner's Initials |
|---|---|---|
| -180 | 1. Examination administration date confirmed (C.1.a; C.2.a and b) | BP |
| -120 | 2. NRC examiners and facility contact assigned (C.1.d; C.2.e) | BP |
| -120 | 3. Facility contact briefed on security and other requirements (C.2.c) | BP |
| -120 | 4. Corporate notification letter sent (C.2.d) | BP |
| [-90] | [5. Reference material due (C.1.e; C.3.c; Attachment 3)] | NA |
| {-75} | 6. Integrated examination outline(s) due, including Forms ES-201-2, ES-201-3, ES-301-1, ES-301-2, ES-301-5, ES-D-1's, ES-401-1/2, ES-401-3, and ES-401-4, as applicable (C.1.e and f; C.3.d) | BP |
| {-70} | {7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)} | BP |
| {-45} | 8. Proposed examinations (including written, walk-through JPMs, and scenarios, as applicable), supporting documentation (including Forms ES-301-3, ES-301-4, ES-301-5, ES-301-6, and ES-401-6, and any Form ES-201-3 updates), and reference materials due (C.1.e, f, g and h; C.3.d) | BP |
| -30 | 9. Preliminary license applications (NRC Form 398's) due (C.1.l; C.2.g; ES-202) | BP |
| -14 | 10. Final license applications due and Form ES-201-4 prepared (C.1.l; C.2.i; ES-202) | BP |
| -14 | 11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f) | BP |
| -14 | 12. Examinations reviewed with facility licensee (C.1.j; C.2.f and h; C.3.g) | BP |
| -7 | 13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h) | BP |
| -7 | 14. Final applications reviewed; 1 or 2 (if >10) applications audited to confirm qualifications / eligibility; and examination approval and waiver letters sent (C.2.i; Attachment 5; ES-202, C.2.e; ES-204) | BP |
| -7 | 15. Proctoring/written exam administration guidelines reviewed with facility licensee (C.3.k) | BP |
| -7 | 16. Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i) | BP |

* Target dates are generally based on facility-prepared examinations and are keyed to the examination date identified in the corporate notification letter. They are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee.
[Applies only] {Does not apply} to examinations prepared by the NRC.

## 1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of 10/5/09 - 10/19/09 as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC chief examiner any indications or suggestions that examination security may have been compromised.

## 2. Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of 10/5/09 - 10/19/09 from the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

| | PRINTED NAME | JOB TITLE / RESPONSIBILITY | SIGNATURE (1) | DATE | SIGNATURE (2) | DATE | NOTE |
|---|---|---|---|---|---|---|---|
| 1. | BRIAN KEMPEN | EXAM AUTHOR | | 3/16/09 | | 10/19/09 | |
| 2. | DAN BURTON | LORT LEAD | | 3-16-09 | | 10-19-09 | |
| 3. | STEVE RENTZ | LORT INSTRUCTOR | | 3-17-09 | | 11-2-09 | |
| 4. | SCOTT DEPREST | OTRS | | 3/16/09 | | 10/19/09 | |
| 5. | ROB CAMERON | LORT INSTRUCTOR | | 3/26/09 | | 11/2/09 | |
| 6. | GREGORY BARKER | LORT INSTRUCTOR | | 4/23/09 | | 11-2-09 | |
| 7. | George Poka | LORT Instructor | | 4/24/09 | | 10/22/09 | |
| 8. | D. Ackerman | WEC/FacRep | | 4 30 09 | | 12-1-09 | |
| 9. | J Smith | SRO | | 5-26-09 | | 11-17-09 | |
| 10. | Jim Tapak | IT/HARDWARE SUPPORT | | 6-17-09 | | 10-20-09 | |
| 11. | Rick Ferrara | IT/Computer Support | Rick Ferrara | 6/22/09 | Rick Ferrara | 10/20/09 | |
| 12. | Boris Kreyman | ITSA, Sim. S/W Support | | 6/24/09 | | 10/22/09 | |
| 13. | Ryan Witczak | SRO / Exam Validator | | 7-8-9 | | 11/17/09 | |
| 14. | Greg Harnois | RO / Exam Validation | | 7-16-9 | | 12/2/09 | |
| 15. | David Mills | SRO / Exam Validator | | 7/27/2009 | | 11/10/2009 | |

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| | PRINTED NAME | JOB TITLE / RESPONSIBILITY | SIGNATURE (1) | DATE | SIGNATURE (2) | DATE NOTE |
|---|---|---|---|---|---|---|
| 1. | MIKE THUEMLER | SR. OPS PROCEDURE WRITER | | 7-27-09 | | 10-22-09 |
| 2. | Norbert Pemper | NSO Validator | | 7/27/09 | | 12/4/09 |
| 3. | DALE RAPP | SRO/EXAM VALIDATOR | | 8/7/09 | | 10-22-09 |
| 4. | CHRIS ABBOTT | SRO/EXAM VALIDATOR | | 8/7/9 | | 11/2/09 |
| 5. | Dale Burchfield | NSO Validation | | 8/12/09 | | 10/22/09 |
| 6. | Russell Pyburn | OPS (LORT) Instructor | | 8/18/09 | | 10/2/09 |
| 7. | Steven French | NSO validation | | 9.14.09 | | 12.1.09 |
| 8. | Phillip J. Rausch | SRO Validator | | 9-14-09 | | 10/22/09 |
| 9. | Brian Bergmann | SRO Validator | | 9-15-9 | | 10-22-09 |
| 10. | Scott Kyrouac | NSO validator | | 9-15-2009 | | 12-01-09 |
| 11. | Charles Gerber | NSO validator | | 9/15/09 | | 11/10/09 |
| 12. | CHARLES WINEY | SRO VALIDATOR | | 9/14/09 | | 11/11/09 |
| 13. | DARREN STILES | ILT GROUP LEAD | | 10/5/09 | | 10/5/09 |
| 14. | Jeffrey Burkett | ILT Instructor | | 10/5/09 | | 11/2/09 |
| 15. | Paul DiGiovanna | Ops Trng Mgr | | 10/5/09 | | 11/2/09 |

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| | PRINTED NAME | JOB TITLE / RESPONSIBILITY | SIGNATURE (1) | DATE | SIGNATURE (2) | DATE | NOTE |
|---|---|---|---|---|---|---|---|
| 1. | Ken Norris | Doctor-Written | | 10/5/09 | | 10/19/09 | |
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| 3. | STEVE RENTZ | LORT INSTRUCTOR | | 3-17-09 | | | |
| 4. | SCOTT DEPRIEST | OTPS | | 3/19/09 | | | |
| 5. | RUBE CAMERON | LORT INSTRUCTOR | | 3/20/09 | | | |
| 6. | GREGORY BARKER | LORT INSTRUCTOR | | 4/23/09 | | | |
| 7. | George Picha | LORT Instructor | | 11/24/09 | | | |
| 8. | D. ACKERMAN | WEC/Fac Rep | | 4/30/09 | | | |
| 9. | J Smith | SRO | | 5-26-09 | | | |
| 10. | Jim TAPPA | IT/HARDWARE SUPPORT | | 6-12-09 | | | |
| 11. | Rick Ferrara | IT/ Computer support | Rick Ferrara | 6/22/09 | | | |
| 12. | | | | | | | |
| 13. | | | | | | | |
| 14. | | | | | | | |
| 15. | | | | | | | |

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| 5. | ROB CAMERON | LORT INSTRUCTOR | | 3/26/09 | | | |
| 6. | GREGORY BARKER | LORT INSTRUCTOR | | 4/23/09 | | | |
| 7. | George Peka | LORT Instructor | | 4/24/09 | | | |
| 8. | D. McKernon | WEC/FacRep | | 4 30 09 | | | |
| 9. | J Smith | SRO | | 5-26-09 | | | |
| 10. | TARBOX | IT/HARDWARE SUPPORT | | 6-17-09 | | | |
| 11. | Rick Ferrara | IT/Computer Support | Rick Ferrara | 6/22/09 | | | |
| 12. | Boris Kreyman | ITSA, Sim. S/W Support | | 6/24/09 | | | |
| 13. | Ryan Witcofski | SRO / Exam Validator | | 7-8-09 | | | |
| 14. | Greg Harmon | RO / Exam Validation | | 7-16-9 | | | |
| 15. | David Mills | SRO / Exam Validator | | 7/27/2009 | | | |

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|---|---|---|---|---|---|---|---|
| 1. | MIKE THOMAS | SR. OPS PROCEDURE WRITER | | 7-27-09 | | | |
| 2. | Norbert Pemper | NSO Validation | | 7/27/09 | | | |
| 3. | DALE RAPP | SRO/EXAM VALIDATOR | | 8/7/09 | | | |
| 4. | CHRIS ABBOTT | SRO/EXAM VALIDATION | | 8/7/09 | | | |
| 5. | Dale Burchfield | NSO Validation | | 8/13/09 | | | |
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NOTES:

| Tier / Group | Randomly Selected K/A | Reason for Rejection |
|---|---|---|
| 2/1 (Q. #4) | 000006K3.03 | Unable to create RO level question that properly discriminates. Replaced with systematically selected K/A 000006K3.02 in same system and category to keep outline balanced. Updated ES-401-2. |
| 2/1 (Q. #25) | 0760002.4.8 | System that was randomly selected for K/A topic (Service Water) does not have any OA procedure use in conjunction with EOPs at Braidwood. Replaced with systematically selected K/A 0620002.4.8 using same K/A topic and new system (AC Elec. Dist.) that does have OA procedure use in conjunction with EOPs. Additionally, Service Water was randomly sampled twice in Tier 2 Group 1 and AC Elec. Dist. only once. Therefore, systematic selection of AC Elec. Dist. system keeps outline balanced. Updated ES-401-2. |
| 2/2 (Q. #38) | 0790002.4.20 | System that was randomly selected for K/A topic (Station Air) does not have any EOP warnings, cautions or notes at Braidwood. Replaced with systematically selected K/A 0350002.4.20 using same K/A topic and new system (Steam Generator) that does have EOP note. Additionally, Steam Generator system was not randomly sampled in Tier 2 Group 2. Therefore, systematic selection of Steam Generator system keeps outline balanced. Updated ES-401-2. |
| 1/1 (Q. #42) | 000011EA2.06 | Randomly selected K/A subject matter is same as question #12 on this exam. Both are checking proper opertion of RCFC fans following an SI. Replaced with systematically selected K/A 000011A2.08 in E/APE category that was not randomly sampled (RCP Malfunctions) and same topic category (A2) to keep outline balanced. Updated ES-401-2. |
| 1/1\ (Q. #47) | 000029EA1.07 | Randomly selected K/A chose ability (operating switch for Charging pump recirc valve) that is not performed in emergency procedure 1BwFR-S.1 at Braidwood. Replaced with systematically selected K/A 000029EA1.13 from same EPE to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #58) | 000037AK1.01 | Randomly selected K/A (use of steam tables) is third time on this exam steam table use was randomly selected. (also used on question #8 and #29). Rejected K/A based upon over sampling of this area. Replaced with systematically selected K/A 0370002.1.23 from same APE and different category that was only sampled 4 times in tier 1 (vs. 5) to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #61) | 000069AK2.03 | Randomly selected K/A subject matter (containment access hatch effect on containment integrity) was on audit exam question #38. Rejected K/A based upon repeatability from audit exam. Replaced with systematically selected K/A 000069AA1.01 from same APE and different category since no other K2 category had importance rating >2.5. Updated ES-401-2. |
| 1/2 (Q. #62) | 000074EA1.18 | Unable to create RO level question that properly discriminates. Replaced with systematically selected K/A 000051AA2.02 in same tier and and different category that was only sampled 4 times in tier 1 (vs. 5) to keep outline balanced. Updated ES-401-2. |
| 2/1 (Q. #78) | 0080002.2.42 | Unable to create SRO level question that properly discriminates. Also CC system was already tested in some form in 4 previous questions (7,12,42 & 45). Replaced with systematically selected K/A 0760002.2.42 in same tier/group and same generic K/A to keep outline balanced. Updated ES-401-2. |
| 2/2 (Q. #83) | 0720002.4.8 | System that was randomly selected for K/A topic (Area Rad Monitoring) does not have any OA procedure use in conjunction with EOPs at |

| | | |
|---|---|---|
| | | Braidwood. Additionally, generic K/A 2.4.8 was previously sampled in question #25. Replaced with systematically selected K/A 0720002.4.11 using same system and new K/A topic to keep outline balanced. Updated ES-401-2. |
| 1/1 (Q. #88) | 000057AA2.15 | Randomly selected K/A APE (loss of Inst. bus) is second time on SRO section of this exam loss of inst. bus was randomly selected. (also selected on question #79 KA topic). Rejected K/A based upon over sampling of this area. Replaced with systematically selected K/A 000009AA2.15 from different APE and same K/A number to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #90) | 000024AA2.01 | Unable to create SRO level question that properly discriminates. Replaced with systematically selected K/A 000003AA2.03 in same tier and group to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #92) | E070002.4.20 | Randomly selected EPE (saturated core cooling) does not contain any unique notes, warnings or cautions that provide bases for discriminating SRO level question. Replaced with systematically selected K/A 0740002.4.20 (inadequate core cooling) with same generic KA statement and in same tier and group to keep outline balanced. Updated ES-401-2. |
| 3/1 (Q. #95) | 0000002.1.39 | Unable to create SRO level question that properly discriminates. Replaced with systematically selected K/A 0000002.1.9 in same tier and category to keep outline balanced. Updated ES-401-2. |
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| ES-403, Rev. 9 | Written Examination Grading Quality Checklist | Form ES-403-1 |
|---|---|---|

Facility: Braidwood U1/U2 Date of Exam: 10/5-16/2009 Exam Level: RO ☒ SRO ☒

| Item Description | Initials a | b | c |
|---|---|---|---|
| 1. Clean answer sheets copied before grading | DM | CM | BP |
| 2. Answer key changes and question deletions justified and documented | N/A DM | N/A CM | BP |
| 3. Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations) | DM | CM | BP |
| 4. Grading for all borderline cases (80 ±2% overall and 70 or 80, as applicable, ±4% on the SRO-only) reviewed in detail | DM | CM | BP |
| 5. All other failing examinations checked to ensure that grades are justified | n/a | n/a | n/a |
| 6. Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants | DM | CM | BP |

| | Printed Name/Signature | Date |
|---|---|---|
| a. Grader | Dell R. McNeil / Dell R. McNeil | 10/22/09 |
| b. Facility Reviewer(*) | Charles D. Zoia / Charles D. Zoia | 10/22/09 |
| c. NRC Chief Examiner (*) | Bruce Palagi / Bruce Palagi | 11/4/09 |
| d. NRC Supervisor (*) | Hironori Peterson / Hironori Peterson | 11/9/09 |

(*) The facility reviewer's signature is not applicable for examinations graded by the NRC; two independent NRC reviews are required.

## BRAIDWOOD 2009

| Q# | 1. LOK (F/H) | 2. LOD (1-5) | 3. Psychometric Flaws | | | | | 4. Job Content Flaws | | | | 5. Other | | 6. | 7. | 8. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Stem Focus | Cues | T/F | Cred. Dist. | Partial | Job-Link | Minutia | #/ units | Back-ward | Q= K/A | SRO Only | B/M/N | U/E/S | Explanation |
| 1 | H | 2 | | | | | | | | | | Y | | B | S | |
| 2 | H | 4 | | | | | | | | | | Y | | B | S | |
| 3 | H | 3 | | | | | | | | | | Y | | M | E | CHANGE "pp" IN THE STEM TO "pump". RESOLUTION: Done |
| 4 | F | 3 | | | | | | | | | | Y | | N | S | VERIFY THERE IS AN RO LEVEL LEARNING OBJECTIVE TO SUPPORT THIS QUESTION. RESOLUTION: Verified |
| 5 | F | 3 | | | | | | | | | | Y | | B | E | REPLACE DISTRACTOR "B" WITH A LINE THAT HAS NO CONNECTION TO THE PRT (ISOLATION VALVE "COULD" LEAK) RESOLUTION: Done |

Instructions

[Refer to Section D of ES-401 and Appendix B for additional information regarding each of the following concepts.]

1. Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.
2. Enter the level of difficulty (LOD) of each question using a 1 – 5 (easy – difficult) rating scale (questions in the 2 – 4 range are acceptable).
3. Check the appropriate box if a psychometric flaw is identified:
   - The stem lacks sufficient focus to elicit the correct answer (e.g., unclear intent, more information is needed, or too much needless information).
   - The stem or distractors contain cues (i.e., clues, specific determiners, phrasing, length, etc).
   - The answer choices are a collection of unrelated true/false statements.
   - The distractors are not credible; single implausible distractors should be repaired, more than one is unacceptable.
   - One or more distractors is (are) partially correct (e.g., if the applicant can make unstated assumptions that are not contradicted by stem).
4. Check the appropriate box if a job content error is identified:
   - The question is not linked to the job requirements (i.e., the question has a valid K/A but, as written, is not operational in content).
   - The question requires the recall of knowledge that is too specific for the closed reference test mode (i.e., it is not required to be known from memory).
   - The question contains data with an unrealistic level of accuracy or inconsistent units (e.g., panel meter in percent with question in gallons).
   - The question requires reverse logic or application compared to the job requirements.
5. Check questions that are sampled for conformance with the approved K/A and those that are *designated SRO-only* (K/A and license level mismatches are unacceptable).
6. Enter question source: (B)ank, (M)odified, or (N)ew. Check that (M)odified questions meet criteria of ES-401 Section D.2.f.
7. Based on the reviewer's judgment, is the question as written (U)nsatisfactory (requiring repair or replacement), in need of (E)ditorial enhancement, or (S)atisfactory?
8. At a minimum, explain any "U" ratings (e.g., how the Appendix B psychometric attributes are not being met).

| Q# | 1. LOK (F/H) | 2. LOD (1-5) | 3. Psychometric Flaws | | | | | 4. Job Content Flaws | | | | 5. Other | | 6. B/M/N | 7. U/E/S | 8. Explanation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Stem Focus | Cues | T/F | Cred. Dist. | Partial | Job-Link | Minutia | #/ units | Back-ward | Q= K/A | SRO Only | | | |
| 6 | H | 3 | | | | | | | | | | Y | | M | E | CHANGE "- A pressurizer safety valve sticks open. " to "- A pressurizer safety fails open. "RESOLUTION: Done |
| 7* | H | 2 | | | | | | | | | | Y | | B | S | IF ALARM PROCEDURE MEDIATE ACTIONS ARE TO BE COMMITTED TO MEMORY THIS IS MEMORY QUESTION. RESOLUTION: Commitment to memory not required of operators. |
| 8* | H | 3 | | | | | | | | | | Y | | M | E | CHANGE STEM FROM "..., what will be the pressurizer liquid temperature..." TO "..., which of the following temperatures most closely approximates the pressurizer liquid temperature ...". RESOLUTION: Done |
| 9* | H | 3 | | | | | | | | | | Y | | B | S | |
| 10* | H | 3 | | | | | | | | | | Y | | N | S | |
| 11* | H | 3 | | | | | | | | | | Y | | B | S | |
| 12 | F | 3 | | | | | | | | | | Y | | M | S | |
| 13 | H | 3 | | | | | | | | | | Y | | N | S | |
| 14* | F | 3 | | | | | | | | | | Y | | N | S | |
| 15* | F | 3 | | | | | | | | | | Y | | N | S | |
| 16* | H | 2 | | | | | | | | | | Y | | N | S | |
| 17* | F | 4 | | | | | | | | | | Y | | B | S | |
| 18* | F | 3 | | | | | | | | | | Y | | B | S | |
| 19 | F | 4 | | | | | | | | | | Y | | N | S | |
| 20 | F | 3 | | | | | | | | | | Y | | N | S | |
| 21 | H | 3 | | | | | | | | | | Y | | N | S | |
| 22 | F | 3 | | | | | | | | | | Y | | N | S | |
| 23 | F | 4 | | | | | | | | | | Y | | N | S | |
| 24 | H | 3 | | | | | | | | | | Y | | N | S | |
| 25 | F | 3 | | | | | | | | | | Y | | N | S | |

| Q# | 1. LOK (F/H) | 2. LOD (1-5) | 3. Psychometric Flaws | | | | | 4. Job Content Flaws | | | | 5. Other | | 6. B/M/N | 7. U/E/S | 8. Explanation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Stem Focus | Cues | T/F | Cred. Dist. | Partial | Job-Link | Minutia | #/ units | Back-ward | Q= K/A | SRO Only | | | |
| 26 | H | 3 | | | | | | | | | | Y | | N | E | Change the question statement to, "Which of the following causes would be consistent this the given conditions? RESOLUTION:Done |
| 27 | F | 1 | | | | X | | | | | | Y | | N | U | Any one would choose to monitor the instrument air pressure on a LOW instrument air pressure alarm even with no plant knowledge. RESOLUTION: Question replaced |
| 28 | H | 2 | | | | | | | | | | Y | | N | S | ADD THE WORD "at" TO SECOND LINE OF STEM RESOLUTION: RESOLUTION: Done |
| 29 | H | 2 | | | | | | | | | | Y | | N | S | |
| 30 | H | 4 | | | | | | | | | | Y | | M | S | |
| 31 | F | 3 | | | | | | | | | | Y | | N | S | |
| 32 | H | 3 | | | | | | | | | | Y | | B | S | |
| 33 | H | 4 | | | | | | | | | | Y | | M | S | |
| 34 | H | 3 | | | | | | | | | | Y | | M | S | |
| 35 | F | 3 | | | | | | | | | | Y | | B | S | Change "Calorimetric Calculations must be performed at" to "Calorimetric Calculations must be performed and NIs adjusted as needed at". RESOLUTION: Done |
| 36 | H | 3 | | | | | | | | | | Y | | N | E | CHANGE "ran" TO "run". RESOLUTION: Done |
| 37 | H | 3 | | | | | | | | | | Y | | N | S | |
| 38 | F | 3 | | | | | | | | | | Y | | N | S | |
| 39* | F | 3 | | | | | | | | | | Y | | N | S | |
| 40* | H | 3 | | | | | | | | | | Y | | M | S | |
| 41* | H | 4 | | | | | | | | | | Y | | N | S | |
| 42* | F | 3 | | | | | | | | | | Y | | B | S | WAS THIS QUESTION USED ON A PREVIOUS BRAIDWOOD ILT EXAM? WOULD OPERATORS EXPECTED TO BE ABLE TO RECOGNIZE THIS NUMBER FROM MEMORY? RESOLUTION: there are learning objectives that require this level of knowledge. |
| 43* | F | 3 | | | | | | | | | | Y | | B | S | |
| 44 | H | 3 | | | | | | | | | | Y | | N | S | |

| Q# | 1. LOK (F/H) | 2. LOD (1-5) | 3. Psychometric Flaws | | | | | 4. Job Content Flaws | | | | 5. Other | | 6. | 7. | 8. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Stem Focus | Cues | T/F | Cred. Dist. | Partial | Job-Link | Minutia | #/ units | Back-ward | Q= K/A | SRO Only | B/M/N | U/E/S | Explanation |
| 45 | H | 3 | | | | | | | | | | Y | | N | S | |
| 46 | F | 3 | | | | | | | | | | Y | | B | S | |
| 47 | F | 3 | | | | | | | | | | Y | | N | S | |
| 48 | F | 3 | | | | | | | | | | Y | | N | E | CHANGE "are" to "have been" and ADD A SPACE BETWEEN "cross" and "tying" RESOLUTION: Done |
| 49 | F | 3 | | | | | | | | | | Y | | N | S | |
| 50 | F | 4 | | | | | | | | | | Y | | N | S | |
| 51 | H | 4 | | | | | | | | | | Y | | N | S | |
| 52 | F | 3 | | | | | | | | | | Y | | N | S | |
| 53 | H | 3 | | | | | | | | | | Y | | N | S | |
| 54 | H | 3 | | | | | | | | | | Y | | N | S | |
| 55 | F | 3 | | | | | | | | | | Y | | N | S | |
| 56 | H | 3 | | | | X | | | | | | Y | | N | E | IN DISTRACTOR B. CHANGE "at the RSP" to "locally" AS WRITTEN NO ONE WOULD PICK B. WITH A. AS AN AVIALABLE ANSWER. RESOLUTION: Done |
| 57 | H | 4 | | | | | | | | | | Y | | N | S | |
| 58 | H | 3 | | | | | | | | | | Y | | B | S | |
| 59 | F | 3 | | | | | | | | | | Y | | N | S | |
| 60* | F | 4 | | | | | | | | | | Y | | N | S | |
| 61* | H | 3 | | | | | | | | | | Y | | N | S | |
| 62* | H | 3 | | | | | | | | | | Y | | M | S | |
| 63* | H | 3 | | | | | | | | | | Y | | N | S | |
| 64* | H | 3 | | | | | | | | | | Y | | B | S | |

| Q# | 1. LOK (F/H) | 2. LOD (1-5) | 3. Psychometric Flaws | | | | | 4. Job Content Flaws | | | | 5. Other | | 6. | 7. | 8. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Stem Focus | Cues | T/F | Cred. Dist. | Partial | Job-Link | Minutia | #/ units | Back-ward | Q= K/A | SRO Only | B/M/N | U/E/S | Explanation |
| 65 | F | 3 | | | | | | | | | | Y | | N | E | CHANGE THE QUESTION STATEMENT TO " What is causing the abnormal indication and what action does the NSO need to take? RESOLUTION: Done |
| 66 | F | 2 | | | | | | | | | | Y | | N | S | |
| 67 | F | 4 | | | | | | | | | | Y | | N | S | |
| 68 | F | 3 | | | | | | | x | | | Y | | B | S | Is it reasonable to expect ROs to know this TS from memory? ? RESOLUTION: there are learning objectives that require this level of knowledge. |
| 69 | H | 3 | | | | | | | | | | Y | | N | S | |
| 70* | H | 3 | | | | | | | | | | Y | | B | S | |
| 71* | F | 3 | | | | | | | | | | Y | | M | S | |
| 72* | H | 3 | | | | | | | | | | Y | | N | S | |
| 73* | F | 2 | | | | | | | | | | Y | | N | S | |
| 74* | F | 2 | | | | | | | | | | Y | | B | S | |
| 75 | F | 3 | | | | | | | | | | Y | | N | S | |
| 76 | H | 3 | | | | | | | | | | Y | | M | S | |
| 77 | H | 3 | | | | | | | | | | Y | | N | S | |
| 78 | H | 3 | | | | | | | | | | Y | | N | S | |
| 79 | H | 3 | | | | | | | | | | Y | | M | S | |
| 80 | H | 3 | | | | | | | | | | Y | | N | S | |
| 81 | F | 3 | | | | | | | | | | NO | | M | U | KA related to spent fuel shipping casks not new fuel shipping containers. RESOLUTION: Changed KA |
| 82 | H | 3 | | | | | | | | | | Y | | M | S | |
| 83 | H | 3 | | | | | | | | | | Y | | B | S | |
| 84 | H | 3 | | | | | | | | | | Y | | B | S | |

| Q# | 1. LOK (F/H) | 2. LOD (1-5) | 3. Psychometric Flaws | | | | | 4. Job Content Flaws | | | | 5. Other | | 6. B/M/N | 7. U/E/S | 8. Explanation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Stem Focus | Cues | T/F | Cred. Dist. | Partial | Job-Link | Minutia | #/ units | Back-ward | Q= K/A | SRO Only | | | |
| 85 | M | 4 | | | | | | | | | | Y | | N | S | |
| 86 | H | 2 | | | | | | | | | | Y | | N | S | |
| 87* | H | 2 | | | | | | | | | | Y | | N | S | |
| 88* | H | 3 | | | | | | | | | | Y | | B | S | |
| 89* | H | 3 | | | | | | | | | | Y | | N | S | |
| 90* | H | 2 | | | | | | | | | | Y | | N | S | |
| 91* | F | 3 | | | | | | | | | | Y | | B | S | |
| 92 | H | 2 | | | | | | | | | | Y | | N | S | |
| 93 | H | 2 | | | | | | | | | | Y | | M | S | |
| 94 | F | 3 | | | | | | | | | | Y | | N | S | |
| 95 | F | 2 | | | | | | | | | | Y | | M | S | |
| 96 | F | 4 | | | | | | | | | | Y | | N | S | |
| 97 | F | 2 | | | | X | | | | | | Y | | N | U | No one would pick "B. APPROVE" or "D. DISTRIBUTE" for a work order that needs to be revised. RESOLUTION: distractors revised. |
| 98 | H | 3 | | | | | | | | | | Y | | M | S | |
| 99 | H | 2 | | | | | | | | | | Y | | M | S | |
| 100 | F | 3 | | | | | | | | | | Y | | N | S | |
| | | | | | | | | | | | | | | | | |

* 30 QUESTIONS REVIEWED FOR MINIUM REVIEW REQUIRED BY ES-401 E.2.c.

OUTLINE COMMENTS

1) On form ES-301-5 for Scenario 9-4 event #9 is the "major" not a "normal"
(corrected)

OPERATING TEST COMMENTS (all comment incorporated after Onsite Vadidation)

JPMs

- SIM-803, replace. This JPM does not have control room manipulations. The control room operator only directs in plant operations.

- SIM-108, provide the complete 1BwFR-I.3 procedure to the candidates.

- SIM-300, change Cue for performance step 1 to states that the Common A VA fan is in operation not the 1A VA fan.

- SIM-507 add a critical step to refer to BwAR 1-3-B5 and place 1D low speed RCFC in pull-to-lock.

SCENARIOS

- 09-1. On Form ES-D-1 remove C-RO and C-BOP from events 7 and 8.
- 09-1. In event 3 add that LCO 3.1.5 condition A applies.

- 09-2. On Form ES-D-1 remove C-RO events 7.

- 09-4. Change to have DG 1A & B failed as an initial condition.
- 09-4 In event 7 mark "Dispatch EO's to Close 1CV8384A & B"as a critical task.
- 09-4 End the scenario after the decision to transition to 1BwCA-0.1 or 0.2

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Exelon Nuclear

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NUREG 1021, Revision 9
Supplement 1

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

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Subject: 2009 Initial License Examination Post Examination

The Braidwood Station 2009 Operator Initial Licensing Examination was administered on October 19, 2009. In accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, Section ES-402, "Administering Initial Written Examinations," the facility licensee should submit formal comments within five working days after the examination is administered. The purpose of this letter is to notify the NRC that Braidwood Station does not challenge the test results and has no post examination comments.

Should you have any questions concerning this letter, please contact Mr. David Gullott, Regulatory Assurance Manager, at (815) 417-2810. For questions concerning administration of the examination, please contact Brian Kempen at (815) 458-7860.

Respectfully,

Amir Shahkarami
Site Vice President
Braidwood Station

cc: Chief, NRC Operator Licensing Branch
NRC Senior Resident Inspector – Braidwood Station

Rec'd via ADAMS
OCT 29 2009

# 2009 BRAIDWOOD STATION

# REVISED FORMS

# DOCUMENT PROFILE IN ADAMS

**DATE:** October 5, 2009

**AUTHOR:** B. B. Palagi

**AFFILIATION:** NRC/RGN-RIII/DRS/OLB

Revised ES-401 after NRC comments included

**ES-401** **PWR Examination Outline** **FORM ES-401-2**

Facility Name:Braidwood Date of Exam:10/5/09

| Tier | Group | RO K/A Category Points | | | | | | | | | | | | SRO-Only Points | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G * | Total | A 2 | | G * | | Total |
| 1. Emergency & Abnormal Plant Evolutions | 1 | 3 | 3 | 3 | N/A | | | 3 | 3 | N/A | | 3 | 18 | 3 | | 3 | | 6 |
| | 2 | 1 | 1 | 1 | | | | 2 | 2 | | | 2 | 9 | 2 | | 2 | | 4 |
| | Tier Totals | 4 | 4 | 4 | | | | 5 | 5 | | | 5 | 27 | 5 | | 5 | | 10 |
| 2. Plant Systems | 1 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 28 | 3 | | 2 | | 5 |
| | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 10 | 0 | 1 | 2 | | 3 |
| | Tier Totals | 4 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 38 | 4 | | 4 | | 8 |
| 3. Generic Knowledge and Abilities Categories | | 1 | | 2 | | 3 | | 4 | | | | | 10 | 1 | 2 | 3 | 4 | 7 |
| | | 3 | | 2 | | 3 | | 2 | | | | | | 2 | 2 | 2 | 1 | |

Note:
1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

| ES-401 | PWR Examination Outline<br>Plant Systems - Tier 2/Group 2 (SRO) | | | | | | | | | | | | | Form ES-401-2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q# | System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | IR | # |
| | 001 Control Rod Drive | | | | | | | | | | | | | | 0 |
| | 002 Reactor Coolant | | | | | | | | | | | | | | 0 |
| | 011 Pressurizer Level Control | | | | | | | | | | | | | | 0 |
| | 014 Rod Position Indication | | | | | | | | | | | | | | 0 |
| | 015 Nuclear Instrumentation | | | | | | | | | | | | | | 0 |
| | 016 Non-nuclear Instrumentation | | | | | | | | | | | | | | 0 |
| | 017 In-core Temperature Monitor | | | | | | | | | | | | | | 0 |
| | 027 Containment Iodine Removal | | | | | | | | | | | | | | 0 |
| | 028 Hydrogen Recombiner and Purge Control | | | | | | | | | | | | | | 0 |
| | 029 Containment Purge | | | | | | | | | | | | | | 0 |
| | 033 Spent Fuel Pool Cooling | | | | | | | | | | | | | | 0 |
| 81 | 034 Fuel Handling Equipment | | | | | | | | | | | 01.<br>40 | Knowledge of refueling administrative requirements. | 3.9 | 1 |
| 82 | 035 Steam Generator | | | | | | | | 0<br>6 | | | | Small break LOCA | 4.6 | 1 |
| | 041 Steam Dump/Turbine Bypass Control | | | | | | | | | | | | | | 0 |
| | 045 Main Turbine Generator | | | | | | | | | | | | | | 0 |
| | 055 Condenser Air Removal | | | | | | | | | | | | | | 0 |
| | 056 Condensate | | | | | | | | | | | | | | 0 |
| | 068 Liquid Radwaste | | | | | | | | | | | | | | 0 |
| | 071 Waste Gas Disposal | | | | | | | | | | | | | | 0 |
| 83 | 072 Area Radiation Monitoring | | | | | | | | | | | 04.<br>11 | Knowledge of abnormal condition procedures. | 4.2 | 1 |
| | 075 Circulating Water | | | | | | | | | | | | | | 0 |
| | 079 Station Air | | | | | | | | | | | | | | 0 |
| | 086 Fire Protection | | | | | | | | | | | | | | 0 |
| | K/A Category Totals: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | Group Point Total: | | 3 |

| Tier / Group | Randomly Selected K/A | Reason for Rejection |
|---|---|---|
| 2/1 (Q. #4) | 000006K3.03 | Unable to create RO level question that properly discriminates. Replaced with systematically selected K/A 000006K3.02 in same system and category to keep outline balanced. Updated ES-401-2. |
| 2/1 (Q. #25) | 0760002.4.8 | System that was randomly selected for K/A topic (Service Water) does not have any OA procedure use in conjunction with EOPs at Braidwood. Replaced with systematically selected K/A 0620002.4.8 using same K/A topic and new system (AC Elec. Dist.) that does have OA procedure use in conjunction with EOPs. Additionally, Service Water was randomly sampled twice in Tier 2 Group 1 and AC Elec. Dist. only once. Therefore, systematic selection of AC Elec. Dist. system keeps outline balanced. Updated ES-401-2. |
| 2/2 (Q. #38) | 0790002.4.20 | System that was randomly selected for K/A topic (Station Air) does not have any EOP warnings, cautions or notes at Braidwood. Replaced with systematically selected K/A 0350002.4.20 using same K/A topic and new system (Steam Generator) that does have EOP note. Additionally, Steam Generator system was not randomly sampled in Tier 2 Group 2. Therefore, systematic selection of Steam Generator system keeps outline balanced. Updated ES-401-2. |
| 1/1 (Q. #42) | 000011EA2.06 | Randomly selected K/A subject matter is same as question #12 on this exam. Both are checking proper opertion of RCFC fans following an SI. Replaced with systematically selected K/A 000011A2.08 in E/APE category that was not randomly sampled (RCP Malfunctions) and same topic category (A2) to keep outline balanced. Updated ES-401-2. |
| 1/1\ (Q. #47) | 000029EA1.07 | Randomly selected K/A chose ability (operating switch for Charging pump recirc valve) that is not performed in emergency procedure 1BwFR-S.1 at Braidwood. Replaced with systematically selected K/A 000029EA1.13 from same EPE to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #58) | 000037AK1.01 | Randomly selected K/A (use of steam tables) is third time on this exam steam table use was randomly selected. (also used on question #8 and #29). Rejected K/A based upon over sampling of this area. Replaced with systematically selected K/A 0370002.1.23 from same APE and different category that was only sampled 4 times in tier 1 (vs. 5) to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #61) | 000069AK2.03 | Randomly selected K/A subject matter (containment access hatch effect on containment integrity) was on audit exam question #38. Rejected K/A based upon repeatability from audit exam. Replaced with systematically selected K/A 000069AA1.01 from same APE and different category since no other K2 category had importance rating >2.5. Updated ES-401-2. |
| 1/2 (Q. #62) | 000074EA1.18 | Unable to create RO level question that properly discriminates. Replaced with systematically selected K/A 000051AA2.02 in same tier and and different category that was only sampled 4 times in tier 1 (vs. 5) to keep outline balanced. Updated ES-401-2. |
| 2/1 (Q. #78) | 0080002.2.42 | Unable to create SRO level question that properly discriminates. Also CC system was already tested in some form in 4 previous questions (7,12,42 & 45). Replaced with systematically selected K/A 0760002.2.42 in same tier/group and same generic K/A to keep outline balanced. Updated ES-401-2. |
| 2/2 (Q. #83) | 0720002.4.8 | System that was randomly selected for K/A topic (Area Rad Monitoring) does not have any OA procedure use in conjunction with EOPs at |

| | | |
|---|---|---|
| | | Braidwood. Additionally, generic K/A 2.4.8 was previously sampled in question #25. Replaced with systematically selected K/A 0720002.4.11 using same system and new K/A topic to keep outline balanced. Updated ES-401-2. |
| 1/1 (Q. #88) | 000057AA2.15 | Randomly selected K/A APE (loss of Inst. bus) is second time on SRO section of this exam loss of inst. bus was randomly selected. (also selected on question #79 KA topic). Rejected K/A based upon over sampling of this area. Replaced with systematically selected K/A 000009AA2.15 from different APE and same K/A number to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #90) | 000024AA2.01 | Unable to create SRO level question that properly discriminates. Replaced with systematically selected K/A 000003AA2.03 in same tier and group to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #92) | E070002.4.20 | Randomly selected EPE (saturated core cooling) does not contain any unique notes, warnings or cautions that provide bases for discriminating SRO level question. Replaced with systematically selected K/A 0740002.4.20 (inadequate core cooling) with same generic KA statement and in same tier and group to keep outline balanced. Updated ES-401-2. |
| 3/1 (Q. #95) | 0000002.1.39 | Unable to create SRO level question that properly discriminates. Replaced with systematically selected K/A 0000002.1.9 in same tier and category to keep outline balanced. Updated ES-401-2. |
| 2/2 (Q. #81) | 000034A2.02 | Randomly selected KA topic (dropped cask) does not apply to Braidwood because Braidwood has not yet shipped any spent fuel in casks. Replaced with systematically selected K/A 000034 2.1.40 in same system, tier and group to keep outline balanced. |
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# GROUP 3
# 3 SRO-I CANDIDATES

## ES-301 Transient and Event Checklist Form ES-301-5

| Facility: Braidwood | | Date of Exam: October 5, 2009 | | | | | | | | | | | | Operating Test Number: 09-1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APPLICANT | EVENT TYPE | Scenarios | | | | | | | | | | | | TOTAL | MINIMUM(*) | | |
| | | 09-1 | | | 09-3 | | | 09-5 | | | N/A | | | | | | |
| | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | | | | |
| | | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | | R | I | U |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | | 3 | | | | | | | | 1 | 1 | 1 | 0 |
| | NOR | 1 | | | | | | | | 1 | | | | 2 | 1 | 1 | 1 |
| | I/C | 2 3 5 | | | | 2 4 | | | | 6 | | | | 6 | 4 | 4 | 2 |
| | MAJ | 6 | | | | 5 | | | | 8 | | | | 3 | 2 | 2 | 1 |
| | TS | 1 2 | | | | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | | | | 2 | | | | | | 1 | 1 | 1 | 0 |
| | NOR | | | | | | | 1 | | | | | | 1 | 1 | 1 | 1 |
| | I/C | | 2 3 5 | | | | 1 | 3 5 6 | | | | | | 7 | 4 | 4 | 2 |
| | MAJ | | 6 | | | | 5 | 8 | | | | | | 3 | 2 | 2 | 1 |
| | TS | | | | | | | 4 5 | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | 3 | | | | 2 | | | | | 2 | 1 | 1 | 0 |
| | NOR | | | 1 | | | | | | | | | | 1 | 1 | 1 | 1 |
| | I/C | | | | 1 2 4 | | | | 3 5 | | | | | 5 | 4 | 4 | 2 |
| | MAJ | | | 6 | 5 | | | | 8 | | | | | 3 | 2 | 2 | 1 |
| | TS | | | | 1 3 | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☐ SRO-U ☐ | RX | | | | | | | | | | | | | N/A | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | N/A | 1 | 1 | 1 |
| | I/C | | | | | | | | | | | | | N/A | 4 | 4 | 2 |
| | MAJ | | | | | | | | | | | | | N/A | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | N/A | 0 | 2 | 2 |

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

# GROUP 1
# 3 SRO-I CANDIDATES

## ES-301 Transient and Event Checklist Form ES-301-5

Facility: Braidwood | Date of Exam: October 5, 2009 | Operating Test Number: 2009-1

| APPLICANT | EVENT TYPE | Scenarios | | | | | | | | | | | | TOTAL | MINIMUM(*) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 09-1 | | | 09-2 | | | 09-4 | | | N/A | | | | | | |
| | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | | | | |
| | | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | | R | I | U |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | | 5 | | | | | | | | 1 | 1 | 1 | 0 |
| | NOR | 1 | | | | | | | | 1 | | | | 2 | 1 | 1 | 1 |
| | I/C | 2 3 5 | | | | 3 4 | | | | 4 | | | | 6 | 4 | 4 | 2 |
| | MAJ | 6 | | | | 6 8 | | | | 8 | | | | 4 | 2 | 2 | 1 |
| | TS | 1 2 | | | | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | | | | 2 | | | | | | 1 | 1 | 1 | 0 |
| | NOR | | | | | | 1 | 1 | | | | | | 2 | 1 | 1 | 1 |
| | I/C | | 2 3 5 | | | | 5 | 3 4 5 6 | | | | | | 8 | 4 | 4 | 2 |
| | MAJ | | 6 | | | | 6 8 | 8 | | | | | | 4 | 2 | 2 | 1 |
| | TS | | | | | | | 3 4 | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | 5 | | | | 2 | | | | | 2 | 1 | 1 | 0 |
| | NOR | | | 1 | 1 | | | | | | | | | 2 | 1 | 1 | 1 |
| | I/C | | | | 3 4 5 | | | | 3 5 6 | | | | | 6 | 4 | 4 | 2 |
| | MAJ | | | 6 | 6 8 | | | | 8 | | | | | 4 | 2 | 2 | 1 |
| | TS | | | | 2 3 | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☐ SRO-U ☐ | RX | | | | | | | | | | | | | N/A | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | N/A | 1 | 1 | 1 |
| | I/C | | | | | | | | | | | | | N/A | 4 | 4 | 2 |
| | MAJ | | | | | | | | | | | | | N/A | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | N/A | 0 | 2 | 2 |

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

# GROUP 5
# 1 SRO-I and 1 RO CANDIDATE

## ES-301 Transient and Event Checklist Form ES-301-5

| Facility: Braidwood | | Date of Exam: October 5, 2009 | | | | | | | | | | | | Operating Test Number: 09-1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APPLICANT | EVENT TYPE | Scenarios | | | | | | | | | | | | TOTAL | MINIMUM(*) | | |
| | | 09-2 | | | 09-4 | | | N/A | | | N/A | | | | | | |
| | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | | | | |
| | | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | | R | I | U |
| RO ☐ SRO-I ☒ SRO-U ☐ **Tierney** | RX | | 5 | | 2 | | | | | | | | | 2 | 1 | 1 | 0 |
| | NOR | | | | 1 | | | | | | | | | 1 | 1 | 1 | 1 |
| | I/C | | 3 4 | | 3 4 5 6 | | | | | | | | | 6 | 4 | 4 | 2 |
| | MAJ | | 6 8 | | 8 | | | | | | | | | 3 | 2 | 2 | 1 |
| | TS | | | | 3 4 | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☒ SRO-I ☐ SRO-U ☐ **Norman** | RX | | | | | 2 | | | | | | | | 1 | 1 | 1 | 0 |
| | NOR | | | 1 | | | | | | | | | | 1 | 1 | 1 | 1 |
| | I/C | | | 5 | | 3 5 6 | | | | | | | | 4 | 4 | 4 | 2 |
| | MAJ | | | 6 8 | | 8 | | | | | | | | 3 | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | 0 | 0 | 2 | 2 |
| RO ☐ SRO-I ☐ SRO-U ☐ | RX | | | | | | | | | | | | | N/A | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | N/A | 1 | 1 | 1 |
| | I/C | | | | | | | | | | | | | N/A | 4 | 4 | 2 |
| | MAJ | | | | | | | | | | | | | N/A | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | N/A | 0 | 2 | 2 |
| RO ☐ SRO-I ☐ SRO-U ☐ | RX | | | | | | | | | | | | | N/A | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | N/A | 1 | 1 | 1 |
| | I/C | | | | | | | | | | | | | N/A | 4 | 4 | 2 |
| | MAJ | | | | | | | | | | | | | N/A | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | N/A | 0 | 2 | 2 |

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

# GROUP 2
# 3 SRO-I CANDIDATES

## ES-301 Transient and Event Checklist Form ES-301-5

| Facility: Braidwood | | Date of Exam: October 5, 2009 | | | | | | | | | | | | Operating Test Number: 09-1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APPLICANT | EVENT TYPE | Scenarios | | | | | | | | | | | | TOTAL | MINIMUM(*) | | |
| | | 09-1 | | | 09-3 | | | 09-5 | | | N/A | | | | | | |
| | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | | | | |
| | | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | | R | I | U |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | | 3 | | | | | | | | 1 | 1 | 1 | 0 |
| | NOR | 1 | | | | | | | | 1 | | | | 2 | 1 | 1 | 1 |
| | I/C | 2 3 5 | | | | 2 4 | | | | 6 | | | | 6 | 4 | 4 | 2 |
| | MAJ | 6 | | | | 5 | | | | 8 | | | | 3 | 2 | 2 | 1 |
| | TS | 1 2 | | | | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | | | | 2 | | | | | | 1 | 1 | 1 | 0 |
| | NOR | | | | | | | 1 | | | | | | 1 | 1 | 1 | 1 |
| | I/C | | 2 35 | | | | 1 | 3 5 6 | | | | | | 7 | 4 | 4 | 2 |
| | MAJ | | 6 | | | | 5 | 8 | | | | | | 3 | 2 | 2 | 1 |
| | TS | | | | | | | 4 5 | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☒ SRO-U ☐ | RX | | | | 3 | | | | 2 | | | | | 2 | 1 | 1 | 0 |
| | NOR | | | 1 | | | | | | | | | | 1 | 1 | 1 | 1 |
| | I/C | | | | 1 2 4 | | | | 3 5 | | | | | 5 | 4 | 4 | 2 |
| | MAJ | | | 6 | 5 | | | | 8 | | | | | 3 | 2 | 2 | 1 |
| | TS | | | | 1 3 | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☐ SRO-U ☐ | RX | | | | | | | | | | | | | N/A | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | N/A | 1 | 1 | 1 |
| | I/C | | | | | | | | | | | | | N/A | 4 | 4 | 2 |
| | MAJ | | | | | | | | | | | | | N/A | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | N/A | 0 | 2 | 2 |

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

# GROUP 4
# 1 SRO-I & 1SRO-U CANDIDATE

## ES-301 Transient and Event Checklist Form ES-301-5

Facility: Braidwood | Date of Exam: October 5, 2009 | Operating Test Number: 09-1

| APPLICANT | EVENT TYPE | Scenarios | | | | | | | | | | | | TOTAL | MINIMUM(*) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 09-2 | | | 09-3 | | | N/A | | | N/A | | | | | | |
| | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | | | | |
| | | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | SRO | ATC | BOP | | R | I | U |
| RO ☐ SRO-I ☒ SRO-U ☐ **Shah** | RX | 5 | | | | 3 | | | | | | | | 2 | 1 | 1 | 0 |
| | NOR | 1 | | | | | | | | | | | | 1 | 1 | 1 | 1 |
| | I/C | 3 4 5 | | | | 2 4 | | | | | | | | 5 | 4 | 4 | 2 |
| | MAJ | 6 8 | | | | 5 | | | | | | | | 3 | 2 | 2 | 1 |
| | TS | 2 3 | | | | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☐ SRO-U ☒ **Logan** | RX | | | | 3 | | | | | | | | | 1 | 1 | 1 | 0 |
| | NOR | | | 1 | | | | | | | | | | 1 | 1 | 1 | 1 |
| | I/C | | | 5 | 1 2 4 | | | | | | | | | 4 | 4 | 4 | 2 |
| | MAJ | | | 6 8 | 5 | | | | | | | | | 3 | 2 | 2 | 1 |
| | TS | | | | 1 3 | | | | | | | | | 2 | 0 | 2 | 2 |
| RO ☐ SRO-I ☐ SRO-U ☐ | RX | | | | | | | | | | | | | N/A | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | N/A | 1 | 1 | 1 |
| | I/C | | | | | | | | | | | | | N/A | 4 | 4 | 2 |
| | MAJ | | | | | | | | | | | | | N/A | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | N/A | 0 | 2 | 2 |
| RO ☐ SRO-I ☐ SRO-U ☐ | RX | | | | | | | | | | | | | N/A | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | N/A | 1 | 1 | 1 |
| | I/C | | | | | | | | | | | | | N/A | 4 | 4 | 2 |
| | MAJ | | | | | | | | | | | | | N/A | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | N/A | 0 | 2 | 2 |

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility Name:Braidwood Date of Exam:10/5/09

| Tier | Group | RO K/A Category Points | | | | | | | | | | | | SRO-Only Points | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G * | Total | A 2 | | G * | | Total | | |
| 1. Emergency & Abnormal Plant Evolutions | 1 | 3 | 3 | 3 | N/A | | | 3 | 3 | N/A | | 3 | 18 | 3 | | 3 | | 6 | | |
| | 2 | 1 | 1 | 1 | | | | 2 | 2 | | | 2 | 9 | 2 | | 2 | | 4 | | |
| | Tier Totals | 4 | 4 | 4 | | | | 5 | 5 | | | 5 | 27 | 5 | | 5 | | 10 | | |
| 2. Plant Systems | 1 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 28 | 3 | | 2 | | 5 | | |
| | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 10 | 0 | 2 | 1 | | 3 | | |
| | Tier Totals | 4 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 38 | 5 | | 3 | | 8 | | |
| 3. Generic Knowledge and Abilities Categories | | 1 | | 2 | | 3 | | 4 | | | | | 10 | 1 | 2 | 3 | 4 | | | 7 |
| | | 3 | | 2 | | 3 | | 2 | | | | | | 2 | 2 | 2 | 1 | | | |

Note:
1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401 PWR Examination Outline Form ES-401-2

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)

| Q# | E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
|---|---|---|---|---|---|---|---|---|---|---|
| 39 | 000007 Reactor Trip - Stabilization - Recovery / 1 | | | | | | 02. 03 | Knowledge of the design, procedural, and operational differences between units. | 3.8 | 1 |
| 40 | 000008 Pressurizer Vapor Space Accident / 3 | | 0 2 | | | | | Sensors and detectors | 2.7 | 1 |
| 41 | 000009 Small Break LOCA / 3 | | | | | 1 4 | | Actions to be taken if PTS limits are violated | 3.8 | 1 |
| | 000011 Large Break LOCA / 3 | | | | | | | | | 0 |
| 42 | 000015 RCP Malfunctions / 4 | | | | | 0 8 | | When to secure RCPs on high bearing temperature | 3.4 | 1 |
| | 000017 RCP Malfunctions (Loss of RC Flow) / 4 | | | | | | | | | |
| 43 | 000022 Loss of Rx Coolant Makeup / 2 | | | | | | 01. 31 | Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. | 4.6 | 1 |
| 44 | 000025 Loss of RHR System / 4 | | | | | 0 2 | | Leakage of reactor coolant from RHR into closed cooling water system or into reactor building atmosphere | 3.4 | 1 |
| 45 | 000026 Loss of Component Cooling Water / 8 | | | | | | 04. 09 | Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies. | 3.8 | 1 |
| 46 | 000027 Pressurizer Pressure Control System Malfunction / 3 | | | | 0 1 | | | PZR heaters, sprays, and PORVs | 4 | 1 |
| 47 | 000029 ATWS / 1 | | | | 1 3 | | | Manual trip of main turbine | 4.1 | 1 |
| | 000038 Steam Gen. Tube Rupture / 3 | | | | | | | | | 0 |
| | 000040 Steam Line Rupture - Excessive Heat Transfer / 4 | | | | | | | | | 1 |
| 56 | WE12 Uncontrolled Depressurization of all Steam Generators / 4 | | 0 1 | | | | | Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features | 3.4 | |
| | 000054 (CE/E06) Loss of Main Feedwater / 4 | | | | | | | | | 0 |
| 48 | 000055 Station Blackout / 6 | | | 0 2 | | | | Actions contained in EOP for loss of offsite and onsite power | 4.3 | 1 |
| 49 | 000056 Loss of Off-site Power / 6 | | | 0 1 | | | | Order and time to initiation of power for the load sequencer | 3.5 | 1 |
| | 000057 Loss of Vital AC Inst. Bus / 6 | | | | | | | | | 0 |
| 50 | 000058 Loss of DC Power / 6 | | | 0 1 | | | | Use of dc control power by ED/Gs | 3.4 | 1 |
| | 000062 Loss of Nuclear Svc Water / 4 | | | | | | | | | 0 |
| 51 | 000065 Loss of Instrument Air / 8 | | | | 0 3 | | | Restoration of systems served by instrument air when pressure is regained | 2.9 | 1 |
| 53 | W/E04 LOCA Outside Containment / 3 | | 0 2 | | | | | Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the | 3.8 | 1 |
| 55 | W/E11 Loss of Emergency Coolant Recirc. / 4 | 0 1 | | | | | | Components, capacity, and function of emergency systems | 3.7 | 1 |
| 54 | BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4 | 0 3 | | | | | | Annunciators and conditions indicating signals, and remedial actions associated with the Loss of Secondary Heat Sink | 3.9 | 1 |
| 52 | 000077 Generator Voltage and Electric Grid Disturbances / 6 | 0 1 | | | | | | Definition of terms: volts, watts, amps, VARs, power factor | 3.3 | 1 |
| | K/A Category Totals: | 3 | 3 | 3 | 3 | 3 | 3 | Group Point Total: | | 18 |

ES-401 PWR Examination Outline Form ES-401-2

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)

| Q# | E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
|---|---|---|---|---|---|---|---|---|---|---|
| | 000001 Continuous Rod Withdrawal / 1 | | | | | | | | | 0 |
| 57 | 000003 Dropped Control Rod / 1 | | | | | 01 | | Rod position indication to actual rod position | 3.7 | 1 |
| | 000005 Inoperable/Stuck Control Rod / 1 | | | | | | | | | 0 |
| | 000024 Emergency Boration / 1 | | | | | | | | | 0 |
| | 000028 Pressurizer Level Malfunction / 2 | | | | | | | | | 0 |
| | 000032 Loss of Source Range NI / 7 | | | | | | | | | 0 |
| | 000033 Loss of Intermediate Range NI / 7 | | | | | | | | | 0 |
| | 000036 Fuel Handling Accident / 8 | | | | | | | | | 0 |
| 58 | 000037 Steam Generator Tube Leak / 3 | | | | | | 01. 23 | Ability to perform specific system and integrated plant procedures during all modes of plant operation. | 4.3 | 1 |
| 62 | 000051 Loss of Condenser Vacuum / 4 | | | | | 02 | | Conditions requiring reactor and/or turbine trip | 3.9 | 1 |
| 59 | 000059 Accidental Liquid RadWaste Rel. / 9 | | 02 | | | | | Radioactive-gas monitors | 2.7 | 1 |
| | 000060 Accidental Gaseous Radwaste Rel. / 9 | | | | | | | | | 0 |
| | 000061 ARM System Alarms / 7 | | | | | | | | | 0 |
| 60 | 000067 Plant Fire On-site / 8 | | | | 03 | | | Bypass of a fire zone detector | 2.5 | 1 |
| | 000068 Control Room Evac. / 8 | | | | | | | | | 0 |
| 61 | 000069 Loss of CTMT Integrity / 5 | | | | 01 | | | Isolation valves, dampers, and electropneumatic devices | 3.5 | 1 |
| | W/E14 High Containment Pressure / 5 | | | | | | | | | |
| | 000074 Inad. Core Cooling / 4 | | | | | | | | | 0 |
| | W/E06 Degraded Core Cooling / 4 | | | | | | | | | |
| | W/E07 Saturated Core Cooling / 4 | | | | | | | | | |
| | 000076 High Reactor Coolant Activity / 9 | | | | | | | | | 0 |
| | W/E01 Rediagnosis / 3 | | | | | | | | | 1 |
| 63 | W/E02 SI Termination / 3 | | | | | | 04. 46 | Ability to verify that the alarms are consistent with the plant conditions. | 4.2 | |
| 65 | W/E13 Steam Generator Over-pressure / 4 | | | 03 | | | | Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations | 3.2 | 1 |
| | W/E15 Containment Flooding / 5 | | | | | | | | | 0 |
| | W/E16 High Containment Radiation / 9 | | | | | | | | | 0 |
| | W/E03 LOCA Cooldown - Depress. / 4 | | | | | | | | | 0 |
| 64 | W/E09 Natural Circulation Operations / 4 | 03 | | | | | | Annunciators and conditions indicating signals, and remedial actions associated with the Natural Circulation Operations | 3.3 | 1 |
| | W/E10 Natural Circulation with Steam Voide in Vessel with/without RVLIS. / 4 | | | | | | | | | |
| | W/E08 RCS Overcooling - PTS / 4 | | | | | | | | | 0 |
| | K/A Category Totals: | 1 | 1 | 1 | 2 | 2 | 2 | Group Point Total: | | 9 |

ES-401 PWR Examination Outline Form ES-401-2

Plant Systems - Tier 2/Group 1 (RO)

| Q# | System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s) | IR | # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 003 Reactor Coolant Pump | 04 | | | | | | | | | | | CVCS | 2.6 | 1 |
| 2 | 004 Chemical and Volume Control | | 02 | | | | | | | | | | Makeup pumps | 2.9 | 1 |
| 3 | 005 Residual Heat Removal | | | 05 | | | | | | | | | ECCS | 3.7 | 1 |
| 4 | 006 Emergency Core Cooling | | | 02 | | | | | | | | | Fuel | 4.3 | 1 |
| 5 & 6 | 007 Pressurizer Relief/Quench Tank | | | | | | | | 01 | 01 | | | Stuck-open PORV or code safety; Components which discharge to the PRT | 3.9; 2.7 | 2 |
| 7 | 008 Component Cooling Water | 01 | | | | | | | | | | | SWS | 3.1 | 1 |
| 8 | 010 Pressurizer Pressure Control | | | | | 01 | | | | | | | Determination of condition of fluid in PZR, using steam tables | 3.5 | 1 |
| 9&10 | 012 Reactor Protection | | 01 | | | | 03 | | | | | | RPS channels, components, and interconnections; Trip logic circuits | 3.3; 3.1 | 2 |
| 11 | 013 Engineered Safety Features Actuation | | | | | | 01 | | | | | | Sensors and detectors | 2.7 | 1 |
| 12&13 | 022 Containment Cooling | | | | | | | | 05 | | | 04, 21 | Major leak in CCS; Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor | 3.1; 4 | 2 |
| | 025 Ice Condenser | | | | | | | | | | | | | | 0 |
| 14&15 | 026 Containment Spray | 01 | | | | | | | | | 05 | | ECCS; Containment spray reset switches | 4.2; 3.5 | 2 |
| 16 | 039 Main and Reheat Steam | | | | | 05 | | | | | | | Bases for RCS cooldown limits | 2.7 | 1 |
| 17 | 059 Main Feedwater | | | | | | | 03 | | | | | Power level restrictions for operation of MFW pumps and valves | 2.7 | 1 |
| 18 | 061 Auxiliary/Emergency Feedwater | | | 02 | | | | | | | | | S/G | 4.2 | 1 |
| 19&25 | 062 AC Electrical Distribution | | | | | | | | | 01 | | 04, 08 | Vital ac bus amperage; Knowledge of how abnormal operating procedures are used in conjunction with EOPs. | 3; 3.8 | 2 |
| 20 | 063 DC Electrical Distribution | | | | 04 | | | | | | | | Trips | 2.6 | 1 |
| 21&22 | 064 Emergency Diesel Generator | | | | 10 | | | | | | | 01, 32 | Automatic load sequencer: blackout; Ability to explain and apply system limits and precautions. | 3.5; 3.8 | 2 |
| 23 | 073 Process Radiation Monitoring | | | | | | | 01 | | | | | Radiation levels | 3.2 | 1 |
| 24 | 076 Service Water | | | | | | | | 01 | | | | Loss of SWS | 3.5 | 1 |
| 26&27 | 078 Instrument Air | | | | 02 | | | | | | 01 | | Cross-over to other air systems; Pressure gauges | 3.2; 3.1 | 2 |
| 28 | 103 Containment | | | | | | | 01 | | | | | Containment pressure, temperature, and humidity | 3.7 | 1 |
| | | | | | | | | | | | | | | | 0 |
| | K/A Category Totals: | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | Group Point Total: | | 28 |

ES-401 PWR Examination Outline Form ES-401-2

Plant Systems - Tier 2/Group 2 (RO)

| Q# | System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | IR | # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 001 Control Rod Drive | | | | | | | | | | | | | | 0 |
| 29 | 002 Reactor Coolant | | | | | 09 | | | | | | | Relationship of pressure and temperature for water at saturation and subcooling conditions | 3.7 | 1 |
| 30 | 011 Pressurizer Level Control | | | | | | 03 | | | | | | Relationship between PZR level and PZR heater control circuit | 2.9 | 1 |
| 31 | 014 Rod Position Indication | | | | | | | | | | 04 | | Re-zeroing of rod position prior to startup | 2.7 | 1 |
| 32 | 015 Nuclear Instrumentation | | 01 | | | | | | | | | | NIS channels, components, and interconnections | 3.3 | 1 |
| 33 | 016 Non-nuclear Instrumentation | | | | | | | | | 01 | | | Automatic selection of NNIS inputs to control systems | 2.9 | 1 |
| | 017 In-core Temperature Monitor | | | | | | | | | | | | | | 0 |
| | 027 Containment Iodine Removal | | | | | | | | | | | | | | 0 |
| | 028 Hydrogen Recombiner and Purge Control | | | | | | | | | | | | | | 0 |
| | 029 Containment Purge | | | | | | | | | | | | | | 0 |
| | 033 Spent Fuel Pool Cooling | | | | | | | | | | | | | | 0 |
| | 034 Fuel Handling Equipment | | | | | | | | | | | | | | 0 |
| 38 | 035 Steam Generator | | | | | | | | | | | 04.20 | Knowledge of the operational implications of EOP warnings, cautions, and notes. | 3.8 | 1 |
| 34 | 041 Steam Dump/Turbine Bypass Control | | | | | | | 02 | | | | | Steam pressure | 3.1 | 1 |
| 35 | 045 Main Turbine Generator | | | | 27 | | | | | | | | Calibrations of the nuclear instrumentation as flux shifts during T/G load increase (permissives and administrative holds) | 2.6 | 1 |
| | 055 Condenser Air Removal | | | | | | | | | | | | | | 0 |
| | 056 Condensate | | | | | | | | | | | | | | 0 |
| 36 | 068 Liquid Radwaste | 02 | | | | | | | | | | | Waste gas vent header | 2.5 | 1 |
| | 071 Waste Gas Disposal | | | | | | | | | | | | | | 0 |
| | 072 Area Radiation Monitoring | | | | | | | | | | | | | | 0 |
| 37 | 075 Circulating Water | | | 07 | | | | | | | | | ESFAS | 3.4 | 1 |
| | 079 Station Air | | | | | | | | | | | | | | 0 |
| | 086 Fire Protection | | | | | | | | | | | | | | 0 |
| | K/A Category Totals: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | Group Point Total: | | 10 |

ES-401 PWR Examination Outline Form ES-401-2

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)

| Q# | E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
|---|---|---|---|---|---|---|---|---|---|---|
| | 000007 Reactor Trip - Stabilization - Recovery / 1 | | | | | | | | | 0 |
| | 000008 Pressurizer Vapor Space Accident / 3 | | | | | | | | | 0 |
| 88 | 000009 Small Break LOCA / 3 | | | | | 1 5 | | RCS parameters | 3.4 | 1 |
| | 000011 Large Break LOCA / 3 | | | | | | | | | 0 |
| 84 | 000015 RCP Malfunctions / 4 | | | | | | 02. 40 | Ability to apply Technical Specifications for a system. | 4.7 | 1 |
| | 000017 RCP Malfunctions (Loss of RC Flow) / 4 | | | | | | | | | |
| | 000022 Loss of Rx Coolant Makeup / 2 | | | | | | | | | 0 |
| | 000025 Loss of RHR System / 4 | | | | | | | | | 0 |
| | 000026 Loss of Component Cooling Water / 8 | | | | | | | | | 0 |
| | 000027 Pressurizer Pressure Control System Malfunction / 3 | | | | | | | | | 0 |
| | 000029 ATWS / 1 | | | | | | | | | 0 |
| 85 | 000038 Steam Gen. Tube Rupture / 3 | | | | | | 02. 22 | Knowledge of limiting conditions for operations and safety limits. | 4.7 | 1 |
| 86 | 000040 Steam Line Rupture - Excessive Heat Transfer / 4 | | | | | 0 2 | | Conditions requiring a reactor trip | 4.7 | 1 |
| | WE12 Uncontrolled Depressurization of all Steam Generators / 4 | | | | | | | | | |
| 87 | 000054 (CE/E06) Loss of Main Feedwater / 4 | | | | | | 02. 40 | Ability to apply Technical Specifications for a system. | 4.7 | 1 |
| | 000055 Station Blackout / 6 | | | | | | | | | 0 |
| | 000056 Loss of Off-site Power / 6 | | | | | | | | | 0 |
| | 000057 Loss of Vital AC Inst. Bus / 6 | | | | | | | | | 0 |
| | 000058 Loss of DC Power / 6 | | | | | | | | | 0 |
| 89 | 000062 Loss of Nuclear Svc Water / 4 | | | | | 0 6 | | The length of time after the loss of SWS flow to a component before that component may be damaged | 3.1 | 1 |
| | 000065 Loss of Instrument Air / 8 | | | | | | | | | 0 |
| | W/E04 LOCA Outside Containment / 3 | | | | | | | | | 0 |
| | W/E11 Loss of Emergency Coolant Recirc. / 4 | | | | | | | | | 0 |
| | BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4 | | | | | | | | | 0 |
| | 000077 Generator Voltage and Electric Grid Disturbances / 6 | | | | | | | | | 0 |
| | K/A Category Totals: | 0 | 0 | 0 | 0 | 3 | 3 | Group Point Total: | | 6 |

ES-401 PWR Examination Outline Form ES-401-2

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)

| Q# | E/APE # / Name / Safety Function | K 1 | K 2 | K 3 | A 1 | A 2 | G | K/A Topic(s) | IR | # |
|---|---|---|---|---|---|---|---|---|---|---|
| | 000001 Continuous Rod Withdrawal / 1 | | | | | | | | | 0 |
| 90 | 000003 Dropped Control Rod / 1 | | | | | 03 | | Dropped rod, using in-core/ex-core instrumentation, in-core or loop temperature measurements | 3.8 | 1 |
| | 000005 Inoperable/Stuck Control Rod / 1 | | | | | | | | | 0 |
| | 000024 Emergency Boration / 1 | | | | | | | | | 0 |
| | 000028 Pressurizer Level Malfunction / 2 | | | | | | | | | 0 |
| | 000032 Loss of Source Range NI / 7 | | | | | | | | | 0 |
| | 000033 Loss of Intermediate Range NI / 7 | | | | | | | | | 0 |
| | 000036 Fuel Handling Accident / 8 | | | | | | | | | 0 |
| | 000037 Steam Generator Tube Leak / 3 | | | | | | | | | 0 |
| | 000051 Loss of Condenser Vacuum / 4 | | | | | | | | | 0 |
| | 000059 Accidental Liquid RadWaste Rel. / 9 | | | | | | | | | 0 |
| | 000060 Accidental Gaseous Radwaste Rel. / 9 | | | | | | | | | 0 |
| | 000061 ARM System Alarms / 7 | | | | | | | | | 0 |
| | 000067 Plant Fire On-site / 8 | | | | | | | | | 0 |
| | 000068 Control Room Evac. / 8 | | | | | | | | | 0 |
| | 000069 Loss of CTMT Integrity / 5 | | | | | | | | | 0 |
| | W/E14 High Containment Pressure / 5 | | | | | | | | | |
| 92 | 000074 Inad. Core Cooling / 4 | | | | | | 04, 20 | Knowledge of the operational implications of EOP warnings, cautions, and notes. | 4.3 | 1 |
| | W/E06 Degraded Core Cooling / 4 | | | | | | | | | |
| | W/E07 Saturated Core Cooling / 4 | | | | | | | | | |
| | 000076 High Reactor Coolant Activity / 9 | | | | | | | | | 0 |
| 91 | W/E01 Rediagnosis / 3 | | | | | 01 | | Facility conditions and selection of appropriate procedures during abnormal and emergency operations | 4 | 1 |
| | W/E02 SI Termination / 3 | | | | | | | | | |
| | W/E13 Steam Generator Over-pressure / 4 | | | | | | | | | 0 |
| | W/E15 Containment Flooding / 5 | | | | | | | | | 0 |
| | W/E16 High Containment Radiation / 9 | | | | | | | | | 0 |
| | W/E03 LOCA Cooldown - Depress. / 4 | | | | | | | | | 0 |
| | W/E09 Natural Circulation Operations / 4 | | | | | | | | | 1 |
| 93 | W/E10 Natural Circulation with Steam Void in Vessel with/without RVLIS. / 4 | | | | | | 04, 21 | Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment | 4.6 | |
| | W/E08 RCS Overcooling - PTS / 4 | | | | | | | | | 0 |
| | K/A Category Totals: | 0 | 0 | 0 | 0 | 2 | 2 | Group Point Total: | | 4 |

ES-401 PWR Examination Outline Form ES-401-2

Plant Systems - Tier 2/Group 1 (SRO)

| Q# | System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | IR | # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 003 Reactor Coolant Pump | | | | | | | | | | | | | | 0 |
| 76 | 004 Chemical and Volume Control | | | | | | | | 2 5 | | | | Uncontrolled boration or dilution | 4.3 | 1 |
| | 005 Residual Heat Removal | | | | | | | | | | | | | | 0 |
| 77 | 006 Emergency Core Cooling | | | | | | | | 1 1 | | | | Rupture of ECCS header | 4.4 | 1 |
| | 007 Pressurizer Relief/Quench Tank | | | | | | | | | | | | | | 0 |
| | 008 Component Cooling Water | | | | | | | | | | | | | | 0 |
| | 010 Pressurizer Pressure Control | | | | | | | | | | | | | | 0 |
| | 012 Reactor Protection | | | | | | | | | | | | | | 0 |
| 79 | 013 Engineered Safety Features Actuation | | | | | | | | 0 4 | | | | Loss of instrument bus | 4.2 | 1 |
| | 022 Containment Cooling | | | | | | | | | | | | | | 0 |
| | 025 Ice Condenser | | | | | | | | | | | | | | 0 |
| | 026 Containment Spray | | | | | | | | | | | | | | 0 |
| | 039 Main and Reheat Steam | | | | | | | | | | | | | | 0 |
| | 059 Main Feedwater | | | | | | | | | | | | | | 0 |
| | 061 Auxiliary/Emergency Feedwater | | | | | | | | | | | | | | 0 |
| 80 | 062 AC Electrical Distribution | | | | | | | | | | | 04. 34 | Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. | 4.1 | 1 |
| | 063 DC Electrical Distribution | | | | | | | | | | | | | | 0 |
| | 064 Emergency Diesel Generator | | | | | | | | | | | | | | 0 |
| | 073 Process Radiation Monitoring | | | | | | | | | | | | | | 0 |
| 78 | 076 Service Water | | | | | | | | | | | 02. 42 | Ability to recognize system parameters that are entry-level conditions for Technical Specifications. | 4.6 | 1 |
| | 078 Instrument Air | | | | | | | | | | | | | | 0 |
| | 103 Containment | | | | | | | | | | | | | | 0 |
| | | | | | | | | | | | | | | | 0 |
| | K/A Category Totals: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | Group Point Total: | | 5 |

ES-401 PWR Examination Outline Form ES-401-2

Plant Systems - Tier 2/Group 2 (SRO)

| Q# | System # / Name | K 1 | K 2 | K 3 | K 4 | K 5 | K 6 | A 1 | A 2 | A 3 | A 4 | G | K/A Topic(s) | IR | # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 001 Control Rod Drive | | | | | | | | | | | | | | 0 |
| | 002 Reactor Coolant | | | | | | | | | | | | | | 0 |
| | 011 Pressurizer Level Control | | | | | | | | | | | | | | 0 |
| | 014 Rod Position Indication | | | | | | | | | | | | | | 0 |
| | 015 Nuclear Instrumentation | | | | | | | | | | | | | | 0 |
| | 016 Non-nuclear Instrumentation | | | | | | | | | | | | | | 0 |
| | 017 In-core Temperature Monitor | | | | | | | | | | | | | | 0 |
| | 027 Containment Iodine Removal | | | | | | | | | | | | | | 0 |
| | 028 Hydrogen Recombiner and Purge Control | | | | | | | | | | | | | | 0 |
| | 029 Containment Purge | | | | | | | | | | | | | | 0 |
| | 033 Spent Fuel Pool Cooling | | | | | | | | | | | | | | 0 |
| 81 | 034 Fuel Handling Equipment | | | | | | | | 02 | | | | Dropped cask | 3.9 | 1 |
| 82 | 035 Steam Generator | | | | | | | | 06 | | | | Small break LOCA | 4.6 | 1 |
| | 041 Steam Dump/Turbine Bypass Control | | | | | | | | | | | | | | 0 |
| | 045 Main Turbine Generator | | | | | | | | | | | | | | 0 |
| | 055 Condenser Air Removal | | | | | | | | | | | | | | 0 |
| | 056 Condensate | | | | | | | | | | | | | | 0 |
| | 068 Liquid Radwaste | | | | | | | | | | | | | | 0 |
| | 071 Waste Gas Disposal | | | | | | | | | | | | | | 0 |
| 83 | 072 Area Radiation Monitoring | | | | | | | | | | | 04, 11 | Knowledge of abnormal condition procedures. | 4.2 | 1 |
| | 075 Circulating Water | | | | | | | | | | | | | | 0 |
| | 079 Station Air | | | | | | | | | | | | | | 0 |
| | 086 Fire Protection | | | | | | | | | | | | | | 0 |
| | K/A Category Totals: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | Group Point Total: | | 3 |

| ES-401 | Generic Knowledge and Abilities Outline (Tier 3) | Form ES-401-3 |
|---|---|---|

Facility Name:Braidwood Date of Exam:10/5/09

| Q# | Category | K/A # | Topic | RO IR | RO # | SRO-Only IR | SRO-Only # |
|---|---|---|---|---|---|---|---|
| 66 | 1. Conduct of Operations | 2.1. 18 | Ability to make accurate, clear, and concise logs, records, status boards, and reports. | 3.6 | 1 | | |
| 67 | | 2.1. 40 | Knowledge of refueling administrative requirements. | 2.8 | 1 | | |
| 68 | | 2.1. 44 | Knowledge of RO duties in the control room during fuel handling such as responding to alarms from the fuel handling area, communication with the fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation. | 3.9 | 1 | | |
| 94 | | 2.1. 20 | Ability to interpret and execute procedure steps. | | | 4.6 | 1 |
| 95 | | 2.1. 09 | Ability to direct personnel activities inside the control room. | | | 4.5 | 1 |
| | | 2.1. | | | | | |
| | | Subtotal | | | 3 | | 2 |
| 69 | 2. Equipment Control | 2.2. 36 | Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. | 3.1 | 1 | | |
| 70 | | 2.2. 44 | Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. | 4.2 | 1 | | |
| 96 | | 2.2. 11 | Knowledge of the process for controlling temporary design changes. | | | 3.3 | 1 |
| 97 | | 2.2. 19 | Knowledge of maintenance work order requirements. | | | 3.4 | 1 |
| | | 2.2. | | | | | |
| | | 2.2. | | | | | |
| | | Subtotal | | | 2 | | 2 |
| 71 | 3. Radiation Control | 2.3. 04 | Knowledge of radiation exposure limits under normal or emergency conditions. | 3.2 | 1 | | |
| 72 | | 2.3. 11 | Ability to control radiation releases. | 3.8 | 1 | | |
| 73 | | 2.3. 15 | Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. | 2.9 | 1 | | |
| 98 | | 2.3. 05 | Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. | | | 2.9 | 1 |
| 99 | | 2.3. 13 | Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, allowing filters, etc. | | | 3.8 | 1 |
| | | 2.3. | | | | | |
| | | Subtotal | | | 3 | | 2 |
| 74 | 4. Emergency Procedures / Plan | 2.4. 16 | Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines. | 3.5 | 1 | | |
| 75 | | 2.4. 27 | Knowledge of "fire in the plant" procedures. | 3.4 | 1 | | |
| 100 | | 2.4. 11 | Knowledge of abnormal condition procedures. | | | 4.2 | 1 |
| | | 2.4. | | | | | |
| | | 2.4. | | | | | |
| | | 2.4. | | | | | |
| | | Subtotal | | | 2 | | 1 |
| Tier 3 Point Total | | | | | 10 | | 7 |

| Tier / Group | Randomly Selected K/A | Reason for Rejection |
|---|---|---|
| 2/1 (Q. #4) | 000006K3.03 | Unable to create RO level question that properly discriminates. Replaced with systematically selected K/A 000006K3.02 in same system and category to keep outline balanced. Updated ES-401-2. |
| 2/1 (Q. #25) | 0760002.4.8 | System that was randomly selected for K/A topic (Service Water) does not have any OA procedure use in conjunction with EOPs at Braidwood. Replaced with systematically selected K/A 0620002.4.8 using same K/A topic and new system (AC Elec. Dist.) that does have OA procedure use in conjunction with EOPs. Additionally, Service Water was randomly sampled twice in Tier 2 Group 1 and AC Elec. Dist. only once. Therefore, systematic selection of AC Elec. Dist. system keeps outline balanced. Updated ES-401-2. |
| 2/2 (Q. #38) | 0790002.4.20 | System that was randomly selected for K/A topic (Station Air) does not have any EOP warnings, cautions or notes at Braidwood. Replaced with systematically selected K/A 0350002.4.20 using same K/A topic and new system (Steam Generator) that does have EOP note. Additionally, Steam Generator system was not randomly sampled in Tier 2 Group 2. Therefore, systematic selection of Steam Generator system keeps outline balanced. Updated ES-401-2. |
| 1/1 (Q. #42) | 000011EA2.06 | Randomly selected K/A subject matter is same as question #12 on this exam. Both are checking proper opertion of RCFC fans following an SI. Replaced with systematically selected K/A 000011A2.08 in E/APE category that was not randomly sampled (RCP Malfunctions) and same topic category (A2) to keep outline balanced. Updated ES-401-2. |
| 1/1\ (Q. #47) | 000029EA1.07 | Randomly selected K/A chose ability (operating switch for Charging pump recirc valve) that is not performed in emergency procedure 1BwFR-S.1 at Braidwood. Replaced with systematically selected K/A 000029EA1.13 from same EPE to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #58) | 000037AK1.01 | Randomly selected K/A (use of steam tables) is third time on this exam steam table use was randomly selected. (also used on question #8 and #29). Rejected K/A based upon over sampling of this area. Replaced with systematically selected K/A 0370002.1.23 from same APE and different category that was only sampled 4 times in tier 1 (vs. 5) to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #61) | 000069AK2.03 | Randomly selected K/A subject matter (containment access hatch effect on containment integrity) was on audit exam question #38. Rejected K/A based upon repeatability from audit exam. Replaced with systematically selected K/A 000069AA1.01 from same APE and different category since no other K2 category had importance rating >2.5. Updated ES-401-2. |
| 1/2 (Q. #62) | 000074EA1.18 | Unable to create RO level question that properly discriminates. Replaced with systematically selected K/A 000051AA2.02 in same tier and and different category that was only sampled 4 times in tier 1 (vs. 5) to keep outline balanced. Updated ES-401-2. |
| 2/1 (Q. #78) | 0080002.2.42 | Unable to create SRO level question that properly discriminates. Also CC system was already tested in some form in 4 previous questions (7,12,42 & 45). Replaced with systematically selected K/A 0760002.2.42 in same tier/group and same generic K/A to keep outline balanced. Updated ES-401-2. |
| 2/2 (Q. #83) | 0720002.4.8 | System that was randomly selected for K/A topic (Area Rad Monitoring) does not have any OA procedure use in conjunction with EOPs at |

| | | |
|---|---|---|
| | | Braidwood. Additionally, generic K/A 2.4.8 was previously sampled in question #25. Replaced with systematically selected K/A 0720002.4.11 using same system and new K/A topic to keep outline balanced. Updated ES-401-2. |
| 1/1 (Q. #88) | 000057AA2.15 | Randomly selected K/A APE (loss of Inst. bus) is second time on SRO section of this exam loss of inst. bus was randomly selected. (also selected on question #79 KA topic). Rejected K/A based upon over sampling of this area. Replaced with systematically selected K/A 000009AA2.15 from different APE and same K/A number to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #90) | 000024AA2.01 | Unable to create SRO level question that properly discriminates. Replaced with systematically selected K/A 000003AA2.03 in same tier and group to keep outline balanced. Updated ES-401-2. |
| 1/2 (Q. #92) | E070002.4.20 | Randomly selected EPE (saturated core cooling) does not contain any unique notes, warnings or cautions that provide bases for discriminating SRO level question. Replaced with systematically selected K/A 0740002.4.20 (inadequate core cooling) with same generic KA statement and in same tier and group to keep outline balanced. Updated ES-401-2. |
| 3/1 (Q. #95) | 0000002.1.39 | Unable to create SRO level question that properly discriminates. Replaced with systematically selected K/A 0000002.1.9 in same tier and category to keep outline balanced. Updated ES-401-2. |
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Facility: Braidwood Date of Examination: 10/5/2009

Examination Level: RO ☒ SRO ☐ Operating Test Number: 2009 NRC

| Administrative Topic (See Note) | Type Code* | Describe activity to be performed |
|---|---|---|
| Conduct of Operations | D, S | R-101 Perform QPTR Calculation using the Process Computer<br>K/A 2.1.19 Imp Factor 3.9 |
| Conduct of Operations | N, C | R-109 Complete NRC Active License Maintenance Log<br>K/A 2.1.4 Imp Factor 3.3 |
| Equipment Control | D, R | R-200 Worker Tagout Peer Check<br>K/A 2.2.13 Imp Factor 4.1 |
| Radiation Control | N, S | R-301 Perform Containment Release Channel Check.<br>BwRP 6110-13T1 and 1BwOS RETS 2.2.B-1<br>K/A 2.3.11 Imp Factor 3.8 |
| Emergency Plan | N/A | N/A |

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

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Braidwood Date of Examination: 10/5/2009

Examination Level: RO ☐ SRO ☒ Operating Test Number: 2009 NRC

| Administrative Topic (See Note) | Type Code* | Describe activity to be performed |
|---|---|---|
| Conduct of Operations | N, S, R | S-108 Determine Venting Time for Rx Vessel Head Void (BwFR-I.3)<br>K/A 2.1.25 Imp Factor 4.2 |
| Conduct of Operations | N, C | R-109 Complete NRC Active License Maintenance Log<br>K/A 2.1.4 Imp Factor 3.8 |
| Equipment Control | D, R | R-200 Worker Tagout Peer Check.<br>K/A 2.2.13 Imp Factor 4.3 |
| Radiation Control | D, S | S-300 Review Containment Release for Approval<br>K/A 2.3.11 Imp Factor 4.3 |
| Emergency Plan | D, S, R | S-404 Screen an Event for Reportability and Complete ENS Worksheet<br>K/A 2.4.30 Imp Factor 4.1 |

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: Braidwood Date of Examination: 10/5/2009

Exam Level: RO ☒ SRO-I ☐ SRO-U ☐ Operating Test Number: 2009 NRC

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

| System / JPM Title | Type Code* | Safety Function |
|---|---|---|
| a. SIM-111 Perform Movable Control Assembly Quarterly Surveillance<br>K/A 001000A4.03 Imp Factor 4.0/3.7 | D, S, A | 1 |
| b. SIM-207 Raise SI Accumulator Pressure<br>K/A 006000A4.02 Imp Factor 4.0/3.8 | D, S | 2 |
| c. SIM-304 Perform Pzr PORV valve stroke surv.<br>K/A 010000A4.03 Imp Factor 4.0/3.8 | N, S | 3 |
| d. SIM-407S Swap SX pumps<br>K/A 076000A4.01 Imp Factor 2.9/2.9 | M, S, A | 4S |
| e. SIM-507 Perform RCFC Surveillance<br>K/A 022000A4.01 Imp Factor 3.6/3.6 | N, S, A | 5 |
| f. SIM-611 Cross-tie ESF to Non-ESF bus in ELEC-4<br>K/A 062000A4.01 Imp Factor 3.3/3.1 | M, S, L | 6 |
| g. SIM-710 Respond to SR NI Failure<br>K/A 015000A2.02 Imp Factor 3.1/3.5 | N, S, L | 7 |
| h. SIM-803 Respond to CC malfunction (relief valve lifting)<br>K/A 008000A2.02 Imp Factor 3.2/3.5 | D, S, E | 8 |
| In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) | | |
| i. IP-200 Locally Reset Feedwater Isolation<br>K/A 013000A4.02 Imp Factor 4.3/4.4 | D, E | 2 |
| j. IP-410S Locally start the 2B AF pump<br>K/A 061000A2.04 Imp Factor 3.4/3.8 | M, R, A | 4S |
| k. IP-703 Local Reactor Trip<br>K/A 029000EA1.12 Imp Factor 4.1/4.0 | D, E, A | 1 |

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

| *Type Codes | Criteria for RO / SRO-I / SRO-U |
|---|---|
| (A)lternate path | 4-6 / 4-6 / 2-3 |
| (C)ontrol room | |
| (D)irect from bank | ≤ 9 / ≤ 8 / ≤ 4 |
| (E)mergency or abnormal in-plant | ≥ 1 / ≥ 1 / ≥ 1 |
| (L)ow-Power / Shutdown | ≥ 1 / ≥ 1 / ≥ 1 |
| (N)ew or (M)odified from bank including 1(A) | ≥ 2 / ≥ 2 / ≥ 1 |
| (P)revious 2 exams | ≤ 3 / ≤ 3 / ≤ 2 (randomly selected) |
| (R)CA | ≥ 1 / ≥ 1 / ≥ 1 |
| (S)imulator | |

Facility: Braidwood Date of Examination: 10/5/2009

Exam Level: RO ☐ SRO-I ☒ SRO-U ☐ Operating Test Number: 2009 NRC

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

| System / JPM Title | Type Code* | Safety Function |
|---|---|---|
| a. SIM-111 Perform Movable Control Assembly Quarterly Surveillance<br>K/A 001000A4.03 Imp Factor 4.0/3.7 | D, S, A | 1 |
| b. SIM-207 Raise SI Accumulator Pressure<br>K/A 006000A4.02 Imp Factor 4.0/3.8 | D, S | 2 |
| c. N/A | | |
| d. SIM-407S Swap SX pumps<br>K/A 076000A4.01 Imp Factor 2.9/2.9 | M, S, A | 4S |
| e. SIM-507 Perform RCFC Surveillance<br>K/A 022000A4.01 Imp Factor 3.6/3.6 | N, S, A | 5 |
| f. SIM-611 Cross-tie ESF to Non-ESF bus in ELEC-4<br>K/A 062000A4.01 Imp Factor 3.3/3.1 | M, S, L | 6 |
| g. SIM-710 Respond to SR NI Failure<br>K/A 015000A2.02 Imp Factor 3.1/3.5 | N, S, L | 7 |
| h. SIM-803 Respond to CC malfunction (relief valve lifting)<br>K/A 008000A2.02 Imp Factor 3.2/3.5 | D, S, E | 8 |
| In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) | | |
| i. IP-200 Locally Reset Feedwater Isolation<br>K/A 013000A4.02 Imp Factor 4.3/4.4 | D, E | 2 |
| j. IP-410S Locally start the 2B AF pump<br>K/A 061000A2.04 Imp Factor 3.4/3.8 | M, R, A | 4S |
| k. IP-703 Local Reactor Trip<br>K/A 029000EA1.12 Imp Factor 4.1/4.0 | D, E, A | 1 |

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

| *Type Codes | Criteria for RO / SRO-I / SRO-U |
|---|---|
| (A)lternate path | 4-6 / 4-6 / 2-3 |
| (C)ontrol room | |
| (D)irect from bank | ≤ 9 / ≤ 8 / ≤ 4 |
| (E)mergency or abnormal in-plant | ≥ 1 / ≥ 1 / ≥ 1 |
| (L)ow-Power / Shutdown | ≥ 1 / ≥ 1 / ≥ 1 |
| (N)ew or (M)odified from bank including 1(A) | ≥ 2 / ≥ 2 / ≥ 1 |
| (P)revious 2 exams | ≤ 3 / ≤ 3 / ≤ 2 (randomly selected) |
| (R)CA | ≥ 1 / ≥ 1 / ≥ 1 |
| (S)imulator | |

Facility: Braidwood Date of Examination: 10/5/2009

Exam Level: RO ☐ SRO-I ☐ SRO-U ☒ Operating Test Number: 2009 NRC

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

| System / JPM Title | Type Code* | Safety Function |
|---|---|---|
| a. N/A | | |
| b. N/A | | |
| c. N/A | | |
| d. N/A | | |
| e. SIM-507 Perform RCFC Surveillance (ESF)<br>K/A 022000A4.01 Imp Factor 3.6/3.6 | N, S, A | 5 |
| f. SIM-611 Cross-tie ESF to Non-ESF bus in ELEC-4<br>K/A 062000A4.01 Imp Factor 3.3/3.1 | M, S, L | 6 |
| g. N/A | | |
| h. N/A | | |

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

| | | |
|---|---|---|
| i. IP-200 Locally Reset Feedwater Isolation<br>K/A 013000A4.02 Imp Factor 4.3/4.4 | D, E | 2 |
| j. IP-410S Locally start the 2B AF pump<br>K/A 061000A2.04 Imp Factor 3.4/3.8 | M, R, A | 4S |
| k. IP-703 Local Reactor Trip<br>K/A 029000EA1.12 Imp Factor 4.1/4.0 | D, E, A | 1 |

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

| *Type Codes | Criteria for RO / SRO-I / SRO-U |
|---|---|
| (A)lternate path | 4-6 / 4-6 / 2-3 |
| (C)ontrol room | |
| (D)irect from bank | ≤ 9 / ≤ 8 / ≤ 4 |
| (E)mergency or abnormal in-plant | ≥ 1 / ≥ 1 / ≥ 1 |
| (L)ow-Power / Shutdown | ≥ 1 / ≥ 1 / ≥ 1 |
| (N)ew or (M)odified from bank including 1(A) | ≥ 2 / ≥ 2 / ≥ 1 |
| (P)revious 2 exams | ≤ 3 / ≤ 3 / ≤ 2 (randomly selected) |
| (R)CA | ≥ 1 / ≥ 1 / ≥ 1 |
| (S)imulator | |