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Examination Guide CNSC-EG2, Rev. 0

Requirements and Guidelines for Simulator-based Certification Examinations for Shift Personnel at Nuclear Power Plants

June 2004

Appendices

1 Purpose and Scope

1.1 Purpose

The purposes of this Canadian Nuclear Safety Commission (CNSC) document are:

a) to specify a process acceptable to the CNSC that nuclear power plant (NPP) licensees should follow in planning, developing, conducting and grading simulator-based certification examinations for persons seeking certification by the CNSC for the operating positions specified in their Power Reactor Operating Licences;

b) to specify requirements, criteria and guidelines endorsed by the CNSC that NPP licensees should comply with or follow to ensure that their simulator-based certification examinations are administered in an equitable and consistent manner.

1.2 Scope

Persons seeking certification for the operating positions listed below must successfully complete the simulator-based certification examination administered by the licensee that is specified in the plant's Power Reactor Operating Licence:

Licensee	CNSC Generic Title	Licensees' Position Title
New Brunswick Power and Hydro-Québec	Reactor Operator (RO)	Control Room Operator (CRO)
	Shift Supervisor (SS)	Shift Supervisor (SS)
Ontario Power Generation and Bruce Power	Reactor Operator (RO)	Authorized Nuclear Operator (ANO)
	Unit 0 Operator (U0O)	Unit 0 Control Room Operator (U0 CRO)
	Shift Supervisor (SS)	Control Room Shift Supervisor (CRSS)
	Shift Supervisor (SS)	Shift Manager (SM)

These examinations are aimed at providing the CNSC with the assurance that, at the time of their certification, candidates for those positions have the level of knowledge and skills required to respond to abnormal operating conditions at their plant.
This document covers all the simulator-based certification examinations applicable to those operating positions.

2 Definitions

The definitions below are of a restricted nature for the purpose of this document.

Abridged Test Scenario (ATS) - A dynamic test scenario consisting of a number of Primary and Secondary Malfunctions that creates a number of abnormal plant conditions, failures or transients and that requires SS candidates at single-unit plants to demonstrate their ability to respond to these abnormal situations when the RO is temporarily absent from the control room.

Actual Test Scenario Dynamic Duration - The interval between the time when the lead examiner signals the simulator operator to start the simulation of a dynamic test scenario and the time at which the simulation is terminated at the predetermined endpoint of the scenario, as measured during the conduct of the test scenario with a candidate.

Additional Malfunction - A failure of a piece of equipment, of a control device or of a component of a system to respond correctly when called upon to act, either automatically or by operator intervention, or a failure of an operating piece of equipment, subsequent to a Primary Malfunction.

Approved Examiner's Guide - The document, approved by the Training Manager, that contains all the information required for the conduct of a test scenario.

Authorized Examiner's Guide - The version of the examiner's guide for a test scenario authorized by the Training Manager for grading an examination.

Barrier - A physical device, an administrative process or an individual's behaviour that significantly reduces the risk of compromising the security of a certification examination. Examples of acceptable barriers are:

- signed security agreements;
- a locked room with opaque windows accessible only to persons who have signed the appropriate security agreement;
- a locked file cabinet, desk or safe accessible only to persons who have signed the appropriate security agreement;
- password protected electronic files accessible only to persons who have signed the appropriate security agreement;
- direct control of examination material by a person who has signed the appropriate security agreement.

Comprehensive Test Scenario (CTS) - A dynamic test scenario consisting of an integrated sequence of Primary and Secondary Malfunctions that creates a succession of abnormal plant conditions, failures or transients and that requires candidates to demonstrate their skills in all competency areas measured by the examination.

Conditional Pass Result - A pass result with attached conditions for remedial training which may be given to a candidate when the candidate obtains a pass score in the examination, but shows one or more significant performance deficiencies that could adversely impact on the safe operation of the plant.

Critical Error - A human error that has an immediate or potential serious impact on plant safety or public safety.

Diagnostic Test Scenario (DTS) - A dynamic test scenario consisting of a single Primary Malfunction and a number of Secondary Malfunctions that requires SS candidates at multi-unit plants to demonstrate their ability to independently monitor the evolution of plant conditions, recognize abnormalities, determine their significance, diagnose malfunctions, and select the relevant procedures to address them or determine the required course of actions when procedures do not exist or are deficient.

Estimated Examination Duration - For the examinations for SS candidates at multi-unit plants, the sum of the estimated dynamic durations of the CTSs and DTSs and of the estimated time to complete the verification task during the Panel Check Test Scenario. For all other examinations, the sum of the estimated dynamic durations of all test scenarios in an examination.

Estimated Test Scenario Dynamic Duration - The time a typically qualified incumbent of the position sought by the candidates would take to complete a given CTS, ATS or DTS, estimated during the final verification of the test scenario. This time is measured from the time the lead examiner signals the simulator operator to start the simulation of the scenario to the time at which the simulation is terminated at the predetermined endpoint of the scenario.

Examination Team - The team which develops, conducts and grades an examination. The team is composed of the lead examiner and at least another qualified examiner.

Frozen Documentation - The set of licensee's administrative, operating and training documents that may be referenced when preparing, conducting or grading a given examination. This set should include all administrative and operating documents available in the plant control room that may be referenced by incumbents of the position sought by the candidates in performing their duties. It should also include all training material given to the candidates.

Lead Examiner (LE) - An examiner who coordinates the development, conduct and grading of an examination.

Monitoring Malfunction - A failure of any indicating device on the control room panels.

Observers - Persons who, due to their duties, need to obtain additional knowledge on the conduct of simulator-based certification examinations.

Panel Anomaly - In the context of a Panel Check Test Scenario, a failed indicating device, an annunciation or an indication of an equipment or system condition that is abnormal under the existing plant conditions, or a control device set-up that is incorrect under the existing plant conditions.

Panel Check Test Scenario (PCTS) - A test scenario during which plant conditions are stable and that requires SS candidates at multi-unit plants to demonstrate their ability to perform verifications of control room panels relevant to the SS position, by recognizing panel anomalies or abnormal conditions and by determining their significance. The PCTS also requires those SS candidates to demonstrate their ability to determine the required course of actions to address these anomalies and abnormal conditions.

Primary Malfunction - A failure of equipment, of a control device, of a component of a system, or a combination of such failures, that creates at the time of its occurrence during a test scenario the main abnormal condition, failure or transient that must be addressed by the candidate.

Secondary Malfunction - Any Additional or Monitoring Malfunction.

Significant Error - A human error that may have some immediate or potential impact on plant safety or public safety, or that results in an unwarranted unit transient.

Support Team - The team which supports the rehearsals of test scenarios and the conduct of an examination by operating the simulator and by playing the role of typical operating crew members.

3 Responsibilities

The titles of the positions used in this document are generic. The responsibilities of those positions should be assigned by the licensee to individuals holding the equivalent position in its organisation.

3.1 Training Manager

The responsibilities of the Training Manager are:

a) To ensure that the requirements in this document are complied with and that the criteria and guidelines it contains are followed during all stages of the examination process.

b) To ensure that sufficient qualified personnel and resources are available to develop, conduct and grade all simulator-based certification examinations.

c) To assign at least two qualified examiners to each examination and to designate one of them as lead examiner.

d) To ensure that the plant full scope simulator meets the capability requirements for simulator-based certification examinations.

e) To approve the examiner's guides prior to the conduct of an examination.

f) To approve the presence of observers during the conduct of an examination.

g) To determine candidates whose examination will be graded a second time.

h) To authorize the examiner's guides and the examination result of each candidate.

i) To ensure that a copy of the authorized examiner's guides is sent to the CNSC following each examination and that the CNSC is formally notified of the results of each candidate.

3.2 Lead Examiner

The responsibilities of the lead examiner are:

a) To inform all persons participating in the development and conduct of an examination of the requirements regarding examination security and to ensure that each person has signed a copy of the applicable security agreement.

b) To coordinate the development, conduct and grading of an examination, and to verify that the relevant criteria and guidelines for simulator-based certification examinations are followed during those stages of the examination process.

c) To decide whether communications with licensee staff, that are not part of the examination team, on any matter relating to an examination are required and, if so, to determine how these communications are to take place.

d) To ensure that the individuals assigned to the support team have the required knowledge and skills to play their respective roles effectively.

e) To determine the order in which candidates will be examined.

f) To make minor adjustments to the approved examiner's guides, where required, at the time of an examination.

g) To ensure that the simulator operator verifies that the simulator and the data collection devices are set properly at the start of each test scenario during the conduct of an examination.

h) To instruct the candidate when to enter or leave the control room at the simulator during the conduct of an examination.

i) To decide when to start, abort or end a test scenario during the conduct of an examination.

j) To ensure that all the required data is collected after each test scenario.

k) To decide when to reset the simulator and its control panels after each test scenario.

3.3 Examination Team Members

The responsibilities of examination team members are:

a) To participate in the development, conduct and grading of an examination.

b) To operate the plant full scope simulator and to perform control panel operations during the verifications of the test scenarios.

c) To identify simulator shortcomings that may affect the simulation of the test scenarios.

d) To record the performance of each candidate in the examiner's guides during the conduct of an examination.

e) To recommend to the lead examiner to abort a test scenario, when warranted.

3.4 Support Team Members

The responsibilities of support team members during rehearsals of test scenarios and the conduct of an examination are:

a) To play the role of the control room and field operating crew, as prescribed in the examiner's guides.

b) To operate the simulator, as prescribed in the examiner's guides (simulator operator).

c) To identify simulator shortcomings that may affect the simulation of the test scenarios.

d) To advise the lead examiner, preferably during the conduct of a test scenario, or immediately after its completion, of any supplementary malfunction or alarm that should be or should have been activated as a result of unexpected actions or lack of proper actions by a candidate (simulator operator).

e) To bring to the immediate attention of the lead examiner during the conduct of a test scenario any simulator deficiency or other circumstance that may affect the validity of the test scenario and possibly necessitate its termination (simulator operator).

4 Administrative Requirements

4.1 Security of Certification Examinations

a) Licensees must document the physical, electronic and administrative measures and requirements, including those specifically designed for the simulator, which must be in place to minimize the risk of compromising the security of the examinations.

b) Access to the examinations and to examination material must be limited to persons with a need to know.

c) All examinations and examination material must be continuously controlled.

   i) At least one barrier against unauthorized access to examinations and examination material must be in place at all times.

   ii) All draft material, notes and other documents generated or consulted during any phase of the examination process must be handled in a way that prevents compromising the security of the examinations.

d) Before a person may participate in the development or conduct of an examination, the person must:

   i) have been informed of the physical, electronic and administrative measures and requirements, applicable to the person's role in the examination, established by the licensee to ensure the security of the examinations;

   ii) have been informed of the terms of the applicable *Security Agreement for Certification Examinations* shown in Appendix A.1, part A or part C and of the consequences of violating its terms;

   iii) have signed a copy of the applicable agreement.

e) Prior to taking an examination, a candidate must:

   i) have been informed of the terms of the *Security Agreement for Certification Examinations* shown in Appendix A.1, part B and of the consequences of violating its terms;

   ii) sign a copy of that agreement.

f) If any unauthorized access to information related to the content of an examination is suspected, the Training Manager must be informed and undertake an investigation. If the investigation shows that the security of the examination has been compromised, the examination must not be used.

4.2 Independence Between Training and Certification Examinations

a) Once an examiner has started working on the development of an examination or once a person has any information on the content of an examination, that individual can no longer train, or give training feedback to, the candidates scheduled to take that examination until all of them have completed the examination.

b) A given simulator-based certification examination must not be designed only by examiners who have given training on the plant full scope simulator to the candidates scheduled to take that examination.

c) The Training Manager and the examiners participating in the examination process must not benefit from any performance incentive related to the success rate of candidates taking the certification examinations.

4.3 Qualifications of Examiners

a) Examiners developing, conducting and grading simulator-based examinations must have the applicable qualifications listed below.

i) For examinations for RO and SS candidates, either:

- be currently certified or have been previously certified by the CNSC as RO or SS at any plant with at least one year of experience in the position, or
- have the knowledge that candidates are expected to have in the areas of:
  - design and operation of plant systems
  - plant systems integrated operation
  - control room panels
  - control room and field standard operating practices at the plant
  - performance expectations of plant management for operations personnel

ii) For examinations for U0O candidates, either:

- be currently certified or have been previously certified by the CNSC as U0O or SS at any plant with at least one year of experience in the position, or
- have the knowledge that candidates are expected to have in the areas of:
  - design and operation of plant systems
  - plant systems integrated operation
  - control room panels
  - control room and field standard operating practices at the plant
  - performance expectations of plant management for operations personnel

iii) If not currently or previously certified at the plant in the position for which the examination is intended, be fully familiar with the knowledge and skill requirements of that position at that plant.

iv) Be familiar with the assessment techniques used during testing on a full scope simulator.

v) Be fully familiar with all criteria and guidelines for simulator-based certification examinations.

Note: Qualified examiners may be assisted by other persons who do not have the applicable qualifications, such as subject matter experts.

b) In addition to meeting the applicable qualification requirements of paragraph a) above, the lead examiner must have participated as an examiner in the examination process for at least one simulator-based certification examination for the position for which the examination is intended or for SS candidates.

c) At least one member of the examination team for a simulator-based examination must:

   i) be currently or have been previously certified at the plant, or at a similar plant on the same site, in the position for which the examination is intended or as an SS; when not currently certified, the examiner must have the knowledge that candidates are expected to have in the areas of:
      - design and operation of plant systems
      - plant systems integrated operation
      - control room panels
      - control room and field standard operating practices at the plant
      - performance expectations of plant management for operations personnel

   ii) have detailed and up-to-date knowledge of the simulator operational capabilities, its modelling limitations and the equipment and system malfunctions that it can simulate;

   iii) be capable of operating the plant full scope simulator and performing control panel operations during the verifications of the test scenarios.

4.4 Appeal of the Result of a Certification Examination

Licensees should have in place a documented process for handling appeals of the results of examinations by candidates.

4.5 Retention of Certification Examination Records

a) For each examination, licensees must retain the following records for a minimum of five years from the end date of the examination:

   i) an approved examination package that includes:

      (1) the approved examiner's guides;

      (2) the test scenario checklists and the examination checklist;

      (3) the names of the persons who developed the examiner's guides;

      (4) the name and signature of the person who approved the examiner's guides and the examination package, with the date of signature;

   ii) the authorized examiner's guides with the name and signature of the person who authorized them, with the date of signature;

   iii) signed security agreements.

b) Licensees must retain the examiner's guides marked up by the examiners and all the data collected during the conduct of an examination for five years from the date of that examination.

c) Licensees must retain for each candidate a record of the examinations taken by the candidate, containing:
   i) the position sought of the candidate;
   ii) the types and dates of the examinations;
   iii) the final assessment package of the candidate for each examination, consisting of the documents specified in paragraph 9.1.4.11;
   iv) when the candidate must clear a conditional pass result:
      (1) the outline of the remedial training completed, with the name and signature of the person who approved the training;
      (2) the final assessment package of the candidate for the examination completed following the remedial training, consisting of the documents specified in paragraph 9.1.4.11;
   v) documentation of the outcome of any appeal of the result of an examination by the candidate.

d) As a minimum, the records specified in paragraph c) must be retained for the period prescribed in paragraph 14(5) of the Class I Nuclear Facilities Regulations.

5 Planning of Examinations

5.1 The Training Manager should establish guidelines for planning simulator-based certification examinations at the plant that ensure that sufficient qualified personnel and resources are available to develop, conduct and grade these examinations, in accordance with the criteria and guidelines of this document.

5.2 The Training Manager should ensure that there is a documented process for confirming that the plant full scope simulator meets the minimum acceptable capability requirements for simulator-based certification examinations specified in Appendix A.3.

5.3 The Training Manager should establish rules regarding frozen documentation, taking into consideration the following guidelines:

a) Documents describing the expectations of plant management regarding the performance of control room response team members should be frozen before the start of the development of an examination.

b) Other documents should be frozen approximately four weeks before the start date of the examination.

c) Frozen documents should not be replaced until the end of the examination process, except for those revisions of approved operating procedures made before the conduct of an examination that, according to plant management, have a significant impact on safe plant operation.

5.4 For each examination, the Training Manager should assign two or more qualified examiners to the examination team and designate one of them as lead examiner.

5.5 The Training Manager should communicate the tentative schedule of simulator-based certification examinations for a given calendar year to the CNSC at least six months before the beginning of the year.

5.6 The Training Manager should promptly inform the CNSC of any change to this schedule.

5.7 Before the start of the design of an examination, the lead examiner should:

a) verify that all the information required to prepare the examination is available;

b) ensure that the members of the examination team are fully aware of their roles and responsibilities and of the rules they must abide by, as specified in Appendix A.2;

c) review with the members of the examination team the intent of the relevant security agreement shown in Appendix A.1, and the consequences of violating its terms;

d) ensure that each person signs or has signed a copy of the relevant agreement and collect the signed agreements for filing.

6 Design of Examinations

The examination team should design the examinations according to the instructions of:

- subsection 6.1 for examinations for RO candidates
- subsection 6.2 for examinations for U0O candidates
- subsection 6.3 for examinations for SS candidates at single-unit plants
- subsection 6.4 for examinations for SS candidates at multi-unit plants

6.1 Examinations for RO Candidates

6.1.1 Design of the Test Scenarios

Design three CTSs that collectively meet the following criteria:

a) Duplication in the required operator actions is minimized among CTSs.

b) Initial plant conditions, including reactor power, are varied among CTSs.

c) At least one CTS starts with initial plant conditions different from normal full power conditions that have a significant impact on the actions to be taken by the candidates.

d) The CTSs cover a broad range of system operations, equipment malfunctions and unit transients.

e) At least one CTS includes a category 4 Primary Malfunction.

f) At least one CTS includes a failure of a major automatic action during a transient that must be detected by the candidates and that requires them to respond immediately.

g) At least two CTSs include one or more situations that require the candidates to determine or recommend an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

h) At least two CTSs include concurrent malfunctions or unit conditions that require the candidates to assign priorities to their actions or to the actions of the support team.

i) At least one CTS includes a situation where a requirement in the *Operating Policies and Principles* (OP&Ps) is not met that must be recognized and addressed by the candidates.

j) At least one CTS includes the occurrence of an impairment of a special safety system or standby safety support system that must be recognized and addressed by the candidates.

k) At multi unit plants, at least one CTS includes conditions on one or more reactor units, other than the simulated reactor unit, that prevent or significantly delay the arrival at this reactor unit of one or both assisting ROs from other units, or that require one or both assisting ROs to subsequently leave the simulated reactor unit during the CTS.

l) Over the entire examination, candidates are tested in the competency areas listed in Appendix A.4 A as follows:

i) at least 25 times in competency area 1, 3, 4 and 5;

ii) at least 15 times in competency area 2.

m) The estimated examination duration is between 2 and 3 hours.

6.1.2 Design of a CTS

6.1.2.1 Define the initial plant conditions according to the following guidelines and criteria:

a) Specify the reactor power and generator load of each reactor unit, the state of the major systems of the various units, the equipment out of service, the status of fuelling activities and any other applicable plant condition, such as routine tests and maintenance activities in progress.

b) Some, but not all, of the equipment out of service may have an impact on the response expected from the candidates.

c) The selected initial plant conditions do not violate requirements in the plant operating documentation.

6.1.2.2 Identify a number of Primary Malfunctions, classify each of them in one of the categories defined in Appendix A.5 and arrange them in a credible sequence. Select the Primary Malfunctions, with their time of occurrence, according to the following guidelines and criteria:

a) The estimated CTS dynamic duration does not significantly exceed 50 minutes.

b) There is a category 2 or category 3 Primary Malfunction that requires a complex intervention by the candidates, or there is a category 4 Primary Malfunction.

c) There is no more than one category 4 Primary Malfunction.

d) The total number of category 3 and category 4 Primary Malfunctions is not greater than three.

e) There are no more than four Primary Malfunctions.

f) The upper limits specified in paragraphs c) to e) may be exceeded when one of the selected malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

g) Consider selecting a Primary Malfunction that results in a degraded reactor unit condition having a significant impact on the actions of the candidates in response to a subsequent Primary Malfunction.

h) Preferably, the Primary Malfunctions are sequenced so that there is a gradual deterioration of unit conditions.

i) The time allocated between successive Primary Malfunctions is such that a typically qualified RO and the support team should be able to respond as expected to any given Primary Malfunction before the next one occurs.

Primary Malfunctions can be derived by referring to the following documentation:

- plant and industry wide significant event reports
- operating manuals and operating memos
- Emergency Operating Procedures and Abnormal Incident Manuals
- design manuals and other technical basis documents
- plant's safety report
- training manuals
- list of simulator malfunction options and simulator training scenarios

6.1.2.3 Identify a number of Secondary Malfunctions associated with the Primary Malfunctions and their time of occurrence. Select these malfunctions according to the following guidelines and criteria:

a) Each Secondary Malfunction satisfies the criteria in Appendix A.6.

b) The total number of Primary and Additional Malfunctions is at least 4.

c) The total number of Primary and Secondary Malfunctions is not greater than 10.

d) There are no more than 5 Additional Malfunctions for a given Primary Malfunction.

e) There are no more than 3 Monitoring Malfunctions.

f) There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.

g) There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.

h) There are no more than 3 Secondary Malfunctions of poised standby safety support systems.

i) The upper limits specified in paragraphs c) to h) may be exceeded when one of the selected Primary Malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

6.1.2.4 To satisfy the criterion of paragraph 6.1.1g), consider selecting some combinations of malfunctions and unit conditions that create situations for which the operating procedures give no specific instructions.

6.1.2.5 To satisfy the criterion of paragraph 6.1.1h), consider selecting concurrent malfunctions or unit conditions that require the candidates to assign priorities.

6.1.2.6 Identify any operating documentation that should be used to respond to the Primary and Secondary Malfunctions, using the frozen documentation.

6.1.2.7 Determine the following conditions that apply to the participation of the members of the control room support team:

a) the number of members available and their respective roles;

b) where each member will be at the start of the CTS;

c) when each member summoned will be instructed to arrive at the simulated reactor unit;

d) at multi-unit plants, whether any certified individual on the support team will be instructed to leave the simulated reactor unit during the CTS and, if so:

i) when the individual will be instructed to leave;

ii) when the individual will be instructed to return to the reactor unit, if applicable.

6.1.2.8 Define the endpoint of the CTS by specifying the unit conditions to be reached, a step in a procedure to be performed, or a decision or action expected of the candidates. The endpoint should be clearly recognizable by the examiners.

6.1.2.9 Determine the appropriate response to each Primary and Secondary Malfunction. Verify that this response is clear and unique. Otherwise, modify the CTS.

6.1.2.10 Estimate the overall complexity of the CTS, considering the number of Primary and Secondary Malfunctions and their timing, the impact of the initial plant conditions on the required response, and the restrictions placed on the availability of the members of the control room support team. It is important to make sure that a typically qualified RO would have sufficient time to respond as expected to each malfunction.

6.1.2.11 Verify that the CTS requires the candidates to demonstrate their skills in each competency area.

6.1.2.12 Identify the system parameters whose evolution will be recorded during the conduct of the examination for subsequent use during grading of the examination. The selection of these parameters should be based on their sensitivity to the selected malfunctions and to the expected response of a candidate. As a minimum, the evolution of the parameters listed in Appendix A.11 should be recorded.

6.1.2.13 Complete a cover sheet for the examiner's guide similar to that shown in Appendix A.7. Also complete the following sections of the examiner's guide:

a) a test scenario summary that contains the information in part A and part B of Appendix A.8 A;

b) a description of the initial plant conditions defined in accordance with paragraph 6.1.2.1a).

6.1.2.14 Complete a CTS Design Checklist similar to that shown in Appendix A.9 A and confirm that the CTS meets the criteria in the checklist.

6.1.3 Completion of Examination Design

Complete an Examination Design Checklist similar to that shown in Appendix A.10 A and confirm that the examination meets the criteria in the checklist.

6.2 Examinations for U0O Candidates

6.2.1 Design of the Test Scenarios

Design two CTSs that collectively meet the following criteria:

a) Duplication in the required operator actions is minimized among CTSs.

b) Initial plant conditions, including conditions of the reactor units, are varied among CTSs.

c) At least one CTS starts with initial conditions of systems operated by U0Os different from normal operating conditions specified in operating procedures that have a significant impact on the actions to be taken by the candidates.

d) The CTSs cover a broad range of system operations, equipment malfunctions and transients relevant to the U0O position.

e) At least one CTS includes a category 4 Primary Malfunction affecting one or more reactor units that requires a complex intervention by the candidates.

f) At least one CTS includes a failure of a major automatic action during complex operations of unit 0 systems that must be detected by the candidates and that requires them to respond immediately.

g) There are at least two situations that require the candidates to determine or recommend an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

h) There are at least two occurrences of concurrent malfunctions or conditions of systems operated by U0Os that require the candidates to assign priorities to their actions or to the actions of the support team.

i) At least one CTS includes a situation where a requirement in the *Operating Policies and Principles* (OP&Ps) is not met that must be recognized and addressed by the candidates.

j) At least one CTS includes the occurrence of an impairment of a special safety system or standby safety support system that must be recognized and addressed by the candidates.

k) One CTS tests the candidates in the role of the lead U0O and the other tests the candidates in the role of the assisting U0O.

l) In both CTSs, the arrival of the second U0O in the control room is delayed for approximately 15 minutes.

m) Over the entire examination, candidates are tested in the competency areas listed in Appendix A.4 A as follows:

   i) at least 25 times in competency areas 1, 3, 4 and 5;

   ii) at least 15 times in competency area 2.

n) The estimated examination duration is between 1.5 and 2.5 hours.

6.2.2 Design of a CTS

6.2.2.1 Define the initial plant conditions according to the following guidelines and criteria:

a) Specify the reactor power and generator load of each reactor unit, the state of the major systems of the reactor units and of unit 0, the equipment out of service, the status of fuelling activities and any other applicable plant condition, such as routine tests and maintenance activities in progress.

b) Some, but not all, of the equipment out of service may have an impact on the response expected from the candidates.

c) The selected initial plant conditions do not violate requirements in the plant operating documentation.

6.2.2.2 Identify a number of Primary Malfunctions, classify each of them in one of the categories defined in Appendix A.5 and arrange them in a credible sequence. Select the Primary Malfunctions, with their time of occurrence, according to the following guidelines and criteria:

a) The estimated CTS dynamic duration does not significantly exceed 60 minutes.

b) There is a category 2 Primary Malfunction of systems operated by the U0Os that has a potential impact on reactor safety and that requires a complex intervention by the candidates.
or
There is a category 2, category 3 or category 4 Primary Malfunction on the simulated reactor unit that requires a complex intervention on the systems operated by U0Os.

c) There is no more than one category 4 Primary Malfunction.

d) There are no more than three Primary Malfunctions that require a complex intervention by the candidates.

e) There are no more than four Primary Malfunctions.

f) The upper limits specified in paragraphs c) to e) may be exceeded when one of the selected malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

g) Consider selecting a Primary Malfunction that results in a degraded unit 0 condition having a significant impact on the actions of the candidates in response to a subsequent Primary Malfunction.

h) Preferably, the Primary Malfunctions are sequenced so that there is a gradual deterioration of unit conditions.

i) The time allocated between successive Primary Malfunctions is such that a typically qualified U0O and the support team should be able to respond as expected to any given Primary Malfunction before the next one occurs.

Primary Malfunctions can be derived by referring to the following documentation:

- plant and industry wide significant event reports
- operating manuals and operating memos
- Emergency Operating Procedures and Abnormal Incident Manuals

- design manuals and other technical basis documents
- plant's safety report
- training manuals
- list of simulator malfunction options and simulator training scenarios

6.2.2.3 Identify a number of Secondary Malfunctions associated with the Primary Malfunctions and their time of occurrence. Select these malfunctions according to the following guidelines and criteria:

a) Each Secondary Malfunction satisfies the criteria in Appendix A.6.

b) The total number of Primary and Additional Malfunctions is at least 4.

c) The total number of Primary and Secondary Malfunctions is not greater than 10.

d) There are no more than 5 Additional Malfunctions for a given Primary Malfunction.

e) There are no more than 3 Monitoring Malfunctions.

f) There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.

g) There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.

h) There are no more than 3 Secondary Malfunctions of poised standby safety support systems.

i) The upper limits specified in paragraphs c) to h) may be exceeded when one of the selected Primary Malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

6.2.2.4 To satisfy the criterion of paragraph 6.2.1g), consider selecting some combinations of malfunctions and conditions that create situations for which the operating procedures give no specific instructions.

6.2.2.5 To satisfy the criterion of paragraph 6.2.1h), consider selecting concurrent malfunctions or conditions that require the candidates to assign priorities.

6.2.2.6 Identify any operating documentation that should be used to respond to the Primary and Secondary Malfunctions, using the frozen documentation.

6.2.2.7 Determine the following conditions that apply to the participation of the members of the control room support team:

a) the number of members available and their respective roles;

b) where each member will be at the start of the CTS;

c) when each member summoned will be instructed to arrive at unit 0;

d) whether any certified individual on the support team will be instructed to leave unit 0 during the CTS and, if so:

   i) when the individual will be instructed to leave;

   ii) when the individual will be instructed to return to unit 0, if applicable.

6.2.2.8 Define the endpoint of the CTS by specifying the unit 0 or plant conditions to be reached, a step in a procedure to be performed, or a decision or action expected of the candidates. The endpoint should be clearly recognizable by the examiners.

6.2.2.9 Determine the appropriate response to each Primary and Secondary Malfunction. Verify that this response is clear and unique. Otherwise, modify the CTS.

6.2.2.10 Estimate the overall complexity of the CTS, considering the number of Primary and Secondary Malfunctions and their timing, the impact of the initial plant conditions on the required response, and the restrictions placed on the availability of the members of the control room support team. It is important to make sure that a typically qualified U0O would have sufficient time to respond as expected to each malfunction.

6.2.2.11 Verify that the CTS requires the candidates to demonstrate their skills in each competency area.

6.2.2.12 Identify the system parameters whose evolution will be recorded during the conduct of the examination for subsequent use during grading of the examination. The selection of these parameters should be based on their sensitivity to the selected malfunctions and to the expected response of a candidate.

6.2.2.13 Complete a cover sheet for the examiner's guide similar to that shown in Appendix A.7. Also complete the following sections of the examiner's guide:

a) a test scenario summary that contains the information in part A and part B of Appendix A.8 A;

b) a description of the initial plant conditions defined in accordance with paragraph 6.2.2.1a).

6.2.2.14 Complete a CTS Design Checklist similar to that shown in Appendix A.9 B and confirm that the scenario meets the criteria in the checklist.

6.2.3 Completion of Examination Design

Complete an Examination Design Checklist similar to that shown in Appendix A.10 B and confirm that the examination meets the criteria in the checklist.

6.3 Examinations for SS Candidates at Single-unit Plants

6.3.1 Design of the Test Scenarios

Design two CTSs and two ATSs that collectively meet the following criteria:

a) Duplication in the required actions is minimized among test scenarios.

b) Initial plant conditions, including reactor power, are varied among test scenarios.

c) At least one test scenario starts with initial plant conditions different from normal full power conditions that have a significant impact on the response expected from the candidates.

d) The test scenarios cover a broad range of system operations, equipment malfunctions and plant transients.

e) At least one test scenario includes a category 4 Primary Malfunction.

f) At least one test scenario includes a failure of a major automatic action during a transient that must be detected by the candidates and that requires them to respond immediately.

g) At least two test scenarios include one or more situations that require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

h) At least one CTS includes concurrent malfunctions or plant conditions that require the candidates to give directions to the support team on the execution of two complex procedures or courses of actions that need to be implemented promptly.

i) At least one ATS includes concurrent malfunctions or plant conditions that require the candidates to assign priorities to their actions or to the actions of the support team.

j) At least two test scenarios include a situation where a requirement in the *Operating Policies and Principles* (OP&Ps) is not met that must be recognized and addressed by the candidates.

k) At least one test scenario includes the occurrence of an impairment of a special safety system or standby safety support system that must be recognized and addressed by the candidates.

l) Over the entire examination, candidates are tested in the competency areas listed in Appendix A.4 B as follows:

   i) at least 25 times in competency areas 1, 3, 4 and 5;

   ii) at least 15 times in competency area 2.

m) The estimated dynamic duration of the two CTSs is between 75 and 120 minutes.

n) The estimated dynamic duration of the two ATSs is between 45 and 60 minutes.

o) The estimated examination duration is between 2 and 3 hours.

6.3.2 Design of a CTS

6.3.2.1 Define the initial plant conditions according to the following guidelines and criteria:

a) Specify the reactor power, the generator load, the state of major plant systems, the equipment out of service, the status of fuelling activities and any other applicable plant condition, such as routine tests and maintenance activities in progress.

b) Some, but not all, of the equipment out of service may have an impact on the response expected from the candidates.

c) The selected initial plant conditions do not violate requirements in the plant operating documentation.

6.3.2.2 Identify a number of Primary Malfunctions, other than category 1 Primary Malfunctions, classify each of them in one of the categories defined in Appendix A.5 and arrange them in a credible sequence. Select the Primary Malfunctions, with their time of occurrence, according to the following guidelines and criteria:

a) The estimated CTS dynamic duration does not significantly exceed 50 minutes.

b) There is a category 2 or category 3 Primary Malfunction that requires a complex intervention by the candidates, or there is a category 4 Primary Malfunction.

c) There is no more than one category 4 Primary Malfunction.

d) The total number of category 3 and category 4 Primary Malfunctions is not greater than three.

e) There are no more than four Primary Malfunctions.

f) The upper limits specified in paragraphs c) to e) may be exceeded when one of the selected malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

g) Consider selecting a Primary Malfunction that results in a degraded plant condition having a significant impact on the actions of the candidates in response to a subsequent Primary Malfunction.

h) Preferably, the Primary Malfunctions are sequenced so that there is a gradual deterioration of plant conditions.

i) The time allocated between successive Primary Malfunctions is such that a typically qualified SS and the support team should be able to respond as expected to any given Primary Malfunction before the next one occurs.

Primary Malfunctions can be derived by referring to the following documentation:

- plant and industry wide significant event reports
- operating manuals and operating memos
- Emergency Operating Procedures and Abnormal Incident Manuals
- design manuals and other technical basis documents
- plant's safety report
- training manuals
- list of simulator malfunction options and simulator training scenarios

6.3.2.3 Identify a number of Secondary Malfunctions associated with the Primary Malfunctions and their time of occurrence. Select these malfunctions according to the following guidelines and criteria:

a) Each Secondary Malfunction satisfies the criteria in Appendix A.6.

b) The total number of Primary and Additional Malfunctions is at least 4.

c) The total number of Primary and Secondary Malfunctions is not greater than 10.

d) There are no more than 5 Additional Malfunctions for a given Primary Malfunction.

e) There are no more than 3 Monitoring Malfunctions.

f) There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.

g) There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.

h) There are no more than 3 Secondary Malfunctions of poised standby safety support systems.

i) The upper limits specified in paragraphs c) to h) may be exceeded when one of the selected Primary Malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

6.3.2.4 Preferably, select malfunctions that, under the defined initial plant conditions, create abnormal situations that would be referred to the SS for resolution, such as malfunctions that cause impairments of special safety systems or standby safety support systems, a requirement in the OP&Ps that is not met, or problems related to the control of reactor power, cooling of the fuel or containment of radioactivity.

6.3.2.5 Select concurrent malfunctions or plant conditions that require the candidates to assign priorities to the actions required to address them.

6.3.2.6 To satisfy the criterion of paragraph 6.3.1g), consider selecting some combinations of malfunctions and plant conditions that create situations for which the operating procedures give no specific instructions.

6.3.2.7 Identify any operating documentation that should be used to respond to the Primary and Secondary Malfunctions, using the frozen documentation.

6.3.2.8 Determine the following conditions that apply to the participation of the members of the control room support team:

a) the number of members available and their respective roles;

b) where each member will be at the start of the CTS;

c) when each member summoned will be instructed to arrive in the control room.

6.3.2.9 Define the endpoint of the CTS by specifying the plant conditions to be reached, a step in a procedure to be performed, or a decision or instruction expected of the candidates. The endpoint should be clearly recognizable by the examiners.

6.3.2.10 Determine the appropriate response to each Primary and Secondary Malfunction. Verify that this response is clear and unique. Otherwise, modify the CTS.

6.3.2.11 Estimate the overall complexity of the CTS, considering the number of Primary and Secondary Malfunctions and their timing, the impact of the initial plant conditions on the required response, and the restrictions placed on the availability of the members of the control room support team. It is important to make sure that a typically qualified SS would have sufficient time to respond as expected to each malfunction.

6.3.2.12 Verify that the CTS requires the candidates to demonstrate their skills in each competency area.

6.3.2.13 Identify the system parameters whose evolution will be recorded during the conduct of the examination for subsequent use during grading of the examination. The selection of these parameters should be based on their sensitivity to the selected malfunctions and to the expected response of a candidate. As a minimum, the evolution of the parameters listed in Appendix A.11 should be recorded.

6.3.2.14 Complete a cover sheet for the examiner's guide similar to that shown in Appendix A.7. Also complete the following sections of the examiner's guide:

a) a test scenario summary that contains the information in part A and part B of Appendix A.8 A;

b) a description of the initial plant conditions defined in accordance with paragraph 6.3.2.1a).

6.3.2.15 Complete a CTS Design Checklist similar to that shown in Appendix A.9 C and confirm that the scenario meets the criteria in the checklist.

6.3.3 Design of an ATS

6.3.3.1 Define the initial plant conditions according to the instructions of paragraph 6.3.2.1.

6.3.3.2 Identify a number of Primary Malfunctions, other than category 1 Primary Malfunctions, classify each of them in one of the categories defined in Appendix A.5 and arrange them in a credible sequence. Select the Primary Malfunctions, with their time of occurrence, according to the following guidelines and criteria:

a) The estimated ATS dynamic duration does not significantly exceed 25 minutes.

b) There is a category 2 or category 3 Primary Malfunction that requires a complex intervention by the candidates, or there is a category 4 Primary Malfunction.

c) There is no more than one category 4 Primary Malfunction.

d) There are no more than two Primary Malfunctions.

e) The upper limits specified in paragraphs c) and d) may be exceeded when one of the selected malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

f) Consider selecting a Primary Malfunction that results in a degraded plant condition having a significant impact on the actions of the candidates in response to a subsequent Primary Malfunction.

g) When applicable, the time allocated between successive Primary Malfunctions is such that a typically qualified SS and the support team should be able to respond as expected to a given Primary Malfunction before the next one occurs.

Primary Malfunction can be derived by referring to the documentation specified at the end of paragraph 6.3.2.2.

6.3.3.3 Identify a number of Secondary Malfunctions associated with the Primary Malfunctions and their time of occurrence. Select these malfunctions according to the following guidelines and criteria:

a) Each Secondary Malfunction satisfies the criteria in Appendix A.6.

b) The total number of Primary and Additional Malfunctions is at least 2.

c) There are at least 3 Secondary Malfunctions of which at least two are Additional Malfunctions, whenever the ATS does not include a category 3 or a category 4 Primary Malfunction.

d) The total number of Primary and Secondary Malfunctions is not greater than five.

e) There are no more than 3 Additional Malfunctions.

f) There are no more than 2 Monitoring Malfunctions.

g) There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.

h) There is no more than 3 Secondary Malfunctions causing an impairment of a special safety system.

i) There are no more than 2 Secondary Malfunctions of poised standby safety support systems.

j) The upper limits specified in paragraphs d) to i) may be exceeded when one of the selected Primary Malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

k) The Secondary Malfunctions only affect indicators, equipment, components or control devices that the candidates are expected to check during the ATS dynamic duration.

l) The number and the nature of the Secondary Malfunctions are such that a typically qualified SS can respond as expected to these malfunctions within the ATS dynamic duration.

6.3.3.4 Preferably, select malfunctions that, under the defined initial plant conditions, create abnormal situations that would be referred to the SS for resolution, such as malfunctions that cause impairments of special safety systems or standby safety support systems, a requirement in the OP&Ps that is not met, or problems related to the control of reactor power, cooling of the fuel or containment of radioactivity.

6.3.3.5 To satisfy the criterion of paragraph 6.3.1g), consider selecting some combinations of malfunctions and plant conditions that create situations for which the operating procedures give no specific instructions.

6.3.3.6 To satisfy the criterion of paragraph 6.3.1i), consider selecting concurrent malfunctions or plant conditions that require the candidates to assign priorities.

6.3.3.7 Identify any operating documentation that should be used to respond to the Primary and Secondary Malfunctions, using the frozen documentation.

6.3.3.8 Determine the following conditions that apply to the participation of the members of the control room support team:

a) the number of members available and their respective roles;

b) where each member will be at the start of the ATS;

c) when each member summoned will be instructed to arrive in the control room.

6.3.3.9 Define the endpoint of the ATS by specifying the plant conditions to be reached, a step in a procedure to be performed, or a decision or instruction expected of the candidates. The endpoint should be clearly recognizable by the examiners.

6.3.3.10 Determine the appropriate response to each Primary and Secondary Malfunction. Verify that this response is clear and unique. Otherwise, modify the ATS.

6.3.3.11 Estimate the overall complexity of the ATS, considering the number of Primary and Secondary Malfunctions and their timing as well as the impact of the initial plant conditions on the required response. It is important to make sure that a typically qualified SS would have sufficient time to respond as expected to each malfunction.

6.3.3.12 Identify the system parameters whose evolution will be recorded during the conduct of the examination for subsequent use during grading of the examination. The selection of these parameters should be based on their sensitivity to the selected malfunctions and to the expected response of a candidate. As a minimum, the evolution of the parameters listed in Appendix A.11 should be recorded.

6.3.3.13 Complete a cover sheet for the examiner's guide similar to that shown in Appendix A.7. Also complete the following sections of the examiner's guide:

a) a test scenario summary that contains the information in part A and part B of Appendix A.8 A;

b) a description of the initial plant conditions defined in accordance with paragraph 6.3.2.1a).

6.3.3.14 Complete an ATS Design Checklist similar to that shown in Appendix A.9 E and confirm that the scenario meets the criteria in the checklist.

6.3.4 Completion of Examination Design

Complete an Examination Design Checklist similar to that shown in Appendix A.10 C and confirm that the examination meets the criteria in the checklist.

6.4 Examinations for SS Candidates at Multi-unit Plants

6.4.1 Design of the Test Scenarios

Design two CTSs, three DTSs and one PCTS that collectively meet the following criteria:

a) Duplication in the required actions is minimized among test scenarios.

b) Initial plant conditions, including reactor power, are varied among test scenarios.

c) At least one CTS starts with initial plant conditions different from normal full power conditions that have a significant impact on the response expected from the candidates.

d) The test scenarios cover a broad range of system operations, equipment malfunctions and plant transients.

e) At least one CTS or DTS includes a category 4 Primary Malfunction.

f) At least one CTS or DTS includes a failure of a major automatic action during a transient that must be detected by the candidates and that requires them to respond immediately.

g) At least two test scenarios include one or more situations that require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

h) At least one CTS includes concurrent malfunctions or plant conditions that require the candidates to give directions to the support team on the execution of two complex procedures or courses of actions that need to be implemented promptly.

i) At least one CTS includes concurrent malfunctions on the reactor unit and on unit 0, or on the reactor unit and on simulated systems common to more than one reactor unit, that require the candidates to assign priorities to their actions or to the actions of the support team.

j) At least one DTS includes concurrent abnormal plant conditions that require the candidates to assign priorities to the actions required to address those conditions.

k) At least two test scenarios include a situation where a requirement in the *Operating Policies and Principles* (OP&Ps) is not met that must be recognized and addressed by the candidates.

l) At least one test scenario includes the occurrence of an impairment of a special safety system or standby safety support system that must be recognized and addressed by the candidates.

m) During one CTS, the candidates are required to give detailed instructions to the support team on the course of actions to be taken in a situation that necessitates a prompt execution of a complex sequence of operator actions because the RO or the U0O needs assistance from the SS.

n) Over the entire examination, candidates are tested in the competency areas listed in Appendix A.4 C as follows:
   i) at least 25 times in competency areas 1, 3, 4 and 5;
   ii) at least 15 times in competency area 2.

o) The estimated dynamic duration of the two CTSs is between 75 and 120 minutes.

p) The estimated dynamic duration of the three DTSs is between 30 and 45 minutes.

q) The estimated time to complete the verification task during the PCTS is approximately 15 minutes.

r) The estimated examination duration is between 2 and 3 hours.

6.4.2 Design of a CTS

6.4.2.1 Define the initial plant conditions according to the following guidelines and criteria:

a) Specify the reactor power and generator load of each reactor unit, the state of the major systems of the various units, the equipment out of service, the status of fuelling activities and any other applicable plant condition, such as routine tests and maintenance activities in progress.

b) Some, but not all, of the equipment out of service may have an impact on the response expected from the candidates.

c) The selected initial plant conditions do not violate requirements in the plant operating documentation.

6.4.2.2 Identify a number of Primary Malfunctions, other than category 1 Primary Malfunctions, classify each of them in one of the categories defined in Appendix A.5 and arrange them in a credible sequence. Select the Primary Malfunctions, with their time of occurrence, according to the following guidelines and criteria:

a) The estimated CTS dynamic duration does not significantly exceed 50 minutes.

b) There is a category 2 or category 3 Primary Malfunction that requires a complex intervention by the candidates, or there is a category 4 Primary Malfunction.

c) There is no more than one category 4 Primary Malfunction.

d) The total number of category 3 and category 4 Primary Malfunctions is not greater than three.

e) There are no more than four Primary Malfunctions.

f) The upper limits specified in paragraphs c) to e) may be exceeded when one of the selected malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

g) Consider selecting a Primary Malfunction that results in a degraded plant condition having a significant impact on the actions of the candidates in response to a subsequent Primary Malfunction.

h) Preferably, the Primary Malfunctions are sequenced so that there is a gradual deterioration of plant conditions.

i) The time allocated between successive Primary Malfunctions is such that a typically qualified SS and the support team should be able to respond as expected to any given Primary Malfunction before the next one occurs.

Primary Malfunctions can be derived by referring to the following documentation:

- plant and industry wide significant event reports
- operating manuals and operating memos
- Emergency Operating Procedures and Abnormal Incident Manuals
- design manuals and other technical basis documents
- plant's safety report
- training manuals
- list of simulator malfunction options and simulator training scenarios

6.4.2.3 Identify a number of Secondary Malfunctions associated with the Primary Malfunctions and their time of occurrence. Select these malfunctions according to the following guidelines and criteria:

a) Each Secondary Malfunction satisfies the criteria in Appendix A.6.

b) The total number of Primary and Additional Malfunctions is at least 4.

c) The total number of Primary and Secondary Malfunctions is not greater than 10.

d) There are no more than 5 Additional Malfunctions for a given Primary Malfunction.

e) There are no more than 3 Monitoring Malfunctions.

f) There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.

g) There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.

h) There are no more than 3 Secondary Malfunctions of poised standby safety support systems.

i) The upper limits specified in paragraphs c) to h) may be exceeded when one of the selected Primary Malfunctions would produce conditions within the plant that may cause more malfunctions, based on the plant's safety analyses or on an event that occurred in the nuclear industry and that could credibly occur at the plant.

6.4.2.4 Preferably, select malfunctions that, under the defined initial plant conditions, create abnormal situations that would be referred to the SS for resolution, such as malfunctions that cause impairments of special safety systems or standby safety support systems, a requirement in the OP&Ps that is not met, or problems related to the control of reactor power, cooling of the fuel or containment of radioactivity.

6.4.2.5 Select concurrent malfunctions or plant conditions that require the candidates to assign priorities to the actions required to address them.

6.4.2.6 To satisfy the criterion of paragraph 6.4.1g), consider selecting some combinations of malfunctions and plant conditions that create situations for which the operating procedures give no specific instructions.

6.4.2.7 Identify any operating documentation that should be used to respond to the Primary and Secondary Malfunctions, using the frozen documentation.

6.4.2.8 Determine the following conditions that apply to the participation of the members of the control room support team:

a) the number of members available and their respective roles;

b) where each member will be at the start of the CTS;

c) when each member summoned will be instructed to arrive at the simulated reactor unit or at unit 0;

d) whether any certified individual on the support team will be instructed to leave the simulated reactor unit or unit 0 during the CTS and, if so:

i) when the individual will be instructed to leave;

ii) when the individual will be instructed to return to the relevant unit, if applicable.

6.4.2.9 For the CTS during which the candidates have to direct in detail the execution of a complex sequence of operator actions to satisfy the criterion of paragraph 6.4.1m), determine the particular sequence of actions that the candidates have to direct.

6.4.2.10 Define the endpoint of the CTS by specifying the plant conditions to be reached, a step in a procedure to be performed, or a decision or instruction expected of the candidates. The endpoint should be clearly recognizable by the examiners.

6.4.2.11 Determine the appropriate response to each Primary and Secondary Malfunction. Verify that this response is clear and unique. Otherwise, modify the CTS.

6.4.2.12 Estimate the overall complexity of the CTS, considering the number of Primary and Secondary Malfunctions and their timing, the impact of the initial plant conditions on the required response, and the restrictions placed on the availability of the members of the control room support team. It is important to make sure that a typically qualified SS would have sufficient time to respond as expected to each malfunction.

6.4.2.13 Verify that the CTS requires the candidates to demonstrate their skills in each competency area.

6.4.2.14 Identify the system parameters whose evolution will be recorded during the conduct of the examination for subsequent use during grading of the examination. The selection of these parameters should be based on their sensitivity to the selected malfunctions and to the expected response of a candidate. As a minimum, the evolution of the parameters listed in Appendix A.11 should be recorded.

6.4.2.15 Complete a cover sheet for the examiner's guide similar to that shown in Appendix A.7. Also complete the following sections of the examiner's guide:

a) a test scenario summary that contains the information in part A and part B of Appendix A.8 A;

b) a description of the initial plant conditions defined in accordance with paragraph 6.4.2.1a).

6.4.2.16 Complete a CTS Design Checklist similar to that shown in Appendix A.9 D and confirm that the CTS meets the criteria in the checklist.

6.4.3 Design of a DTS

6.4.3.1 Define the initial plant conditions according to the following guidelines and criteria:

a) Specify the reactor power and generator load of each reactor unit, the state of the major systems of the various units, the equipment out of service, the status of fuelling activities and any other applicable plant condition, such as routine tests and maintenance activities in progress.

b) Some, but not all, of the equipment out of service may have an impact on the diagnosis expected or on the course of actions to be taken.

c) The selected initial plant conditions do not violate requirements in the plant operating documentation.

6.4.3.2 Select Primary and Secondary Malfunctions that, under the defined initial plant conditions, create abnormal plant conditions for which there is at least one significant concern regarding one or more of the following:

- control of reactor power
- cooling of the fuel
- containment of radioactivity
- impairment of special safety systems
- impairment of standby safety support systems
- compliance with OP&Ps
- safe operation of plant systems and equipment
- safety of plant personnel
- protection of the environment

6.4.3.3 Select one Primary Malfunction according to the following guidelines and criteria:

a) The estimated DTS dynamic duration does not significantly exceed 15 minutes.

b) The Primary Malfunction is a category 2, category 3 or category 4 Primary Malfunction that, under the defined initial plant conditions, requires a sufficiently complex analysis of the available information to make the correct diagnosis and to determine the appropriate course of actions.

c) The Primary Malfunction does not create abnormal plant conditions that would require prompt implementation of more than two complex procedures or courses of actions.

d) If the Primary Malfunction were to occur at the plant, sufficient information would be available within the DTS dynamic duration to make the correct diagnosis.

The Primary Malfunction can be derived by referring to the documentation specified at the end of paragraph 6.4.2.2.

6.4.3.4 Define the specific diagnosis that the candidates are expected to make and determine the control room and field information required to make this diagnosis.

6.4.3.5 Identify a number of Secondary Malfunctions associated with the Primary Malfunction and their time of occurrence. Select these malfunctions according to the following guidelines and criteria:

a) Each Secondary Malfunction satisfies the criteria in Appendix A.6.

b) There is at least 1 Secondary Malfunction.

c) There are no more than 4 Secondary Malfunctions.

d) There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.

e) There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.

f) There are no more than 3 Secondary Malfunctions of poised standby safety support systems.

g) The Secondary Malfunctions only affect indicators, equipment, components or control devices that the candidates are expected to check during the DTS dynamic duration.

h) The number and the nature of the Secondary Malfunctions are such that a typically qualified SS would be able to respond as expected to these malfunctions and to formulate the correct diagnosis within the DTS dynamic duration.

6.4.3.6 To satisfy the criterion of paragraph 6.4.1g), consider selecting some combinations of malfunctions and plant conditions that create situations for which the operating procedures give no specific instructions.

6.4.3.7 To satisfy the criterion of paragraph 6.4.1j), consider selecting concurrent abnormal plant conditions that require the candidates to assign priorities.

6.4.3.8 Identify any operating documentation that should be used to respond to the Primary and Secondary Malfunctions, using the frozen documentation.

6.4.3.9 Estimate the time that will be given to the candidates to make the correct diagnosis, based on the performance expectations of plant management for the SS position. This time defines the endpoint of the dynamic portion of the DTS when the simulator is frozen and questioning of the candidates begins.

6.4.3.10 Determine the appropriate course of actions to respond to the selected malfunctions.

a) Verify that this course of actions is clear. Otherwise, modify the DTS.

b) Verify that any appropriate course of actions to respond to a failure of a major automatic action prior to diagnosing the Primary Malfunction does not have an impact on unit conditions that would prevent, or excessively interfere with, making the correct diagnosis. Otherwise, modify the DTS.

6.4.3.11 Identify the significant concerns associated with the plant conditions existing at the end of the DTS and arrange them in the categories listed in paragraph 6.4.3.2.

6.4.3.12 Estimate the overall complexity of the DTS, considering the number of malfunctions and their timing as well as the impact of the initial plant conditions on the required response. It is important to make sure that a typically qualified SS would have sufficient information and time to respond as expected to the Secondary Malfunctions and to make the correct diagnosis within the DTS dynamic duration.

6.4.3.13 Identify the system parameters whose evolution will be recorded during the conduct of the examination for subsequent use during grading of the examination. The selection of these parameters should be based on their sensitivity to the selected malfunctions and to the expected response of a candidate. As a minimum, the evolution of the parameters listed in Appendix A.11 should be recorded.

6.4.3.14 Complete a cover sheet for the examiner's guide similar to that shown in Appendix A.7. Also complete the following sections of the examiner's guide:

a) a test scenario summary that contains the information in part A and part B of Appendix A.8 A;

b) a description of the initial plant conditions defined in accordance with paragraph 6.4.2.1a).

6.4.3.15 Complete a DTS Design Checklist similar to that shown in Appendix A.9 F and confirm that the DTS meets the criteria in the checklist.

6.4.4 Design of the PCTS

6.4.4.1 Define the initial plant conditions according to the following guidelines and criteria:

a) Initial conditions include reactor power and generator load of each reactor unit, the state of the major systems of the various units, the equipment out of service, the status of fuelling activities and any other applicable plant condition, such as routine tests and maintenance activities in progress.

b) Some, but not all, of the equipment out of service may have an impact on the significance of the panel anomalies or on the course of actions to be taken.

c) The selected equipment out of service does not create conditions that violate requirements in the plant operating documentation.

6.4.4.2 Identify a verification task to be performed by the candidates and a number of panel anomalies associated with the task. Select the task and the panel anomalies according to the following guidelines and criteria:

a) The duration of the selected task does not significantly exceed 15 minutes.

b) The task is related to the responsibilities of the SS such as an independent verification of system operating configurations and unit state; verification of system, unit and plant conditions before granting an approval; verification of available heat sinks.

c) There are at least 3 panel anomalies that indicate abnormal situations that would be referred to the SS for resolution, such as abnormal system configurations, impairments of special safety systems or of standby safety support systems, a violation of a requirement in the OP&Ps, or problems related to the control of reactor power, cooling of the fuel or containment of radioactivity.

d) There are no more than 10 panel anomalies.

e) The panel anomalies can be detected from the control room panels during the execution of the verification task.

f) To satisfy the criterion of paragraph 6.4.1g), consider selecting some panel anomalies that represent situations for which the operating procedures give no specific instructions.

g) A typically qualified SS would be able to complete the selected task within the time available.

The verification task and the panel anomalies can be derived by referring to the documentation specified at the end of paragraph 6.4.2.2.

6.4.4.3 Identify the control room indications associated with each panel anomaly and any field information required to assess the corresponding abnormal condition.

6.4.4.4 Identify any operating documentation that should be used to perform the verification task, and to identify the existing panel anomalies and to address them, using the frozen documentation.

6.4.4.5 Determine the appropriate course of actions to address each panel anomaly. Verify that this course of actions is clear. Otherwise, modify the PCTS.

6.4.4.6 Determine the time that will be given to the candidates to review and perform the verification task. Also determine the time that will be given to the candidates to assess the significance of the panel anomalies and to decide on the course of actions to address them, based on the performance expectations of plant management for the SS position.

6.4.4.7 Estimate the overall complexity of the PCTS, considering the number of panel anomalies as well as the difficulty of determining their significance and the course of actions to address them. It is important to make sure that a typically qualified SS would have sufficient time to complete the verification task and to decide how to address the panel anomalies as expected.

6.4.4.8 Complete a cover sheet for the examiner's guide similar to that shown in Appendix A.7. Also complete the following sections of the examiner's guide:

a) a test scenario summary that contains the information in part A of Appendix A.8 B;

b) a description of the initial plant conditions defined in accordance with paragraph 6.4.4.1a).

6.4.4.9 Complete a PCTS Design Checklist similar to that shown in Appendix A.9 G and confirm that the PCTS meets the criteria in the checklist.

6.4.5 Completion of Examination Design

Complete an Examination Design Checklist similar to that shown in Appendix A.10 D and confirm that the examination meets the criteria in the checklist.

7 Development of Examinations

The lead examiner coordinates the activities of the examination team during the development of an examination. The examinations are developed according to:

- subsection 7.1 for examinations for RO and U0O candidates and for SS candidates at single-unit plants
- subsection 7.2 for examinations for SS candidates at multi-unit plants

7.1 Examinations for RO and U0O Candidates and for SS candidates at Single-unit Plants

7.1.1 Initial Verification of the Test Scenarios

The examination team should perform an initial verification of the test scenarios on the plant simulator to determine that they unfold as planned and that the simulated response of the systems involved has the required degree of realism. This verification should be made in accordance with the following instructions.

7.1.1.1 Maintain a list of simulator deficiencies encountered during the initial verification of the test scenarios that cannot be rectified at this time.

7.1.1.2 Ensure that the simulator is placed in a secure configuration to avoid compromising the security of the examination.

7.1.1.3 When any significant change is made to a test scenario, ensure that it still meets the criteria indicated in its design checklist.

7.1.1.4 Run each test scenario on the simulator and perform the required actions, using the relevant operating procedures.

a) During the run, closely verify the fidelity of the simulator response to the malfunctions and other scenario conditions inserted and to the expected operator actions. The purpose of this verification is to ensure that the simulated unit response is realistic and that there is no misleading difference between the simulated response and the response of the reference unit. As a minimum, the alarms received in the control room at the simulator and the parameters listed in the checklist of Appendix A.11 should be verified to ensure that:

   i) the key alarms are received when expected and in the correct sequence;

   ii) the values of each system parameter monitored have approximately the correct magnitude and their excursions, if any, have approximately the correct magnitude and duration, based on the applicable laws of physics and the characteristics of the equipment and systems of the reference unit;

   iii) the relevant system logic control circuits operate correctly.

b) If during this verification it is found that a malfunction is not simulated correctly, it is acceptable to reproduce the desired effect by simulator operator intervention provided this will not be noticeable to the candidates. Otherwise, another malfunction should be used. Similarly, if the test scenario as a whole cannot be simulated correctly, another test scenario should be designed.

7.1.1.5 For each test scenario that includes situations for which the operating procedures give no specific instructions, verify that the appropriate course of actions is clear and unique. Otherwise, modify the test scenario.

7.1.1.6 For each test scenario, confirm that the list of system parameters to be recorded during its conduct, which is contained in part B of section 1 of the examiner's guide (Appendix A.8 A), is appropriate and complete.

7.1.1.7 Run each test scenario in real time on the simulator and determine:

a) the alarm messages and the other information that will be communicated to the candidates by support team members;

b) the required actions by the members of the control room support team;

c) the approximate time it would take at the plant for completing the field activities required by the scenario;

d) other field interventions that might be requested by a candidate and the approximate time it would take for completing them at the plant;

e) the approximate test scenario dynamic duration.

7.1.1.8 At the end of each test scenario:

a) Confirm that the timing of the malfunctions is such that a typically qualified incumbent of the position sought by the candidates would have sufficient time to respond as expected to each malfunction.

b) Collect all the data necessary for the preparation of the examiner's guide.

7.1.1.9 At the conclusion of the initial verification of the test scenarios:

a) Collect all material that may compromise the security of the examination.

b) Ensure that the simulator is restored to a normal configuration.

7.1.2 Preparation of the Examiner's Guides

The examination team should prepare the initial drafts of the examiner's guides for the selected test scenarios in accordance with the following instructions.

7.1.2.1 Verify that the frozen documentation required to prepare the examiner's guides is available.

7.1.2.2 Maintain a record of any significant deficiency found in the plant documentation during the preparation of the examiner's guides.

7.1.2.3 Prepare an examiner's guide for each test scenario according to the guidelines and criteria detailed below.

Cover Sheet

A form similar to that shown in Appendix A.7 completed during the design of the test scenario.

Section 1 - Test Scenario Summary

A section similar to that shown in Appendix A.8 A, with part A and part B completed during the design of the test scenario and modified to reflect any significant change made to the scenario during its development.

Section 2 - Initial Plant Conditions

This section details the initial plant conditions defined during the design of the test scenario:

- reactor power of each reactor unit
- generator load of each reactor unit
- unit control mode of the simulated reactor unit, if applicable
- average liquid zone level of the simulated reactor unit
- state of major systems of the various units
- equipment out of service
- fuelling machine activities in progress
- routine tests and maintenance activities in progress
- other plant conditions

It also details where each member of the control room support team will be at the start of the test scenario.

This information is given to the candidate during the turnover at the start of the test scenario.

Section 3 - Candidate Action Checklist

This section details the sequence of actions and checks expected from the candidates in response to the malfunctions and conditions of the test scenario. It also contains detailed instructions for the individual members of the control room support team and for the individual directing the activities of the field operators or playing their role. These instructions should be written according to the guidelines in Appendix A.12 A. Finally, for SS candidates this section contains the standard questions to be asked at the end of the test scenario with answers. The checklist format is shown in Appendix A.13, part A.

The checklist allows the examiners to record accurately the response of the candidates to the conditions of the scenario, independently of the video recordings and of the operator action monitor. It should reflect as closely as possible the performance of a typically qualified incumbent of the position sought by the candidates and it should contain the following information arranged in the anticipated sequence of occurrence:

1- The Primary Malfunctions and when each is initiated.

2- The sequence of key alarms and annunciations received on the control room panels and CRTs after the initiation of each Primary Malfunction.

3- The Secondary Malfunctions that follow the occurrence of a Primary Malfunction and when each is observable.

4- Any key alarm or annunciation on the control room panels and CRTs associated with each Secondary Malfunction.

5- When each member of the control room support team summoned will be instructed to arrive at the relevant unit in the control room.

6- The alarms, annunciations, equipment malfunctions and any other information that the members of the control room support team must communicate to the candidates and when they must be communicated.

7- The field conditions and any other information that the individual directing the activities or playing the role of the field operators must communicate to the candidates and when they must be communicated.

8- The checks of automatic actions that the candidates must perform, specifying the indicators to be used (see note below). For checks of automatic actions of complex systems where a number of identical devices are actuated (e.g. Emergency Core Cooling System), generic statements may be used (e.g. check D_2O isolation valves open).

9- The checks of system parameters and indicators that the candidates must perform, including those to determine the nature of a Primary Malfunction and to identify the relevant operating procedures, specifying the indicators to be used (see note below).

10- The actions and checks that the candidates must perform or must instruct the members of the control room support team to perform, based on diagnosis, prior to accessing the relevant operating procedures, specifying the controls or devices to be operated and the indicators to be used to perform the checks (see note below).

11- For RO and U0O candidates and for SS candidates during an ATS, the actions and checks that the candidates must perform or must instruct the members of the control room support team to perform to implement each applicable step of the relevant procedures, specifying the controls or devices to be operated and the indicators to be used to perform the checks (see note below). These actions and checks include any standard operating practice that is not mentioned explicitly in a step of the procedure, but is associated with its execution, based on training and on the expectations of plant management.

12- For SS candidates during a CTS, the specific instructions that the candidates must give to the members of the control room support team to direct them to implement the relevant operating procedures.

13- For SS candidates during a CTS, the actions and checks that the candidates must instruct the members of the control room support team to perform whenever they request assistance from the SS while implementing a procedure, specifying the devices to be operated and the indicators to be used to perform the checks (see note below).

14- For SS candidates, the actions and checks that the candidates must perform to implement any step of a relevant procedure specifically assigned to the SS.

15- When operating procedures do not specifically address a malfunction or plant condition, the actions and checks that the candidates must perform or must

instruct the members of the control room support team to perform to place the unit, the systems or the equipment in the required state, specifying the controls or devices to be operated and the indicators to be used to perform the checks (see note below).

16- The checks that the candidates must perform to determine the nature of any Secondary Malfunction and to identify the relevant operating procedure, if any, specifying the indicators to be used (see note below).

17- The actions and checks that the candidates must perform or must instruct the members of the control room support team to perform upon detection of each Secondary Malfunction, specifying the controls or devices to be operated and the indicators to be used to perform the checks (see note below).

18- For RO and U0O candidates and for SS candidates during an ATS, the specific instructions with the appropriate demonstration, if required, that the candidates should give to the members of control room support team when delegating an activity and, for each, the specific information to be reported back once it is completed.

19- All requests for activities in the control equipment room expected from the candidates and for each activity, the time that would be required for completing it at the plant and the information to be reported back to the candidates by the member of the control room support team involved once the activity is completed.

20- All requests for field activities expected from the candidates and for each activity, the number of field operators and the time that would be required for completing it at the plant and the information to be reported back to the candidates once the activity is completed.

21- The specific information that the candidates should give to the support team members.

22- The notifications and any request for approval that the candidates must make.

23- For SS candidates, the checks of system and plant conditions, constraints and limits that the candidates must perform before approving request by the support team.

24- At multi-unit plants, when any certified individual on the support team will be instructed to leave the simulated reactor unit or unit 0 during the test scenario and, if applicable, when the individual will be instructed to return to the relevant unit.

25- For SS candidates, the standard questions in part A of Appendix A.14, with complete and accurate answers. Only significant concerns that the candidates are not expected to address during the dynamic portion of the test scenario and that are not addressed by the procedures being implemented at the endpoint of the test scenario should be covered in the answers.

Note: Specify in the checklist the indicator or the set of indicators to be used for checking or monitoring a parameter or condition when it is specified in the

relevant operating procedure, or when only one indicator or set of indicators is reliable under the existing circumstances.

Section 4 - Simulator Operator Instructions

This section details the activities of the simulator operator during the test scenario. It should contain the following instructions arranged in the planned sequence of execution:

1- Instructions to set up the simulator.

2- The checks required before the start of the scenario to ensure that:
   a) the simulator is in the proper configuration to simulate the initial unit conditions and the equipment out of service at the beginning of the scenario;
   b) all equipment out of service is correctly identified on the unit panels;
   c) the required malfunctions of poised equipment are programmed;
   d) all panel lights are functional and the panel horn is on;
   e) all data collection devices are operational and synchronized;
   f) the telephone system, the radiation emergency warning siren, the fire emergency warning siren and the public address system are functional.

3- The sequence of Primary and Secondary Malfunctions to be entered during the test scenario, with the conditions for their activation. These conditions may be any of the following:
   a) a specific system or unit condition;
   b) the completion of a specified step in an operating procedure;
   c) the completion of a specified action in the control room by a candidate or by a member of the support team;
   d) a signal from the lead examiner;
   e) a specified time after a given occurrence during the scenario.

   Note: Care should be taken when using time as the condition for activation of a malfunction since this may result in the malfunction occurring at an inappropriate moment during the conduct of the examination due to the speed with which the expected actions and checks are performed.

4- The actions required to reproduce in the control room the outcome of each operation performed in the field or in the control equipment room and the time after which the outcome will be seen in the control room, based on the time that would be required for completing the operation at the plant.

5- The specific data to be collected after completion of the test scenario, based on the list in Appendix A.15.

Section 5 - Instructions for Support Team Staff in the Control Room

This section contains separate instructions for each member of the control room support team that specify the actions they must perform during the test scenario. It is completed after the initial rehearsal of the scenario with the support team. The sequence of instructions for each member will then be compiled from section 3.

Section 6 - Field Operator Instructions

This section contains instructions that specify the actions that the individual directing the activities or playing the role of the field operators must perform during the test scenario. It is completed after the initial rehearsal of the scenario with the support team. The sequence of instructions for each field operation expected will then be compiled from section 3.

7.1.2.4 For SS candidates, verify for each test scenario that there is no duplication in the Candidate Action Checklist between the performance items measured during the dynamic portion of the scenario and the answer items for the questions asked at the end of the scenario. Modify the checklist to remove any duplication of items.

7.1.2.5 Promptly report to the Training Manager any deficiency found in the plant operating procedures which may impact on plant safety.

7.1.3 Final Verification of the Test Scenarios

The examination team should perform a final verification of the test scenarios on the plant simulator to determine that they unfold as planned in section 3 of the examiner's guides. This final verification should be made in accordance with the following instructions.

7.1.3.1 Maintain a record of any additional simulator deficiency encountered during the final verification and the rehearsal of the test scenarios that cannot be rectified at this time.

7.1.3.2 Ensure that the simulator is placed in a secure configuration to avoid compromising the security of the examination.

7.1.3.3 Verify that the data collection devices and other devices required for certification examinations, as specified in Appendix A.3B) and C), are functional.

7.1.3.4 Run each test scenario in real time on the simulator while performing the required actions and checks, using the relevant operating procedures.

a) During the run, verify that the scenario unfolds as planned using section 3 of the examiner's guide.

b) Measure the dynamic duration of the scenario and confirm that it does not significantly exceed the prescribed time limit.

c) For an ATS, confirm that each Secondary Malfunction only affect those indicators, equipment, components or control devices that the candidates are expected to check during the scenario.

d) Confirm that the required sequence of actions is clear and unique and that a typically qualified incumbent of the position sought by the candidates would have sufficient time to respond as expected to each malfunction.

e) Confirm the fidelity of the simulator response to the malfunctions and other scenario conditions, to the actions performed on control room panels and to simulator operator interventions, as specified in paragraph 7.1.1.4a).

f) Review the actions performed by the simulator operator during the scenario to ensure that no excessive demands which may jeopardize the conduct of the examination are imposed on this individual.

g) Review section 3 of the examiner's guide to identify the steps where candidates are most likely to make errors.

   i) Try to predict what those errors might be and verify whether any of the errors could force the termination of the scenario because of conditions that the simulator cannot replicate properly.

   ii) If an error that would force the termination of the scenario is found, evaluate the impact this would have on the assessment of the performance of a candidate. If necessary, modify or replace the scenario.

h) Modify the test scenario and its guide if:

   i) some malfunctions and their consequences cannot be simulated realistically;

   ii) conditions exist in the scenario for which no unique sequence of actions can be predicted with confidence;

   iii) excessive demands are likely to be imposed on the candidate, the simulator operator or support team members;

   iv) the test scenario dynamic duration significantly exceeds the applicable time limit.

i) Modify the examiner's guide to correct any technical error and to have it reflect the response expected from a typically qualified operating team.

j) In case of significant modifications to the test scenario or to its guide:

   i) Ensure that the scenario still meets the criteria indicated in its design checklist.

   ii) Run the scenario again on the simulator. All modifications to sections 3 and 4 of the examiner's guide should be completed before the rehearsal of the test scenarios.

k) Review all the information collected to ensure that the data collection devices meet the requirements specified in Appendix A.3B).

l) Complete a Test Scenario Verification Checklist similar to that shown in Appendix A.11.

7.1.3.5 At the conclusion of the final verification of the test scenarios:

a) Collect all material that may compromise the security of the examination.

b) Ensure that the simulator is restored to a normal configuration.

7.1.4 Rehearsal of the Test Scenarios

The examination team should rehearse each test scenario with the support team to confirm that the examiner's guide is complete and technically accurate, and that, during the examination, all support team members will play their role exactly as specified in the examiner's guide. During the rehearsals, an individual, capable of filling the position sought by the candidates and who preferably has not been involved in the preparation of the examination, plays the role of the candidate. The lead examiner should coordinate the rehearsals in accordance with the following instructions.

7.1.4.1 Before the rehearsals of the test scenarios:

a) Brief the members of the support team on their role and responsibilities, and on the rules they must abide by. Appendix A.16 is provided to assist the lead examiner in this briefing.

b) Review with the members of the support team the intent of the relevant security agreement shown in Appendix A.1, and the consequences of violating its terms.

c) Ensure that each person signs or has signed a copy of the relevant agreement and collect the signed agreements for filing.

7.1.4.2 Prior to rehearsing a test scenario:

a) Give each member of the support team a controlled copy of the relevant examiner's guide.

b) Review the scenario with the support team and discuss the response expected from each member as specified in sections 3 and 4 of the examiner's guide.

c) Ensure that the simulator is placed in a secure configuration to avoid compromising the security of the examination.

d) Ensure that the operator action monitor, the alarm message printer and the parameter recording devices required by the test scenario are in service.

7.1.4.3 Request the simulator operator to run the test scenario in real time with the individual playing the role of the candidate responding to the conditions of the scenario, according to the performance expectations of plant management, while the support team members perform their respective activities. During this time:

a) Verify jointly with the examination team that the scenario unfolds as planned and that the support team members respond as specified in sections 3 and 4 of the examiner's guide.

b) Ensure that the examiner's guide is complete and accurate in every respect for the dynamic part of the scenario.

c) Measure the dynamic duration of the scenario and confirm that it does not significantly exceed the prescribed time limit.

7.1.4.4 At the end of a test scenario for SS candidates:

a) Ask the individual playing the role of the candidate to answer the questions from the relevant part of Appendix A.14 contained in the examiner's guide.

b) Confirm that each answer documented in the examiner's guide is complete and accurate.

7.1.4.5 At the end of the test scenario, review with the examination team the performance of the support team and, if necessary, modify the instructions in sections 3 and 4 of the examiner's guide in accordance with the guidelines in the relevant part of Appendix A.12. In particular, watch for:

a) support team members doing more than what is specified in the examiner's guide or what is requested by the candidate;

b) support team members not giving the necessary feedback to the candidate on time, or giving incomplete or erroneous feedback;

c) support team members acting in any way that could interfere with the conduct of the examination.

7.1.4.6 Review with the examination team the data collected to ensure that the presence of the support team does not change the intent and the scope of the test scenario.

a) Modify the test scenario and its guide if:

i) conditions exist in the scenario for which no unique sequence of actions can be predicted with confidence;

ii) excessive demands are likely to be imposed on the candidate, the simulator operator or support team members.

b) Modify the examiner's guide as necessary to have it reflect the response expected from a typically qualified operating team.

c) In case of substantial modifications to the test scenario or to its guide:

i) Ensure that the scenario still meets the criteria indicated in its design checklist.

ii) Perform another rehearsal of the scenario.

7.1.4.7 After the rehearsal of the test scenario:

a) Collect the copies of the examiner's guide given to the support team members and all other material that may compromise the security of the examination.

b) Keep the parameter trends recorded during the rehearsal for reference during the assessment of the candidates.

7.1.4.8 Repeat steps 7.1.4.2 to 7.1.4.7 for the other test scenarios.

7.1.4.9 At the conclusion of the rehearsals of the test scenarios, ensure that the simulator is restored to a normal configuration.

7.1.5 Finalization and Approval of the Examiner's Guides

The lead examiner should coordinate the preparation of the final version of the examiner's guides and have them reviewed and approved by the Training Manager, in accordance with the following instructions.

7.1.5.1 Revise the test scenario design checklists and the examination design checklist where necessary and confirm that the examination meets all the applicable criteria.

7.1.5.2 Prepare with the examination team the final version of the examiner's guides in the light of the outcome of the rehearsal of the test scenarios with the support team. Compile the instructions for the support team in sections 5 and 6 of the guides.

7.1.5.3 Cross-reference with the examination team each item of the Candidate Action Checklist of each examiner's guide to one or more of the generic performance expectations listed in Appendix A.4 A or B, as appropriate.

7.1.5.4 Verify that, over the entire examination, each of competency areas 1, 3, 4 and 5 is tested at least 25 times and competency area 2 is tested at least 15 times. If this criterion is not met, modify the test scenarios accordingly.

7.1.5.5 Before the conduct of the examination, determine the order in which the candidates will be examined. The guidelines below should be followed by the lead examiner when scheduling candidates for the examination:

a) All candidates should be examined on a given test scenario before conducting the next one.

b) The order in which the candidates are examined should be varied from one test scenario to another.

c) The total estimated dynamic duration of the test scenarios conducted each day by an examination team should be between three and four hours.

7.1.5.6 Determine the order in which the test scenarios will be presented to the candidates during the examination and number each examiner's guide accordingly.

7.1.5.7 Forward the examiner's guides, the examination design checklist, the test scenario design checklists and the test scenario verification checklists to the Training Manager to obtain approval of the examiner's guides for the conduct of the examination.

7.1.5.8 Make arrangements to obtain the required number of copies of the approved examiner's guides for the conduct of the examination.

7.2 Examinations for SS candidates at Multi-unit Plants

7.2.1 Initial Verification of the Test Scenarios

The examination team should perform an initial verification of the CTSs and DTSs on the plant simulator to determine that they unfold as planned and that the simulated response of the systems involved has the required degree of realism. The examination team should also perform a verification of the PCTS to ensure that the panel anomalies are simulated realistically. These verifications should be made in accordance with the following instructions.

7.2.1.1 Maintain a list of simulator deficiencies encountered during the initial verification of the test scenarios that cannot be rectified at this time.

7.2.1.2 Ensure that the simulator is placed in a secure configuration to avoid compromising the security of the examination.

7.2.1.3 When any significant change is made to a test scenario, ensure that it still meets the criteria indicated in its design checklist.

7.2.1.4 Run each CTS and DTS on the simulator and perform the required actions, using the relevant operating procedures.

a) During the run, closely verify the fidelity of the simulator response to the malfunctions and other scenario conditions inserted and to the expected operator actions. The purpose of this verification is to ensure that the simulated unit response is realistic and that there is no misleading difference between the simulated response and the response of the reference unit. As a minimum, the alarms received in the control room at the simulator and the parameters listed in the checklist of Appendix A.11 should be verified to ensure that:

   i) the key alarms are received when expected and in the correct sequence;

   ii) the values of each system parameter monitored have approximately the correct magnitude and their excursions, if any, have approximately the correct magnitude and duration, based on the applicable laws of physics and the characteristics of the equipment and systems of the reference unit;

   iii) the relevant system logic control circuits operate correctly.

b) If during this verification it is found that a malfunction is not simulated correctly, it is acceptable to reproduce the desired effect by simulator operator intervention provided this will not be noticeable to the candidates. Otherwise, another malfunction should be used. Similarly, if the test scenario as a whole cannot be simulated correctly, another test scenario should be designed.

7.2.1.5 For each CTS that includes situations for which the operating procedures give no specific instructions, verify that the appropriate course of actions is clear and unique. Otherwise, modify the CTS.

7.2.1.6 For each DTS that includes situations for which the operating procedures give no specific instructions:

a) Verify that the appropriate course of actions is clear. Otherwise, modify the DTS.

b) Verify that any appropriate course of actions to respond to a failure of a major automatic action prior to diagnosing the Primary Malfunction does not have an impact on unit conditions that would prevent, or excessively interfere with, making the correct diagnosis. Otherwise, modify the DTS.

7.2.1.7 For each CTS and DTS, confirm that the list of system parameters to be recorded during its conduct, which is contained in part B of section 1 of the examiner's guide (Appendix A.8 A), is appropriate and complete.

7.2.1.8 Run each CTS and DTS in real time on the simulator and determine:

a) the alarm messages and the other information that will be communicated to the candidates by support team members;

b) the required actions by the members of the control room support team;

c) the approximate time it would take at the plant for completing the field activities required by the scenario;

d) other field interventions that might be requested by a candidate and the approximate time it would take for completing them at the plant;

e) the approximate CTS dynamic duration or the maximum DTS dynamic duration allowed for making the correct diagnosis, as applicable.

7.2.1.9 At the end of each CTS, confirm that the timing of the malfunctions is such that a typically qualified SS would have sufficient time to respond as expected to each malfunction.

7.2.1.10 At the end of each DTS, confirm that:

a) a typically qualified SS would have sufficient information and time to respond as expected to the Secondary Malfunctions and to make the correct diagnosis;

b) unit conditions have not deteriorated to a level that would prevent, or excessively interfere with, making the correct diagnosis.

7.2.1.11 At the end of each CTS and DTS, collect all the data necessary for the preparation of the examiner's guide.

7.2.1.12 For the PCTS:

a) Verify that the panel anomalies can be detected from the control room panels during the execution of the verification task.

b) Verify that the control room indications associated with each panel anomaly are the same as they would be at the reference unit under the defined initial unit conditions.

c) Perform the verification task and verify that a typically qualified SS would have sufficient time to complete the verification task.

7.2.1.13 At the conclusion of the initial verification of the test scenarios:

a) Collect all material that may compromise the security of the examination.

b) Ensure that the simulator is restored to a normal configuration.

7.2.2 Preparation of the Examiner's Guides

The examination team should prepare the initial drafts of the examiner's guides for the selected test scenarios in accordance with the following instructions.

7.2.2.1 Verify that the frozen documentation required to prepare the examiner's guides is available.

7.2.2.2 Maintain a record of any significant deficiency found in the plant documentation during the preparation of the examiner's guides.

7.2.2.3 Prepare an examiner's guide for each CTS according to the guidelines and criteria detailed below.

Cover Sheet

A form similar to that shown in Appendix A.7 completed during the design of the CTS.

Section 1 - Test Scenario Summary

A section similar to that shown in Appendix A.8 A, with part A and part B completed during the design of the test scenario and modified to reflect any significant change made to the scenario during its development.

Section 2 - Initial Plant Conditions

This section details the initial plant conditions defined during the design of the test scenario:

- reactor power of each reactor unit
- generator load of each reactor unit
- unit control mode of the simulated reactor unit, if applicable
- average liquid zone level of the simulated reactor unit
- state of major systems of the various units
- equipment out of service
- fuelling machine activities in progress
- routine tests and maintenance activities in progress
- other plant conditions

It also details where each member of the control room support team will be at the start of the test scenario.

This information is given to the candidate during the turnover at the start of the test scenario.

Section 3 - Candidate Action Checklist

This section details the sequence of actions and checks expected from the candidates in response to the malfunctions and conditions of the CTS. It also contains detailed instructions for the individual members of the control room support team and for the individual directing the activities of the field operators or playing their role. These instructions should be written according to the guidelines in Appendix A.12 A. Finally, this section contains the standard questions to be asked at the end of the CTS with answers. The checklist format is shown in Appendix A.13, part A.

The checklist allows the examiners to record accurately the response of the candidates to the conditions of the scenario, independently of the video recordings and of the operator action monitor. It should reflect as closely as possible the performance of a typically qualified SS and contain the following information arranged in the anticipated sequence of occurrence:

1- The Primary Malfunctions and when each is initiated.

2- The sequence of key alarms and annunciations received on the control room panels and CRTs after the initiation of each Primary Malfunction.

3- The Secondary Malfunctions that follow the occurrence of a Primary Malfunction and when each is observable.

4- Any key alarm or annunciation on the control room panels and CRTs associated with each Secondary Malfunction.

5- When each member of the control room support team summoned will be instructed to arrive at the simulated reactor unit or at unit 0.

6- The alarms, annunciations, equipment malfunctions and any other information that the members of the control room support team must communicate to the candidates and when they must be communicated.

7- The field conditions and any other information that the individual directing the activities or playing the role of the field operators must communicate to the candidates and when they must be communicated.

8- The checks of automatic actions that the candidates must perform, specifying the indicators to be used (see note below). For checks of automatic actions of complex systems where a number of identical devices are actuated (e.g. Emergency Core Cooling System), generic statements may be used (e.g. check D_2O isolation valves open).

9- The checks of system parameters and indicators that the candidates must perform, including those to determine the nature of a Primary Malfunction and to identify the relevant operating procedures, specifying the indicators to be used (see note below).

10- The actions and checks that the candidates must instruct the members of the control room support team to perform, based on diagnosis, prior to accessing the relevant operating procedures, specifying the devices to be operated and the indicators to be used to perform the checks (see note below).

11- The specific instructions that the candidates must give to the members of the control room support team to direct them to implement the relevant operating procedures.

12- The actions and checks that the candidates must instruct the members of the control room support team to perform whenever they request assistance from the SS while implementing a procedure, specifying the devices to be operated and the indicators to be used to perform the checks (see note below).

13- The actions and checks that the candidates must perform to implement any step of a relevant procedure specifically assigned to the SS.

14- When operating procedures do not specifically address a malfunction or plant condition, the actions and checks that the candidates must instruct the members of the control room support team to perform to place the unit, the systems or the equipment in the required state, specifying the devices to be operated and the indicators to be used to perform the checks (see note below).

15- The checks that the candidates must perform to determine the nature of any Secondary Malfunction and to identify the relevant operating procedure, if any, specifying the indicators to be used (see note below).

16- The actions and checks that the candidates must instruct the members of the control room support team to perform upon detection of each Secondary Malfunction, specifying the devices to be operated and the indicators to be used to perform the checks (see note below).

17- All requests for activities in the control equipment room expected from the candidates and for each activity, the time that would be required for completing it at the plant and the information to be reported back to the candidates by the member of the control room support team involved once the activity is completed.

18- All requests for field activities expected from the candidates and for each activity, the number of field operators and the time that would be required for completing it at the plant and the information to be reported back to the candidates once the activity is completed.

19- The specific information that the candidates should give to the support team members.

20- The notifications and any request for approval that the candidates must make.

21- The checks of system, unit and plant conditions, constraints and limits that the candidates must perform before approving a request by the support team.

22- When any certified individual on the support team will be instructed to leave the simulated reactor unit or unit 0 during the CTS and, if applicable, when the individual will be instructed to return to the relevant unit.

23- The standard questions in part A of Appendix A.14, with complete and accurate answers. Only significant concerns that the candidates are not expected to address during the dynamic portion of the CTS and that are not addressed by the procedures being implemented at the endpoint of the CTS should be covered in the answers.

Note: Specify in the checklist the indicator or the set of indicators to be used for checking or monitoring a parameter or condition when it is specified in the relevant operating procedure, or when only one indicator or set of indicators is reliable under the existing circumstances.

Section 4 - Simulator Operator Instructions

This section details the activities of the simulator operator during the CTS. It should contain the following instructions arranged in the planned sequence of execution:

1- Instructions to set up the simulator.

2- The checks required before the start of the scenario to ensure that:
   a) the simulator is in the proper configuration to simulate the initial unit conditions and the equipment out of service at the beginning of the scenario;
   b) all equipment out of service is correctly identified on the unit panels;
   c) the required malfunctions of poised equipment are programmed;
   d) all panel lights are functional and the panel horn is on;
   e) all data collection devices are operational and synchronized;
   f) the telephone system, the radiation emergency warning siren, the fire emergency warning siren and the public address system are functional.

3- The sequence of Primary and Secondary Malfunctions to be entered during the CTS, with the conditions for their activation. These conditions may be any of the following:
   a) a specific system or unit condition;
   b) the completion of a specified step in an operating procedure;
   c) the completion of a specified action in the control room by a candidate or by a member of the support team;
   d) a signal from the lead examiner;
   e) a specified time after a given occurrence during the scenario.

   Note: Care should be taken when using time as the condition for activation of a malfunction since this may result in the malfunction occurring at an inappropriate moment during the conduct of the examination due to the speed with which the expected actions and checks are performed.

4- The actions required to reproduce in the control room the outcome of each operation performed in the field or in the control equipment room and the time after which the outcome will be seen in the control room, based on the time that would be required for completing the operation at the plant.

5- The specific data to be collected after completion of the CTS, based on the list in Appendix A.15.

Section 5 - Instructions for Support Team Staff in the Control Room

This section contains separate instructions for each member of the control room support team that specify the actions they must perform during the test scenario. It is completed after the initial rehearsal of the scenario with the support team. The sequence of instructions for each member will then be compiled from section 3.

Section 6 - Field Operator Instructions

This section contains instructions that specify the actions that the individual directing the activities or playing the role of the field operators must perform during the test scenario. It is completed after the initial rehearsal of the scenario with the support team. The sequence of instructions for each field operation expected will then be compiled from section 3.

7.2.2.4 Prepare an examiner's guide for each DTS according to the guidelines and criteria detailed below.

Cover Sheet

A form similar to that shown in Appendix A.7 completed during the design of the DTS.

Section 1 - Test Scenario Summary

Refer to section 1 of a CTS examiner's guide on page 47.

Section 2 - Initial Plant Conditions

Refer to section 2 of a CTS examiner's guide on page 47.

Section 3 - Candidate Action Checklist

This section details the sequence of actions and checks expected from the candidates in response to the malfunctions and conditions of the DTS. It also contains detailed instructions for the individuals playing the role of the RO, of the U0O where applicable, and of the field operators. These instructions should be written according to the guidelines in Appendix A.12 B. Finally, this section contains the standard questions to be asked at the end of the DTS with answers.

The checklist allows the examiners to accurately record the response of the candidates to the conditions of the scenario, independently of the video recordings and of the operator action monitor. It should reflect as closely as possible the performance of a typically qualified SS and contain the following information arranged in the anticipated sequence of occurrence:

1- The Primary Malfunction.

2- The sequence of key alarms and annunciations received on the control room panels and CRTs after the initiation of the Primary Malfunction.

3- Any Secondary Malfunction that follows the occurrence of the Primary Malfunction and when it is observable.

4- Any key alarm or annunciation on the control room panels and CRTs associated with a Secondary Malfunction.

5- The field conditions and any other information that the individual playing the role of the field operators must communicate to the candidates and when they must be communicated.

6- The checks of major automatic actions and major system parameters that the candidates must perform, specifying the indicators to be used (see note on page 50). For checks of automatic actions of complex systems where a number of

identical devices are actuated (e.g. Emergency Core Cooling System), generic statements may be used (e.g. check D_2O isolation valves open).

7- The checks or combinations of checks of system parameters and indicators that the candidates must perform to determine unambiguously the nature of the Primary Malfunction and to identify the relevant operating procedures, specifying the indicators to be used (see note on page 50). When there is more than one approach to reach the correct diagnosis, each acceptable combination of checks that supports a unique conclusion should be documented.

8- The checks that the candidates must perform to determine the nature of any Secondary Malfunction and to identify the relevant operating procedures, if any, specifying the indicators to be used (see note on page 50).

9- The actions that the candidates must instruct the members of the control room support team to perform when a major automatic action fails to occur.

10- All requests for verifications in the control equipment room expected from the candidates and for each verification, the time that would be required for completing it at the plant and the information to be reported back to the candidates.

11- All requests for verifications in the field expected from the candidates and for each verification, the minimum time that would be required for completing it at the plant and the information to be reported back to the candidates. When it is acceptable to report back, before the minimum time, field information requested that is essential to make the correct diagnosis, the control room checks that a candidate must have performed before the field information is reported back.

12- The DTS dynamic duration allowed for making the correct diagnosis.

13- The standard questions in part B of Appendix A.14, modified as appropriate to reflect the actual conditions of the scenario, with complete and accurate answers.

Section 4 - Simulator Operator Instructions

This section details the activities of the simulator operator during the DTS. It should contain the following instructions arranged in the planned sequence of execution:

1- Instructions to set up the simulator.

2- The checks required before the start of the scenario to ensure that:
   a) the simulator is in the proper configuration to simulate the initial unit conditions and the equipment out of service at the beginning of the scenario;
   b) all equipment out of service is correctly identified on the unit panels;
   c) any Secondary Malfunction associated with poised equipment is programmed;
   d) all panel lights are functional and the panel horn is on;
   e) all data collection devices are operational and synchronized;
   f) the telephone system, the radiation emergency warning siren, the fire emergency warning siren and the public address system are functional.

3- The Primary Malfunction to be entered at the start of the DTS.

4- Any Additional Malfunction associated with an operating piece of equipment to be entered during the DTS, with the conditions for its activation.

5- The specific data to be collected after completion of the DTS, based on the list in Appendix A.15.

Section 5 - Instructions for Support Team Staff in the Control Room

Refer to section 5 of a CTS examiner's guide on page 50.

Section 6 - Field Operator Instructions

Refer to section 6 of a CTS examiner's guide on page 51.

7.2.2.5 Prepare an examiner's guide for the PCTS according to the guidelines and criteria detailed below.

Cover Sheet

A form similar to that shown in Appendix A.7 completed during the design of the PCTS.

Section 1 - Test Scenario Summary

A section similar to that shown in A.8 B, with part A completed during the design of the PCTS and modified to reflect any significant change made to the scenario during its development.

Section 2 - Initial Plant Conditions

Refer to section 2 of a CTS examiner's guide on page 47.

Section 3 - Candidate Action Checklist

This section details the answers expected of a typically qualified SS to the standard questions asked at the end of the PCTS. This checklist allows the examiners to accurately record the answers given by the candidates independently of the video recordings. It should contain the following information:

1- The control room indications associated with each panel anomaly.

2- Any expected request from the candidates for field information required to assess the abnormal system condition associated with a panel anomaly and for each, the specific information that the lead examiner must give to the candidates.

3- The maximum time allowed for completing the verification task.

4- The standard questions in part C of Appendix A.14, with complete and accurate answers.

Section 4 - Simulator Operator Instructions

This section details the activities of the simulator operator before the start of the PCTS. It should contain the following instructions:

1- Instructions to set up the simulator.

2- The checks required before the start of the scenario to ensure that:
   a) the simulator is in the proper configuration to simulate the initial unit conditions and the equipment out of service at the beginning of the scenario;
   b) all equipment out of service is correctly identified on the unit panels;

c) all panel anomalies are set up properly;
d) all panel lights are functional and the panel horn is on;
e) the video system is operational.

Section 5 - Instructions for the Candidates

This section contains specific instructions regarding the verification task to be performed by the candidates during the PCTS.

7.2.2.6 For each CTS and DTS, verify that there is no duplication in the Candidate Action Checklist between the performance items measured during the dynamic portion of the test scenario and the answer items for the questions asked at the end of the scenario. Modify the checklist to remove any duplication of items.

7.2.2.7 Promptly report to the Training Manager any deficiency found in the plant operating procedures which may impact on plant safety.

7.2.3 Final Verification the Test Scenarios

The examination team should perform a final verification of the test scenarios on the plant simulator to determine that they unfold as planned in section 3 of the examiner's guides. This final verification should be made in accordance with the following instructions.

7.2.3.1 Maintain a record of any additional simulator deficiency encountered during the final verification and the rehearsal of the test scenarios that cannot be rectified at this time.

7.2.3.2 Ensure that the simulator is placed in a secure configuration to avoid compromising the security of the examination.

7.2.3.3 Verify that the data collection devices and other devices required for certification examinations, as specified in Appendix A.3B) and C), are functional.

7.2.3.4 Run each CTS in real time on the simulator while performing the required actions and checks, using the relevant operating procedures.

a) Verify that the CTS unfolds as planned using section 3 of the examiner's guide.
b) Measure the dynamic duration of the CTS and confirm that it does not significantly exceed 50 minutes.
c) Confirm that the required sequence of actions is clear and unique and that a typically qualified SS would have sufficient time to respond as expected to each malfunction.
d) Confirm the fidelity of the simulator response to the malfunctions and other scenario conditions, to the actions performed on control room panels and to simulator operator interventions, as specified in paragraph 7.2.1.4a).
e) Review the actions performed by the simulator operator during the CTS to ensure that no excessive demands which may jeopardize the conduct of the examination are imposed on this individual.
f) Review section 3 of the examiner's guide to identify the steps where candidates are most likely to make errors.

i) Try to predict what those errors might be and verify whether any of the errors could force the termination of the CTS because of conditions that the simulator cannot replicate properly.

ii) If an error that would force the termination of the CTS is found, evaluate the impact this would have on the assessment of the performance of a candidate. If necessary, modify or replace the CTS.

g) Modify the CTS and its guide if:

i) some malfunctions and their consequences cannot be simulated realistically;

ii) conditions exist in the scenario for which no unique sequence of actions can be predicted with confidence;

iii) excessive demands are likely to be imposed on the candidate, the simulator operator or support team members;

iv) the test scenario dynamic duration significantly exceeds 50 minutes.

h) Modify the examiner's guide to correct any technical error and to have it reflect the response expected from a typically qualified operating team.

i) In case of significant modifications to the CTS or to its guide:

i) Ensure that the CTS still meets the criteria indicated in its design checklist.

ii) Run the scenario again on the simulator. All modifications to sections 3 and 4 of the examiner's guide should be completed before the rehearsal of the test scenarios.

j) Review all the information collected to ensure that the data collection devices meet the requirements specified in Appendix A.3B).

k) Complete a Test Scenario Verification Checklist similar to that shown in Appendix A.11.

7.2.3.5 Run each DTS in real time on the simulator while performing the required checks to make the correct diagnosis and responding as expected to any Secondary Malfunction.

a) Verify that the DTS unfolds as planned using section 3 of the examiner's guide.

b) Measure the dynamic duration of the DTS and confirm that it does not significantly exceed 15 minutes.

c) Confirm that each Secondary Malfunction only affect those indicators, equipment, components or control devices that the candidates are expected to check during the DTS dynamic duration.

d) Confirm that any appropriate course of actions to respond to a failure of a major automatic action prior to diagnosing the Primary Malfunction is clear and does not have an impact on unit conditions that would prevent, or excessively interfere with, making the correct diagnosis.

e) Confirm that a typically qualified SS has sufficient information and time to respond as expected to the Secondary Malfunctions and to formulate the correct diagnosis.

f) Confirm the fidelity of the simulator response to the malfunctions and other scenario conditions, and to any action performed on control room panels to

respond to a failure of a major automatic action, as specified in paragraph 7.2.1.4a).

g) Modify the DTS and its guide if:
   i) some malfunctions and their consequences cannot be simulated realistically;
   ii) unit conditions are likely to deteriorate to a level that would prevent, or excessively interfere with, making the correct diagnosis;
   iii) the course of actions to respond to the malfunctions is not clear;
   iv) the test scenario dynamic duration significantly exceeds 15 minutes.

h) Modify the examiner's guide to correct any technical error and to have it reflect the response expected from a typically qualified SS.

i) In case of significant modifications to the DTS or to its guide:
   i) Ensure that the DTS still meets the criteria indicated in its design checklist.
   ii) Run the scenario again on the simulator. All modifications to sections 3 and 4 of the examiner's guide should be completed before the rehearsal of the test scenarios.

j) Review all the information collected to ensure that the data collection devices meet the requirements specified in Appendix A.3B).

k) Complete a Test Scenario Verification Checklist similar to that shown in Appendix A.11.

7.2.3.6 Run the PCTS on the simulator while an individual capable of filling the SS position and who has not been involved in the preparation of the scenario performs the selected verification task.

a) Confirm that the panel anomalies can be detected from the control room panels during the execution of the verification task.

b) Measure the time taken to complete the verification task, confirm that it does not significantly exceed 15 minutes and determine the maximum time that will be given to the candidates for completing the task.

c) Confirm the fidelity of the simulation of the control room indications associated with each panel anomaly. Also, confirm that any field information that the candidates will need to assess the abnormal system condition associated with a panel anomaly is specified in the examiner's guide.

d) Ask the individual playing the role of the candidate to answer the questions in part C of Appendix A.14 contained in the examiner's guide.

e) Confirm that each answer documented in the examiner's guide is complete and accurate.

f) Modify the examiner's guide to correct any technical error.

7.2.3.7 At the conclusion of the final verification of the test scenarios:

a) Collect all material that may compromise the security of the examination.

b) Ensure that the simulator is restored to a normal configuration.

7.2.4 Rehearsal of the Test Scenarios

The lead examiner should coordinate the rehearsals of the CTSs and DTSs in accordance with subsection 7.1.4, except for the instructions in paragraph 7.1.4.6 which are modified as follows:

Review with the examination team the data collected to ensure that the presence of the support team does not change the intent and the scope of the test scenario.

a) In the case of a CTS:
   i) Modify the test scenario and its guide if:
      (1) conditions exist in the scenario for which no unique sequence of actions can be predicted with confidence;
      (2) excessive demands are likely to be imposed on the candidate, the simulator operator or support team members.
   ii) Modify the examiner's guide as necessary to have it reflect the response expected from a typically qualified operating team.
b) In the case of a DTS:
   i) Modify the test scenario and its guide if:
      (1) unit conditions are likely to deteriorate to a level that would prevent, or excessively interfere with, making the correct diagnosis;
      (2) the course of actions to respond to the malfunctions is not clear.
   ii) Modify the examiner's guide as necessary to have it reflect the response expected from a typically qualified SS.
c) In case of substantial modifications to the test scenario or to its guide:
   i) Ensure that the scenario still meets the criteria indicated in its design checklist.
   ii) Perform another rehearsal of the scenario.

7.2.5 Finalization and Approval of the Examiner's Guides

The lead examiner should coordinate the preparation of the final version of the examiner's guides and have them reviewed and approved by the Training Manager, in accordance with the following instructions.

7.2.5.1 Revise the test scenario design checklists and the examination design checklist where necessary and confirm that the examination meets all the applicable criteria.

7.2.5.2 Prepare with the examination team the final version of the examiner's guides for the CTSs and DTSs in the light of the outcome of the rehearsal of the test scenarios with the support team. Complete sections 5 and 6 of the guides which contain the instructions for the support team.

7.2.5.3 Prepare with the examination team the final version of the examiner's guide for the PCTS in the light of the outcome of the final verification of the test scenario.

7.2.5.4 Cross-reference with the examination team each item of the Candidate Action Checklist of each examiner's guide to one or more of the generic performance expectations listed in Appendix A.4 C.

7.2.5.5 Verify that, over the entire examination, each of competency areas 1, 3, 4 and 5 is tested at least 25 times and competency area 2 is tested at least 15 times. If this criterion is not met, the test scenarios should be modified accordingly.

7.2.5.6 Determine the order in which the candidates will be examined. The guidelines below should be followed by the lead examiner when scheduling candidates for the examination:

a) All candidates will be examined on a given test scenario before conducting the next one.

b) The order in which the candidates are examined should be varied from one test scenario to another.

c) Based on the estimated dynamic durations of the CTSs and DTSs and on the estimated time to complete the verification task during the PCTS, the total duration of the test scenarios conducted each day by an examination team should be between three and four hours.

7.2.5.7 Determine the order in which the test scenarios will be presented to the candidates during the examination and number each examiner's guide accordingly.

7.2.5.8 Forward the examiner's guides, the examination design checklist, the test scenario design checklists and the test scenario verification checklists to the Training Manager to obtain approval of the examiner's guides for the conduct of the examination.

7.2.5.9 Make arrangements to obtain the required number of copies of the approved examiner's guides for the conduct of the examination.

8 Conduct of Examinations

The lead examiner coordinates the activities of the examination team during the conduct of an examination. Occasionally, observers may be present (refer to Appendix A.17, Section A). Candidates are examined on the various test scenarios in the order previously determined by the lead examiner.

A candidate may voluntarily withdraw at any time during the conduct of the examination. However, such an action automatically results in the candidate being assigned a fail grade for the examination and the withdrawal should be documented in the candidate's result letter.

The lead examiner is empowered to make minor adjustments to the approved examiner's guides, as required, at the time of the examination.

The lead examiner should coordinate the conduct of an examination in accordance with the applicable instructions below.

8.1 Preparation for the Conduct of Test Scenarios

8.1.1 At a convenient time before the examination:

a) Brief the candidates on the role and responsibilities of the various individuals involved in the conduct of the examination, on the main characteristics of the examination, on the performance expected from candidates during the conduct of the examination and on the rules they must abide by. Appendices A.18 A, B and C are provided to assist the lead examiner in this briefing.

b) Review with the candidates the intent of the security agreement shown in Appendix A.1, part B, and the consequences of violating its terms.

c) Ensure that each candidate signs a copy of that agreement and collect the signed agreements for filing.

8.1.2 If observers are involved:

a) Brief them on the rules they must abide by, using Appendix A.17, Section B.

b) Review with the observers the intent of the security agreement shown in Appendix A.1, part C, and the consequences of violating its terms.

c) Ensure that each observer signs a copy of that agreement and collect the signed agreements for filing.

8.1.3 Prior to conducting a CTS, an ATS or a DTS for the first time:

a) Give a controlled copy of section 4 of the examiner's guide to the simulator operator. Also, give a controlled copy of section 5 or 6, as appropriate, to each support team member who will participate in the conduct of the test scenario.

b) Review with the support team members the content of the scenario and the response expected from each team member, as specified in sections 5 and 6 of the examiner's guide.

c) Ensure that the simulator is placed in a secure configuration to avoid compromising the security of the examination.

d) Request the simulator operator to run the test scenario in real time and perform a final rehearsal of the scenario with the support team to ensure that all its members play their role as specified in the examiner's guide.
In particular, watch for:

i) support team members doing more than what is specified in the examiner's guide or what is requested by the candidate;

ii) support team members not giving the necessary feedback to the candidate on time, or giving incomplete or erroneous feedback;

iii) support team members acting in any way that could interfere with the conduct of the examination.

8.1.4 After the rehearsal of the test scenario, comment with the other examiner on any significant shortcoming observed in the performance of the support team.

8.1.5 Record any minor adjustment made to the approved examiner's guide as a result of the final rehearsal of the test scenario, with the reason for the change, in part C of section 1 of the guide (see Appendix A.8 A).

8.2 Conduct of a CTS or ATS

8.2.1 Before allowing a candidate scheduled for testing into the control room for the conduct of a selected test scenario, ensure that:

a) the simulator is placed in a secure configuration to avoid compromising the security of the examination;

b) the simulator is set in the proper configuration for the test scenario;

c) the operator action monitor, the alarm message printer, the parameter recording devices required by the scenario and the video system are in service and synchronized;

d) the video system is loaded with a properly labelled tape or disc;

e) any equipment out of service during the test scenario is identified on the panels in accordance with approved plant procedures;

f) the information available to the candidates in the control room at the simulator is limited to that approved for use in the control room at the plant;

g) all support team members who will participate in the test scenario are present.

8.2.2 Let the candidate in.

8.2.3 Ensure that the devices for recording communications between the candidate and the support team members are in service.

8.2.4 Instruct the video operator to begin recording the examination and to follow the movements of the candidate.

8.2.5 Prior to running the test scenario:

a) For an SS candidate, inform the candidate of the type of scenario.

b) Give the candidate a written turnover specifying the initial plant conditions for the test scenario, as detailed in section 2 of the examiner's guide, and describe these conditions to the candidate.

c) Make clear to the candidate that there is no abnormality in plant conditions to be found on control room panels other than those just described.

d) Give the candidate a maximum of five minutes to review control panels and alarm summaries. Begin the test after the five minutes have elapsed or sooner at the request of the candidate.

8.2.6 Notify the candidate that the simulation of the test scenario is about to start and signal the simulator operator to start the scenario.

8.2.7 In parallel with the other examiner, record the performance of the candidate on your copy of the Candidate Action Checklist in section 3 of the examiner's guide. Note on the checklist any change to the planned evolution of the test scenario and any unexpected action performed by the candidate.

8.2.8 If any of the abort conditions in Appendix A.19 is met:

a) Instruct the simulator operator to freeze the simulator and silence the alarm horns.

b) Inform the candidate and the support team that the simulation of the test scenario has been terminated due to unforeseen circumstances.

c) Instruct the candidate to sit at the operator desk while the examination team reviews the data collected so far and decides on a course of actions.

d) Instruct the support team members to leave the control room and to remain on standby.

e) Record the point at which the simulator was frozen and the reason for aborting the test scenario in the examiner's guide.

f) If this is the third test scenario abort to occur during the conduct of the examination, suspend the conduct of the examination immediately after completing the steps below for the candidate under test. The examination may continue only with the approval of the Training Manager.

g) Consider resuming the conduct of the test scenario only if all the following conditions are met:

   i) The abort was caused by a simulator deficiency that occurred shortly after the start of the test scenario.

   ii) The candidate is unlikely to be able to predict the rest of the test scenario.

   iii) The simulator deficiency is not likely to reoccur.

h) If you decide to resume the conduct of the test scenario:

   i) Instruct the candidate to leave the control room and to remain on standby.

   ii) Instruct the video operator to stop recording.

iii) Determine the plant conditions that will exist at the time of the resumption of the test scenario and record them in the examiner's guide.

iv) Instruct the simulator operator to reset the simulator and the control panel devices in preparation for the resumption of the test scenario.

v) Prior to resuming the conduct of the test scenario, review with the support team the plant conditions that will exist at the time of its resumption and the response expected from each team member during the remaining part of the scenario.

vi) Let the candidate in.

vii) Ensure that the devices for recording communications are in service.

viii) Instruct the video operator to resume recording the examination.

ix) Prior to resuming the test scenario, describe to the candidate the existing plant conditions.

x) Resume testing at step 8.2.6.

i) If it is not possible to resume the conduct of the test scenario:

i) Compare the information you recorded in your Candidate Action Checklist with that recorded by the other examiner to identify discrepancies in the information gathered.

ii) In consultation with the other examiner, determine if there is a need to question the candidate to clarify any aspect of observed performance that may affect the assessment of the individual. Document any question in the examiner's guide before asking it.

iii) Inform the candidate that it is not possible to resume the conduct of the test scenario and that another test scenario may have to be arranged.

iv) If there is a need to question the candidate:

(1) Ensure that the devices for recording the questions and the answers are in service.

(2) Ask the candidate the documented questions.

(a) In parallel with the other examiner, record the answers of the candidate in your examiner's guide.

(b) Confirm with the other examiner that no further clarification is required.

v) Instruct the candidate to leave the control room.

vi) Instruct the video operator to stop recording and the simulator operator to collect the data recorded during the test scenario.

vii) Continue with step 8.2.15.

8.2.9 At the end point of the test scenario:

a) Instruct the simulator operator to freeze the simulator and silence the alarm horns. Record the actual duration of the test scenario in your examiner's guide.

b) Inform the candidate and the support team that the end point of the test scenario has been reached and that the simulator has been frozen.

c) Instruct the candidate to sit at the operator desk while the examination team reviews the data collected.

d) Instruct the support team members to leave the control room and to remain on standby.

8.2.10 Compare the information you recorded in your Candidate Action Checklist with that recorded by the other examiner to identify discrepancies in the information gathered.

8.2.11 In consultation with the other examiner, determine if there is a need to question the candidate to clarify any aspect of observed performance that may affect the assessment of the individual. Document any supplementary question in the examiner's guide before asking it. This consultation should not normally last more than ten minutes.

8.2.12 If there is a need to question the candidate:

a) Ensure that the devices for recording the questions and the answers are in service.

b) For an SS candidate, ask the standard questions in part A of Appendix A.14 documented in the examiner's guide.

i) Give a copy of one question to the candidate and read it out. Give the candidate clarifications on the question, if required.

ii) In parallel with the other examiner, record the answer of the candidate using the Candidate Action Checklist of your examiner's guide. Note on the checklist any significant difference with the expected answer.

iii) If the answer is incomplete, rephrase the question, being careful not to give hints on the answer, to determine if the answer given accurately reflects the candidate's knowledge of the subject.

iv) Ask the candidate additional questions, if necessary, to determine the extent of the knowledge deficiencies shown or to obtain clarification of a particular point made by the candidate. If necessary, summarize the answers given by the candidate before asking these questions.

v) Repeat steps i) to iv) for each other question.

c) Ask any supplementary question needed to clarify the observed performance of the candidate during the simulation of the test scenario.

i) In parallel with the other examiner, record the answers of the candidate in your examiner's guide.

ii) Confirm with the other examiner that no further clarification is required.

8.2.13 Instruct the candidate to leave the control room.

8.2.14 Instruct the video operator to stop recording and the simulator operator to collect the data recorded during the test scenario.

8.2.15 In parallel with the other examiner, record your areas of concerns and any significant misconception shown by the candidate in your examiner's guide.

8.2.16 Perform a final verification of the status of those control panel devices necessary to complete the information recorded in the examiner's guides.

8.2.17 Complete a Data Collection Checklist similar to that shown in Appendix A.15 and attach it to the data collected. If applicable, remove the tabs on the video tape to prevent accidental erasure of the recording.

8.2.18 Store the data collected and the marked-up examiner's guides securely.

8.2.19 Instruct the simulator operator to reset the simulator and the control panel devices in preparation for the next candidate.

8.2.20 Collect all material that may compromise the security of the examination.

8.2.21 Repeat steps 8.2.1 to 8.2.20 until all candidates have been examined in the predetermined order on the test scenario.

8.2.22 At the end of each daily testing session:

a) Ensure that the simulator is restored to a normal configuration.

b) Collect all controlled copies of complete or partial examiner's guides and all other material that may compromise the security of the examination.

8.2.23 After all candidates have been examined on a test scenario, collect all controlled copies of complete or partial examiner's guides and all other material that may compromise the security of the examination for immediate disposal.

8.3 Conduct of a DTS

8.3.1 Before allowing a candidate scheduled for testing into the control room for the conduct of a selected DTS, follow the instructions of paragraph 8.2.1.

8.3.2 Let the candidate in.

8.3.3 Ensure that the devices for recording communications between the candidate and the support team members are in service.

8.3.4 Instruct the video operator to begin recording the examination and to follow the movements of the candidate.

8.3.5 Prior to running the DTS:

a) Inform the candidate of the type of scenario.

b) Give the candidate a written turnover specifying the initial plant conditions for the test scenario, as detailed in section 2 of the examiner's guide, and describe these conditions to the candidate.

c) Make clear to the candidate that there is no abnormality in plant conditions to be found on control room panels other than those just described.

d) Give the candidate a maximum of five minutes to review control panels and alarm summaries. Begin the test after the five minutes have elapsed or sooner at the request of the candidate.

8.3.6 Notify the candidate that the simulation of the test scenario is about to start and signal the simulator operator to start the scenario.

8.3.7 In parallel with the other examiner, record the performance of the candidate on your copy of the Candidate Action Checklist in section 3 of the examiner's guide. Note on the checklist any change to the planned evolution of the test scenario, any significant deviation from the key checks to be made by the candidate and any unexpected request to support team members made by the candidate.

8.3.8 If any of the abort conditions in Appendix A.19 is met:

a) Instruct the simulator operator to freeze the simulator and silence the alarm horns.

b) Inform the candidate and the support team that the simulation of the test scenario has been terminated due to unforeseen circumstances.

c) Instruct the candidate to sit at the operator desk while the examination team reviews the data collected so far.

d) Instruct the support team members to leave the control room and to remain on standby.

e) Record the point at which the simulator was frozen and the reason for aborting the test scenario in the examiner's guide.

f) If this is the third test scenario abort to occur during the conduct of the examination, suspend the conduct of the examination immediately after completing the steps below for the candidate under test. The examination may continue only with the approval of the Training Manager.

g) Compare the information you recorded in your Candidate Action Checklist with that recorded by the other examiner to identify discrepancies in the information gathered.

h) In consultation with the other examiner, determine if there is a need to question the candidate to clarify any aspect of observed performance that may affect the assessment of the individual. Document any question in the examiner's guide before asking it.

i) Inform the candidate that another test scenario will have to be arranged.

j) If there is a need to question the candidate:

  i) Ensure that the devices for recording the questions and the answers are in service.

  ii) Ask the candidate the documented questions.

    (1) In parallel with the other examiner, record the answers of the candidate in your examiner's guide.

    (2) Confirm with the other examiner that no further clarification is required.

k) Instruct the candidate to leave the control room.

l) Instruct the video operator to stop recording and the simulator operator to collect the data recorded during the test scenario.

m) Continue with step 8.3.16.

8.3.9 At the end point of the DTS:

a) Instruct the simulator operator to freeze the simulator and silence the alarm horns. Record the actual duration of the test scenario in your examiner's guide.

b) Inform the candidate and the support team that the end point of the test scenario has been reached and that the simulator has been frozen.

c) Instruct the support team members to leave the control room and to remain on standby.

d) Ask the candidate the questions in part B of Appendix A.14, as documented in the examiner's guide.

i) Remind the candidate that access to operating documentation is allowed for answering the questions.

ii) Give a copy of one question to the candidate and read it out. Give the candidate clarifications on the question, if required.

iii) In parallel with the other examiner, record the answer of the candidate using the Candidate Action Checklist of your examiner's guide. Note on the checklist any significant difference with the expected answer.

iv) If the answer is incomplete, rephrase the question, being careful not to give hints on the answer, to determine if the answer given accurately reflects the candidate's knowledge of the subject.

v) Ask the candidate additional questions, if necessary, to determine the extent of the knowledge deficiencies shown or to obtain clarification of a particular point made by the candidate. If necessary, summarize the answers given by the candidate before asking these questions.

vi) Repeat steps ii) to v) for the other questions.

8.3.10 When the candidate has answered all questions, instruct the candidate to sit at the operator desk while the examination team reviews the data collected.

8.3.11 Compare the information you recorded in your Candidate Action Checklist with that recorded by the other examiner to identify discrepancies in the information gathered.

8.3.12 In consultation with the other examiner, determine if there is a need to ask the candidate supplementary questions to clarify any aspect of performance observed during the simulation of the DTS that may affect the assessment of the individual. Document any supplementary question in the examiner's guide before asking it.

8.3.13 If there is a need to ask supplementary questions to the candidate:

a) Ensure that the devices for recording the questions and the answers are in service.

b) Ask the documented questions.

i) In parallel with the other examiner, record the answers of the candidate in your examiner's guide.

ii) Confirm with the other examiner that no further clarification is required.

8.3.14 Instruct the candidate to leave the control room.

8.3.15 Instruct the video operator to stop recording and the simulator operator to collect the data recorded during the DTS.

8.3.16 In parallel with the other examiner, record your areas of concerns and any significant misconception shown by the candidate in your examiner's guide.

8.3.17 Perform a final verification of the status of those control panel devices necessary to complete the information recorded in the examiner's guides.

8.3.18 Complete a Data Collection Checklist similar to that shown in Appendix A.15 and attach it to the data collected. If applicable, remove the tabs on the video tape to prevent accidental erasure of the recording.

8.3.19 Store the data collected and the marked-up examiner's guides securely.

8.3.20 Instruct the simulator operator to reset the simulator and the control panel devices in preparation for the next candidate.

8.3.21 Collect all material that may compromise the security of the examination.

8.3.22 Repeat steps 8.3.1 to 8.3.21 until all candidates have been examined in the predetermined order on the DTS.

8.3.23 At the end of each daily testing session:

a) Ensure that the simulator is restored to a normal configuration.

b) Collect all controlled copies of complete or partial examiner's guides and all other material that may compromise the security of the examination.

8.3.24 After all candidates have been examined on a test scenario, collect all controlled copies of complete or partial examiner's guides and all other material that may compromise the security of the examination for immediate disposal.

8.4 Conduct of the PCTS

8.4.1 Prior to conducting the PCTS, give to the simulator operator a controlled copy of section 4 of the examiner's guide.

8.4.2 Before allowing a candidate scheduled for testing into the control room for the conduct of the PCTS, ensure that:

a) the simulator is placed in a secure configuration to avoid compromising the security of the examination;

b) the simulator is set in the proper configuration for the test scenario;

c) the video system is in service and loaded with a properly labelled tape or disc;

d) any equipment out of service during the test scenario is identified on the panels in accordance with approved plant procedures;

e) the information available to the candidates in control room at the simulator is limited to that approved for use in the control room at the plant.

8.4.3 Let the candidate in.

8.4.4 Ensure that the devices for recording communications are in service.

8.4.5 Instruct the video operator to begin recording the examination and to follow the movements of the candidate.

8.4.6 Prior to conducting the PCTS:

a) Inform the candidate of the type of scenario.

b) Give the candidate a written turnover specifying the initial plant conditions for the test scenario, as detailed in section 2 of the examiner's guide, and describe these conditions to the candidate.

c) Give the candidate a copy of Section 5 - Instructions for the Candidate and describe the verification task to be performed to the candidate.

d) Inform the candidate of the maximum time allowed for completing the verification task.

8.4.7 Instruct the candidate to start performing the verification task, with access to operating documentation.

8.4.8 Observe the performance of the candidate with the other examiner. Note on your copy of the Candidate Action Checklist in section 3 of the examiner's guide any unexpected check or request for information made by the candidate.

8.4.9 When the candidate indicates having completed the verification task or when the maximum time allocated for completing it has expired, ask the candidate what panel anomalies or abnormal conditions were found.

8.4.10 When the candidate has answered this first question:

a) Give the candidate a copy of the other two questions in part C of Appendix A.14 documented in the examiner's guide.

b) Allow the candidate ten minutes to prepare for answering these questions orally, with access to operating documentation.

8.4.11 In consultation with the other examiner, determine if there is a need to ask the candidate supplementary questions to clarify any aspect of observed performance that may affect the assessment of the individual. Document any supplementary question in the examiner's guide before asking it.

8.4.12 When the time allocated to prepare for answering the last two questions has expired:

a) Ensure that the devices for recording the questions and the answers are in service.

b) Ask the candidate to answer the two questions.

i) In parallel with the other examiner, record the answers of the candidate using the Candidate Action Checklist of your examiner's guide. Note on the checklist any significant difference with the expected answer.

ii) If the answer to a question is incomplete, rephrase the question, being careful not to give hints on the answer, to determine if the answer given accurately reflects the candidate's knowledge of the subject.

iii) Ask the candidate additional questions, if necessary, to determine the extent of the knowledge deficiencies shown or to obtain clarification of a particular

point made by the candidate. If necessary, summarize the answers given by the candidate before asking these questions.

c) Ask any supplementary question needed to clarify the observed performance of the candidate during the PCTS.

i) In parallel with the other examiner, record the answers of the candidate in your examiner's guide.

ii) Confirm with the other examiner that no further clarification is required.

8.4.13 Instruct the candidate to leave the control room.

8.4.14 Instruct the video operator to stop recording.

8.4.15 In parallel with the other examiner, record your areas of concerns and any significant misconception shown by the candidate in your examiner's guide.

8.4.16 Complete a Data Collection Checklist similar to that shown in Appendix A.15 and attach it to the data collected. If applicable, remove the tabs on the video tape to prevent accidental erasure of the recording.

8.4.17 Store the data collected and the marked-up examiner's guides securely.

8.4.18 Collect all material that may compromise the security of the examination.

8.4.19 Repeat steps 8.4.1 to 8.4.18 until all candidates have been examined in the prescribed order on the PCTS.

8.4.20 At the end of each daily testing session:

a) Ensure that the simulator is restored to a normal configuration.

b) Collect all controlled copies of complete or partial examiner's guides and all other material that may compromise the security of the examination.

8.4.21 After all candidates have been examined on the PCTS, collect all controlled copies of complete or partial examiner's guides and all other material that may compromise the security of the examination for immediate disposal.

8.5 End of Examination Conduct

Once an examination is completed, record any simulator deficiency or any deficiency in plant documentation encountered during the conduct of the examination.

9 Grading of Examinations

The examination team should assess the performance of the candidates as soon as practicable after the conduct of an examination. The results of each candidate should be determined, using the data collected during the conduct of the examination.

The examinations are graded according to:

- subsection 9.1 for the examinations for RO and U0O candidates and for SS candidates at single-unit plants
- subsection 9.2 for the examinations for SS candidates at multi-unit plants

9.1 Examinations for RO and U0O Candidates and for SS candidates at Single-unit Plants

9.1.1 Preparation for the Grading

The examination team should prepare for the assessment of the performance of the candidates in accordance with the following instructions.

9.1.1.1 Make the necessary modifications to the approved examiner's guides to account for any minor adjustment made during the conduct of the examination. Cross-reference any additional action or check to one or more generic performance expectations listed in Appendix A.4 A or B, as appropriate.

9.1.1.2 Obtain the Training Manager's authorization of the examiner's guides for grading of the examination.

9.1.1.3 Prepare a temporary examination file for each candidate containing the following material arranged by scenario:

a) the examiner's guides marked up during the conduct of the examination;

b) all the data collected as indicated on the Data Collection Checklists of the candidate.

9.1.1.4 For any candidate for whom a test scenario was aborted:

a) Determine whether the part of the examination completed by the candidate meets the minimum criteria for the applicable type of test scenario and for the examination specified in the relevant sections of Appendices A.9 and A.10.

b) If the part of the examination completed meets those minimum criteria, proceed with the assessment of the candidate.

c) If the part of the examination completed does not meet those minimum criteria, inform the Training Manager that one or more additional test scenarios need to be developed and conducted to complete the examination of the candidate.

9.1.1.5 Divide the candidate files between the members of the examination team for the first assessment.

9.1.2 First Assessment

An examiner should perform the first assessment of candidates in accordance with the following instructions.

9.1.2.1 Obtain the temporary examination files of the candidates.

9.1.2.2 Prepare a new electronic copy of the first three sections of each authorized examiner's guide for each candidate. On the cover page of each guide, enter the name and employee number of the candidate, the position sought by the candidate and your name.

9.1.2.3 Grade the complete examination of one candidate at a time.

9.1.2.4 Review the data in the marked-up Candidate Action Checklists for each test scenario to determine whether any significant change to the planned evolution of the scenario has occurred.

9.1.2.5 In the event of any significant change to the planned evolution of a test scenario:

a) Confirm what specific changes occurred by referring to the relevant alarm message printout, operator action monitor printout and video recording.

b) Determine the required modifications to the actions and checks expected from the candidate as a result of the changes.

c) Insert the letter D in the electronic Candidate Action Checklist in front of any item that cannot be used for assessment because of the changed evolution of the scenario, as shown in Appendix A.13, part B.

d) Insert at the appropriate location in the electronic Candidate Action Checklist the additional scenario conditions, and the additional actions and checks that the candidate should have performed, identifying each modification with the letter M, as shown in Appendix A.13, part B.

e) Cross-reference each additional action or check to one or more generic performance expectations listed in Appendix A.4 A or B, as appropriate.

f) Record the reasons for each change made to the test scenario at the proper location in the electronic Candidate Action Checklist.

9.1.2.6 For each test scenario:

a) Consolidate all the data related to the response of a candidate in the corresponding electronic Candidate Action Checklist of the candidate. In the case of significant changes to a test scenario, enter the data in the modified checklist prepared as described in paragraph 9.1.2.5.

i) Check in the electronic Candidate Action Checklist the items for which both examiners gave credit in their checklist during the conduct of the examination.

ii) Whenever a performance item has not been credited or has been credited by one examiner only, refer to the corresponding alarm message printout,

operator action monitor printout and video recording to determine whether the credit is warranted.

iii) For an SS candidate, whenever an answer item has not been credited or has been credited by one examiner only, refer to the corresponding video recording to determine whether the credit is warranted.

iv) Record and highlight unexpected actions and checks performed by the candidate at the proper location in the checklist.

v) For an SS candidate, record and highlight the unexpected answers given by the candidate at the proper location in the checklist.

b) Review the data in the consolidated Candidate Action Checklist and for each omitted or unexpected action or check by the candidate:

i) Determine whether it constitutes a critical or a significant error according to the lists of errors and to the criteria in Appendix A.20.

ii) Review the parameter trends and the alarm message printout recorded during the test scenario to identify any significant adverse consequence on system and unit conditions. The parameter trends recorded during the rehearsal of the test scenario performed during the development of the examination may be used as a reference for this evaluation.
Record and highlight your findings at the proper location in the checklist for subsequent use in the assessment of the performance of the candidate.

c) For an SS candidate, review the answer items missed by the candidate and determine whether any of them constitutes a critical or a significant error according to Appendix A.20.

d) For each critical or significant error identified, complete a Critical or Significant Error Assessment Form similar to that shown in Appendix A.21.

e) Compile and highlight at the end of the consolidated checklist the areas of concern and the misconceptions recorded in the marked-up Candidate Action Checklists during the conduct of the examination.

i) Record any additional area of concern or misconception found during this assessment.

ii) Refer to the corresponding video recording to confirm that the areas of concern and the misconceptions are accurately described.

9.1.2.7 Calculate the scores obtained by each candidate, using all consolidated Candidate Action Checklists. Document the following:

a) the score obtained for each generic performance expectation in the entire examination;

b) the score obtained for each competency area in each test scenario;

c) the score obtained for each competency area in the entire examination.

Refer to Appendix A.22 for information on the calculation of the various scores mentioned above.

9.1.2.8 Assign a pass result in the examination if a candidate either:

- has scored 80% or higher in each competency area and has not made a critical error, a significant error or another error that you consider serious;
- has scored between 70% and 80% in a single competency area, but 80% or higher for the average of all competency areas, and has not made a critical error, a significant error or another error that you consider serious.

9.1.2.9 Assign a fail result in the examination if a candidate has made any of the following:

- one or more critical errors
- two or more significant errors in the same competency area
- three or more significant errors
- has scored less than 80% in more than two competency areas

9.1.2.10 When a candidate does not meet any of the pass or fail criteria above:

a) Prepare a candidate's comment file to document your conclusions on the performance of the candidate in the examination.

b) For each competency area with a score of less than 80%, or associated with a significant error or with another error that you consider serious:

i) Review the scores obtained by the candidate for the competency area in each test scenario and for each associated generic performance expectation in the entire examination.

ii) Document your conclusions on the significance and extent of the candidate's weaknesses in the competency area in the candidate's comment file.

c) Review your conclusions from b) above and the highlighted information already recorded in the consolidated Candidate Action Checklist of each test scenario to determine the significance and extent of the candidate's deficiencies in the examination. Document your conclusions in the candidate's comment file.

d) Recommend a pass or fail result according to the following guidelines and justify your recommendation:

- Recommend a pass result for a candidate who does not meet any of the pass criteria in paragraph 9.1.2.8, but whose performance during the examination warrants in your judgement a pass result.
- Recommend a conditional pass result if the candidate's deficiencies in the examination are, in your judgement, significant enough to warrant formal remedial training, but not extensive enough to warrant a fail result. The recommendation should include a list of these deficiencies.
- Recommend a fail result for a candidate who does not meet any of the fail criteria in paragraph 9.1.2.9, but who has shown deficiencies that are in your judgement serious enough to warrant a fail result.

9.1.2.11 For each candidate, complete a Simulator-based Examination Result Form similar to that shown in Appendix A.23.

9.1.2.12 Identify the candidates who you recommend should undergo a second assessment and indicate in each of their consolidated Candidate Action Checklist the specific items that should be reviewed during the second assessment.

9.1.2.13 For each candidate, print the consolidated examiner's guides and sign each guide on the cover page.

9.1.2.14 Prepare a package for each candidate that documents the first assessment. The package should consist of the completed Simulator-based Examination Result Form, the scores specified in paragraph 9.1.2.7 obtained in the examination, the candidate's comment file, if applicable, any completed Critical or Significant Error Assessment Form and the consolidated examiner's guides. Forward these packages to the Training Manager for consideration.

9.1.3 Second Assessment

The second assessment of a candidate is performed by the member of the examination team who has not performed the first assessment. The Training Manager should select candidates for a second assessment according to the following criteria:

- Candidates who do not meet any of the pass criteria in paragraph 9.1.2.8
- Candidates for whom the examiner who did the first assessment recommends a second assessment
- Candidates for whom significant changes to the planned evolution of a test scenario occurred
- Other candidates at the discretion of the Training Manager

At least one candidate must be selected for a second assessment.

An examiner should perform the second assessment of candidates in accordance with the following instructions.

9.1.3.1 For each candidate selected for a second assessment:

a) Obtain from the first examiner an electronic copy of the consolidated examiner's guides of the candidate, any completed Critical or Significant Error Assessment Form, the Simulator-based Examination Result Form, the scores obtained by the candidate in the examination, the candidate's comment file, if any, and the temporary examination files of the candidate.

b) Make a new electronic copy of each consolidated examiner's guide to be used to complete the second assessment. Enter your name on each cover page.

9.1.3.2 Grade the complete examination of one candidate at a time.

9.1.3.3 For each candidate:

a) Verify that the modifications made during the first assessment to any authorized Candidate Action Checklist, due to significant changes to the planned evolution of a test scenario, are complete and technically correct, as detailed in paragraph 9.1.2.5.

Make the changes that you consider necessary recording them in redline and strikeout for subsequent discussion with the first examiner.

b) Assess in each consolidated Candidate Action Checklist those specific items identified for review by the first examiner and make any change that you consider necessary.

c) Review the highlighted information recorded by the first examiner in each consolidated Candidate Action Checklist for accuracy and completeness. Refer as required to the relevant data collected during the conduct of the examination to make your assessment.

Make any change to the comments of the first examiner that you consider necessary. Record these changes in redline and strikeout for subsequent discussion with the first examiner.

d) For each test scenario, review each omitted or unexpected action or check by the candidate and independently determine whether it constitutes a critical or a significant error according to the lists of errors and to the criteria in Appendix A.20.

e) Verify whether the first examiner has completed a Critical or Significant Error Assessment Form for each critical or significant error you have found and whether the information in each form is complete and accurate. Make the changes to the forms that you consider necessary and highlight them for subsequent discussion with the first examiner. Complete additional Critical or Significant Error Assessment Forms, if required.

f) Calculate the scores specified in paragraph 9.1.2.7, using all consolidated Candidate Action Checklists, as modified during the second assessment.

9.1.3.4 Determine the result of each candidate in accordance with paragraphs 9.1.2.8 through 9.1.2.10. When a candidate does not meet any of the pass or fail criteria in paragraphs 9.1.2.8 and 9.1.2.9, make any change you consider necessary to the conclusions of the first examiner in the candidate's comment file and highlight these changes for subsequent discussion with the first examiner.

9.1.3.5 Enter your name on the Simulator-based Examination Result Forms of the candidates and make any change you consider necessary to these forms. Highlight these changes for subsequent discussion with the first examiner.

9.1.3.6 For each candidate, print the consolidated examiner's guides and sign each guide on the cover page.

9.1.3.7 Prepare a package for each candidate that documents the second assessment. The package should consist of the completed Simulator-based Examination Result Form, the scores obtained in the examination, the candidate's comment file, if applicable, any completed Critical or Significant Error Assessment Form and the consolidated examiner's guides. Forward these packages to the Training Manager for consideration.

9.1.4 Reconciliation of the Results of the First and Second Assessments

The examiners who have performed the first and the second assessment should meet to discuss their results and to resolve any discrepancy between their two assessments and recommendations. They should resolve those discrepancies in accordance with the following instructions.

9.1.4.1 For each candidate selected for a second assessment, make a new electronic copy of each consolidated examiner's guide completed during the second assessment to be used for the reconciliation of the first and second assessments.

9.1.4.2 Review the complete examination of one candidate at a time.

9.1.4.3 For each candidate:

a) Discuss the changes made by the second examiner to the credits given and to the comments of the first examiner in each Candidate Action Checklist. Refer as required to the relevant data collected during the conduct of the examination to reach a conclusion on the adequacy of the changes.

i) Whenever you agree on a change to a comment, remove the redline and strikeout mark-up in the examiner's guide to show the final wording.

ii) Whenever you disagree with a change proposed, record the disagreement for subsequent discussion with the Training Manager.

b) Discuss the changes to the Critical or Significant Error Assessment Forms made by the second examiner. Revise the forms as required whenever you agree on a change and record any disagreement for subsequent discussion with the Training Manager.

9.1.4.4 After completion of the above instructions for all candidates, meet with the Training Manager to discuss and resolve any persisting disagreement. Make the required changes to the consolidated examiner's guide used for the reconciliation and to the Critical or Significant Error Assessment Forms to account for the outcome of the discussion.

9.1.4.5 For each candidate:

a) Calculate the scores specified in paragraph 9.1.2.7, using all consolidated Candidate Action Checklists of the candidate, as modified during the reconciliation of the results of the first and second assessments.

b) Discuss the changes to the Simulator-based Examination Result Form made by the second examiner. Revise the forms as required whenever you agree on a change and record any disagreement for subsequent discussion with the Training Manager.

c) When a candidate does not meet any of the pass or fail criteria in paragraphs 9.1.2.8 and 9.1.2.9, discuss the changes to the candidate's comment file made by the second examiner. Revise the file as required whenever you agree on a change and record any disagreement for subsequent discussion with the Training Manager.

9.1.4.6 When a candidate has not achieved a pass score in competency area 1 or 5:

a) Determine whether this was caused by a failure of the candidate to perform a single expected action or to give a single instruction to the support team in a test scenario that resulted in numerous items associated with competency area1 or 5 not being credited.

b) In the event of such a deviation in candidate's performance from that expected in an examiner's guide, determine whether the deviation has had an unfair negative impact on the candidate's score in competency area 1 or 5.

c) If you conclude that there was such an unfair negative impact, label the corresponding items in the Candidate Action Checklist with the letter N, as shown in Appendix A.13, part B, and justify at the proper location in the checklist your decision to exclude those items.

d) In the event of a recommendation to grant a pass or conditional pass result to a candidate based on this approach, include in the final assessment package the candidate's scores in competency areas 1 and 5, before and after the exclusion of the items with a label N.

9.1.4.7 Review the assessment packages of the candidates who were not selected for a second assessment to confirm that you agree to recommend a pass result for each of these candidates. The second examiner indicates concurrence by signing the Simulator-based Examination Result Form and the cover page of each consolidated examiner's guide prepared by the first examiner. Document any disagreement regarding granting of a pass result for subsequent discussion with the Training Manager.

9.1.4.8 Add to the electronic version of the authorized examiner's guides any comment that may help in developing and conducting future examinations.

9.1.4.9 Meet with the Training Manager to discuss your recommendations on the candidates' results. Seek resolution of any persisting disagreement.

9.1.4.10 Complete any additional work requested by the Training Manager to finalize your recommendations of examination results and revise the relevant documents accordingly.

9.1.4.11 Prepare a final assessment package for each candidate consisting of the following documents:

a) the Simulator-based Examination Result Form signed by both examiners;

b) the final scores obtained in the examination;

c) if applicable, the final version of the candidate's comment file;

d) any Critical or Significant Error Assessment Form signed by both examiners;

e) the consolidated examiner's guides signed by both examiners.

Forward these packages to the Training Manager for authorization of the examination results, together with a copy of the authorized examiner's guides which include comments that may help in developing and conducting future examinations.

9.1.4.12 Draft a report to notify the Training Manager of any significant deficiency in the plant's training program found during the examination process.

9.1.4.13 Return to the temporary examination file of the individual candidates all the documents collected during the conduct of the examination and those prepared during the assessment. Forward these files and the parameter trends recorded during the rehearsal of the test scenarios performed during the development of the examination for storage.

9.2 Examinations for SS candidates at Multi-unit Plants

9.2.1 Preparation for the Grading

The examination team should prepare for the assessment of the performance of the candidates in accordance with the following instructions.

9.2.1.1 Make the necessary modifications to the approved examiner's guides to account for any minor adjustment made during the conduct of the examination. Cross-reference any additional item of the Candidate Action Checklists to one or more generic performance expectations listed in Appendix A.4 C.

9.2.1.2 Obtain the Training Manager's authorization of the examiner's guides for grading of the examination.

9.2.1.3 Prepare a temporary examination file for each candidate containing the following material arranged by scenario:

a) the examiner's guides marked up during the conduct of the examination;

b) all the data collected as indicated on the Data Collection Checklists of the candidate.

9.2.1.4 For any candidate for whom a CTS was aborted:

a) Determine whether the part of the examination completed by the candidate meets the minimum criteria for a CTS and for the examination specified in Appendices A.9 D and A.10 D.

b) If the part of the examination completed meets those minimum criteria, proceed with the assessment of the candidate.

c) If the part of the examination completed does not meet those minimum criteria, inform the Training Manager that one or more additional CTSs need to be developed and conducted to complete the examination of the candidate.

9.2.1.5 For any candidate for whom a DTS was aborted:

a) Proceed with the assessment of the candidate for the part of the examination that was completed.

b) If the candidate is not assigned a failed grade on the part of the examination that was completed, inform the Training Manager that one or more additional DTSs need to be developed and conducted to complete the examination of the candidate.

9.2.1.6 Divide the candidate files between the members of the examination team for the first assessment.

9.2.2 First Assessment

An examiner should perform the first assessment of candidates in accordance with the following instructions.

9.2.2.1 Obtain the temporary examination files of the candidates.

9.2.2.2 Prepare a new electronic copy of the first three sections of each authorized examiner's guide for each candidate. On the cover page of each guide, enter the name and employee number of the candidate, the position sought by the candidate and your name.

9.2.2.3 Grade the complete examination of one candidate at a time.

9.2.2.4 Review the data in the marked-up Candidate Action Checklists for each CTS to determine whether any significant change to the planned evolution of the scenario occurred.

9.2.2.5 In the event of any significant change to the planned evolution of a CTS:

a) Confirm what specific changes occurred by referring to the relevant alarm message printout, operator action monitor printout and video recording.

b) Determine the necessary modifications to the actions, checks and answers expected from the candidate as a result of the changes.

c) Insert the letter D in the electronic Candidate Action Checklist in front of any item that cannot be used for assessment because of the changed evolution of the scenario, as shown in Appendix A.13, part B.

d) Insert at the appropriate location in the electronic Candidate Action Checklist the additional scenario conditions, the additional actions and checks that the candidate should have performed, and any additional answer item that the candidate should have given, identifying each modification with the letter M, as shown in Appendix A.13, part B.

e) Cross-reference each additional item in the Candidate Action Checklist to one or more generic performance expectations listed in Appendix A.4 C.

f) Record the reasons for each change made to the test scenario at the proper location in the electronic Candidate Action Checklist.

9.2.2.6 For each test scenario:

a) Consolidate all the data related to the response of a candidate in the corresponding electronic Candidate Action Checklist of the candidate. In the case of significant changes to a CTS, enter the data in the modified checklist prepared as described in paragraph 9.1.2.5.

i) Check in the electronic Candidate Action Checklist the items for which both examiners gave credit in their checklist during the conduct of the examination.

ii) For a CTS or a DTS, whenever a performance item has not been credited or has been credited by one examiner only, refer to the corresponding alarm

message printout, operator action monitor printout and video recording to determine whether the credit is warranted.

iii) Whenever an answer item has not been credited or has been credited by one examiner only, refer to the corresponding video recording to determine whether the credit is warranted.

iv) Record and highlight the unexpected actions and checks performed by the candidate, and the unexpected answers given by the candidate at the proper location in the checklist.

b) For a DTS in which there is more than one approach to reach the correct diagnosis, insert the letter D in the electronic Candidate Action Checklist, as shown in Appendix A.13, part B, in front of any check that will not be used for assessment because it is not relevant to the approach used by the candidate to unambiguously reach the correct diagnosis, based on the answer the candidate gave to question 2 in part B of Appendix A.14.

c) For a CTS or a DTS, review the data in the consolidated Candidate Action Checklist and for each omitted or unexpected action or check by the candidate:

i) Determine whether it constitutes a critical or a significant error according to the lists of errors and to the criteria in Appendix A.20.

ii) Review the parameter trends and the alarm message printout recorded during the test scenario to identify any significant adverse consequence on system and unit conditions. The parameter trends recorded during the rehearsal of the test scenario performed during the development of the examination may be used as a reference for this evaluation.
Record and highlight your findings at the proper location in the checklist for subsequent use in the assessment of the performance of the candidate.

d) Review the answer items missed by the candidate and determine whether any of them constitutes a critical or a significant error according to Appendix A.20.

e) For each critical or significant error identified, complete a Critical or Significant Error Assessment Form similar to that shown in Appendix A.21.

f) Compile and highlight at the end of the consolidated checklist the areas of concern and the misconceptions recorded in the marked-up Candidate Action Checklists during the conduct of the examination.

i) Record any additional area of concern or misconception found during this assessment.

ii) Refer to the corresponding video recording to confirm that the areas of concern and the misconceptions are accurately described.

9.2.2.7 Calculate the scores obtained by each candidate, using all consolidated Candidate Action Checklists. Document the following:

a) the score obtained for each generic performance expectation in the entire examination;

b) the score obtained for each competency area in each test scenario;

c) the score obtained for each competency area in the entire examination.

Refer to Appendix A.22 for information on the calculation of the various scores mentioned above.

9.2.2.8 Determine the result of each candidate in accordance with paragraphs 9.1.2.8 through 9.1.2.10.

9.2.2.9 For each candidate, complete a Simulator-based Examination Result Form similar to that shown in Appendix A.23.

9.2.2.10 Identify the candidates who you recommend should undergo a second assessment and indicate in each of their consolidated Candidate Action Checklist the specific items that should be reviewed during the second assessment.

9.2.2.11 For each candidate, print the consolidated examiner's guides and sign each guide on the cover page.

9.2.2.12 Prepare a package for each candidate that documents the first assessment. The package should consist of the completed Simulator-based Examination Result Form, the scores specified in paragraph 9.2.2.7 obtained in the examination, the candidate's comment file, if applicable, any completed Critical or Significant Error Assessment Form and the consolidated examiner's guides. Forward these packages to the Training Manager for consideration.

9.2.3 Second Assessment

The second assessment of a candidate is performed by the member of the examination team who has not performed the first assessment. The Training Manager should select candidates for a second assessment according to the following criteria:

- Candidates who do not meet any of the pass criteria in paragraph 9.1.2.8
- Candidates for whom the examiner who did the first assessment recommends a second assessment
- Candidates for whom significant changes to the planned evolution of a CTS occurred
- Other candidates at the discretion of the Training Manager

At least one candidate must be selected for a second assessment.

An examiner should perform the second assessment of candidates in accordance with the following instructions.

9.2.3.1 For each candidate selected for a second assessment:

a) Obtain from the first examiner an electronic copy of the consolidated examiner's guides of the candidate, any completed Critical or Significant Error Assessment Form, the Simulator-based Examination Result Form, the scores obtained by the candidate in the examination, the candidate's comment file, if any, and the temporary examination files of the candidate.

b) Make a new electronic copy of each consolidated examiner's guide to be used to complete the second assessment. Enter your name on each cover page.

9.2.3.2 Grade the complete examination of one candidate at a time.

9.2.3.3 For each candidate:

a) Verify that the modifications made during the first assessment to any authorized Candidate Action Checklist, due to significant changes to the planned evolution of a CTS, are complete and technically correct, as detailed in paragraph 9.2.2.5.

Make the changes that you consider necessary recording them in redline and strikeout for subsequent discussion with the first examiner.

b) For each DTS in which there is more than one approach to reach the correct diagnosis, verify that the identification with the letter D in the consolidated Candidate Action Checklist of the checks that are not used for assessment because they are not relevant to the approach used by the candidate to unambiguously reach the correct diagnosis is appropriate, based on the answer the candidate gave to question 2 in part B of Appendix A.14.

c) Assess in each consolidated Candidate Action Checklist those specific items identified for review by the first examiner and make any change that you consider necessary.

d) Review the highlighted information recorded by the first examiner in each consolidated Candidate Action Checklist for accuracy and completeness. Refer as required to the relevant data collected during the conduct of the examination to make your assessment.

Make any change to the comments of the first examiner that you consider necessary. Record these changes in redline and strikeout for subsequent discussion with the first examiner.

e) For each CTS and DTS, review each omitted or unexpected action or check by the candidate and independently determine whether it constitutes a critical or a significant error according to the lists of errors and to the criteria in Appendix A.20.

f) Review the answer items missed by the candidate and determine whether any of them constitutes a critical or a significant error according to Appendix A.20.

g) Verify whether the first examiner has completed a Critical or Significant Error Assessment Form for each critical or significant error you have found and whether the information in each form is complete and accurate. Make the changes to the forms that you consider necessary and highlight them for subsequent discussion with the first examiner. Complete additional Critical or Significant Error Assessment Forms, if required.

h) Calculate the scores specified in paragraph 9.2.2.7, using all consolidated Candidate Action Checklists, as modified during the second assessment.

9.2.3.4 Determine the result of each candidate in accordance with paragraphs 9.1.2.8 through 9.1.2.10. When a candidate does not meet any of the pass or fail criteria in paragraphs 9.1.2.8 and 9.1.2.9, make any change you consider necessary to the conclusions of the first examiner in the candidate's comment file and highlight these changes for subsequent discussion with the first examiner.

9.2.3.5 Enter your name on the Simulator-based Examination Result Forms of the candidates and make any change you consider necessary to these forms. Highlight these changes for subsequent discussion with the first examiner.

9.2.3.6 For each candidate, print the consolidated examiner's guides and sign each guide on the cover page.

9.2.3.7 Prepare a package for each candidate that documents the second assessment. The package should consist of the completed Simulator-based Examination Result Form, the scores obtained in the examination, the candidate's comment file, if applicable, any completed Critical or Significant Error Assessment Form and the consolidated examiner's guides. Forward these packages to the Training Manager for consideration.

9.2.4 Reconciliation of the Results of the First and Second Assessments

Refer to subsection 9.1.4 and follow all instructions as written, except for those in paragraph 9.1.4.6 that apply only to the CTSs.

10 Examination Follow-up

After authorizing the results of an examination, the Training Manager must ensure that a copy of the authorized examiner's guides is sent to the CNSC and that the CNSC is formally notified of the results of each candidate.

11 Clearance of a Conditional Pass Result

A candidate who has received a conditional pass result in the simulator-based examination must complete appropriate training to correct the knowledge and skills deficiencies revealed by the examination. The licensee should follow the following process for clearing a conditional pass status in the examination.

11.1 Determine and document the nature and extent of the candidate's deficiencies in each area where remedial training is required as indicated in the examination result report.

11.2 Prepare, document and implement a remedial training program for the candidate to correct all deficiencies identified in paragraph 11.1. This training program should be approved by the Training Manager prior to its implementation.

11.3 Prepare a simulator-based examination that meets the following criteria:

a) The examination consists of a number of test scenarios sufficient to clearly demonstrate that the candidate has achieved the expected level of performance in each area covered by the remedial training program. Specifically:

i) For an RO or U0O candidate, the examination consists of at least one CTS.

ii) For an SS candidate, the examination consists of one or more test scenarios of one or more types, as appropriate.

iii) The test scenarios allow a meaningful sampling of each competency area related to the areas covered by the remedial training program.

iv) The test scenarios are designed and developed in accordance with the relevant instructions in sections 6 and 7.

b) The examination is designed and developed by two qualified examiners and approved by the Training Manager.

11.4 At the completion of the remedial training, administer to the candidate the simulator-based examination in accordance with the relevant instructions in section 8.

11.5 Grade the candidate's performance in accordance with the relevant instructions for first assessment of an examination in subsection 9.1.2 or 9.2.2.

a) A pass result should be recommended to the Training Manager if the candidate meets either of the pass criteria in paragraph 9.1.2.8 and the examiner is satisfied that no significant concern remains in the areas covered by the remedial training program.

b) A fail grade should be recommended if the candidate meets any of the fail criteria in paragraph 9.1.2.9 or if the examiner concludes that significant concerns remain in the areas covered by the remedial training program.

11.6 If the candidate receives a fail result in the examination, the candidate must complete additional remedial training and a simulator-based examination, based on an analysis of the cause of the failure, until no significant concern remains.

11.7 After endorsing a recommendation for a pass result, the Training Manager must ensure that the CNSC is formally notified of the examination result.

A.1 Security Agreements for Certification Examinations

Part A: Examiners and Examination Support Staff

Any person working on a regular basis in the development and conduct of certification examinations, either as an examiner or as examination support staff, must sign this agreement only once, when first being given those responsibilities.

Until I have been notified that the security of a certification examination is no longer an issue, I will not knowingly reveal any information related in any way to the content of the examination to any person other than:

- the examiners participating in the development and conduct of the examination
- any other person who has signed this security agreement or a security agreement for that examination

Discussions on a certification examination with any of these persons must take place in a secure environment to prevent compromising the security of the examination.

Once I have started working on the development of an examination or once I have any information on the content of the examination, I will no longer participate in the instruction of, or give training feedback to, the candidates scheduled to take that examination until all of them have completed the examination.

I am aware of the physical, electronic and administrative measures and requirements that are in place to prevent compromising the security of certification examinations.

I will immediately report to the lead examiner or to Training Manager any indication or suspicion that the security of an examination may have been compromised.

I understand that violation of the terms of this agreement may result in an examination being cancelled.

_____	_____	_____
Name	Signature	Date
_____	_____	_____
Name	Signature	Date
_____	_____	_____
Name	Signature	Date
_____	_____	_____
Name	Signature	Date

Part B: Candidates Taking an Oral or a Simulator-based Examination

This agreement must be signed by the candidates who are scheduled to take a given oral or simulator-based examination.

To the best of my knowledge, I have not received any information related in any way to the content of:

<Insert certification examination identifier>

that I am about to take.

Until I have been notified that this agreement has been rescinded, I will not knowingly reveal any information related in any way to the content of this certification examination to any person other than the examiners participating in the conduct of the examination. I understand that discussions on this examination with examiners must take place in a secure environment to prevent compromising the security of the examination.

I will immediately report to the lead examiner or to the Training Manager any indication or suspicion that the security of the examination may have been compromised.

I understand that violation of the terms of this agreement may result in the examination being cancelled.

_____	_____	_____
Name	Signature	Date
_____	_____	_____
Name	Signature	Date
_____	_____	_____
Name	Signature	Date
_____	_____	_____
Name	Signature	Date
_____	_____	_____
Name	Signature	Date
_____	_____	_____
Name	Signature	Date

Part C: Others

This agreement must be signed by any person who participates in the development and conduct of a given certification examination, other than persons employed on a regular basis as examiners and examination support staff, and other than the candidates scheduled to take the examination.

Until I have been notified that this agreement has been rescinded, I will not knowingly reveal any information related in any way to the content of:

<Insert certification examination identifier>

to any person other than:

- the examiners participating in the development and conduct of the examination;
- any other person whose name and signature appear below.

Discussions on this certification examination with any of these persons must take place in a secure environment to prevent compromising the security of the examination.

Once I have started working on the development of the examination or once I have any information on its content, I will no longer participate in the instruction of, or give training feedback to, the candidates scheduled to take that examination until all of them have completed the examination.

I am aware of the physical, electronic and administrative measures and requirements, applicable to my role in the examination, that are in place to prevent compromising the security of certification examinations.

I will immediately report to the lead examiner or to the Training Manager any indication or suspicion that the security of the examination may have been compromised.

I understand that violation of the terms of this agreement may result in the examination being cancelled.

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

A.2 Briefing of the Examination Team

The purpose of this briefing by the lead examiner is to review with the members of the examination team, before the development of the examination begins, their responsibilities and the rules they must abide by.

A) Responsibilities

a) To participate in the development, conduct and grading of an examination.

b) To operate the plant full scope simulator and to perform control panel operations during the verifications of the test scenarios.

c) To identify simulator shortcomings that may affect the simulation of the test scenarios.

d) To prevent unauthorized access to the plant simulator when it is being used for the development and the conduct of the examination.

e) To record the performance of each candidate in the examiner's guides during the conduct of an examination.

f) To recommend to the lead examiner to abort a test scenario, when warranted.

g) To record significant deficiencies in the plant's documentation found during the development of the examination.

h) To record significant deficiencies in the plant's training documentation and training program found during the examination process.

B) Rules of Conduct

a) Examination team members must control copies of all documents and data related to the examination that may compromise its security, such as examiner's guides, alarm printouts, parameter trends, marked-up flowsheets, operating and training documentation and personal notes. They must be careful not to leave examination material unsecured or unattended at any time, particularly when using copying machines in public areas.

b) Examination team members must reset the simulator to a configuration which does not reveal the content of the test scenarios being developed or conducted before releasing the simulator for other uses.

c) Examination team members must not modify or otherwise tamper with the simulation programs in any way that may significantly impair the fidelity of simulation of the reference unit during an examination.

d) Examination team members must not prompt the candidates nor offer any suggestion or solution regarding expected diagnoses of malfunctions, decisions to be made or actions to be performed.

e) Examination team members must minimize verbal communications and the use of body language during the conduct of an examination.

A.3 Simulator Capabilities

Simulators used for certification examinations for RO, U0O and SS candidates must meet the requirements specified below.

A) Minimum Acceptable Simulation Capabilities

Simulators must be capable of simulating, realistically and in real time, all significant plant manoeuvres and transients, including:

- plant start-ups and shutdowns
- major plant upsets and accident conditions
- all significant failures of systems and their equipment and the consequences of such failures

For conditions and failures, such as pipe breaks, loss of inventory, loss of flow, loss of pressure and loss of vacuum, for which unit response and operator actions are a function of the degree of severity of the condition or failure, the simulator must have adjustable rates for the condition or failure covering its entire possible range.

Specifically, simulators should be capable of simulating the abnormal, transient and emergency conditions and failures listed below.

Note In the list, loss of a system includes, but is not limited to, loss of circulation, loss of cooling and loss of inventory.

I) Special Safety Systems
   1- Shutdown System #1 and Shutdown System #2 trips on all parameters (Pickering NGS A excepted)
   2- Reactor Protective System (SDSA) and Shutdown System Enhancement (SDSE) trips on all parameters (Pickering NGS A only)
   3- NOP detector response to abnormal flux shapes
   4- Spurious initiation of any Special Safety System, including for the Emergency Core Cooling System spurious loop isolation, where applicable, and spurious crash cooling
   5- Safe and unsafe failures of any channel of any Special Safety System, including failures of start-up instrumentation
   6- Any Special Safety System impairment documented in plant procedures that is observable from the main control room

II) Reactivity Effects and Reactivity Control
   1- Any shutoff or absorber rod falling partially or fully in core
   2- Any adjuster or absorber rod driving out of sequence
   3- Any shutoff, adjuster or absorber rod stuck out of core, or partially or fully in core
   4- Reactor stepback on all parameters (Pickering NGS A excepted)
   5- Reactor setback on all parameters
   6- Single and dual computer failures

7- Drifts and failures of input and output signals of the Reactor Regulation System control program, including drifts and failures of nuclear instrumentation
8- Single and dual failures of the Reactor Regulation System control program, including failures of the Stepback program where applicable
9- Loss of reactor regulation
10- Reactor flux tilts
11- Drifts and failures of input signals of the Flux Mapping, ZOTPR, FINCH or CTM computer program, as applicable
12- Single and dual failures of the Flux Mapping, ZOTPR, FINCH or CTM computer program, as applicable
13- Liquid Zone Control system failures, including:
    a) loss of helium inventory
    b) loss of balance header pressure control
    c) loss of bubbler header pressure control
    d) loss of water pressure
    e) loss of water inventory, including leak of a zone compartment to the moderator
    f) loss of water flow to any zone compartment

III) Heat Transport System

1- Pressure tube leaks into annulus gas
2- Reactor fuel channel flow blockages
3- Loss of coolant accidents (LOCAs) from reactor inlet feeders and headers
4- LOCAs from reactor outlet feeders and headers
5- In-core LOCAs caused by the failure of a pressure tube and its calandria tube
6- Boiler tube failures on any boiler
7- Preheater tube failures on any preheater (Bruce NGS A and B only)
8- Failure of any seal or combination of seals on any main heat transport pump
9- Trip of any one or more main heat transport pumps
10- Natural modes of heat transport circulation under abnormal and emergency conditions, including single phase and two phase thermosyphoning
11- Operation with the heat transport system partially drained
12- Failures associated with inter-unit D_2O transfers at multi unit plants
13- Heat transport system pressure and inventory control failures, including:
    a) drifts and failures of input and output signals
    b) single and dual failures of the associated control programs, where applicable
    c) loss of control in normal and in solid mode (Pickering NGS A and B excepted)
14- Failure open or closed of one or two feed or bleed valves
15- Single and dual heat transport feed pump trips
16- Failure open of one or more heat transport system liquid relief valves
17- Failure open of one or two pressurizer steam bleed valves or relief valves (Pickering NGS A and B excepted)
18- Pressurizer steam bleed line failure (Pickering NGS A and B excepted)
19- Failure open of one or two bleed condenser relief valves (600 MW plants excepted)

20- Failure open of one or two degasser condenser relief valves at 600 MW plants
21- Bleed condenser tube bundle leaks (600 MW plants excepted)
22- Bleed cooler or degasser condenser cooler tube leaks, as applicable
23- Loss of shutdown or maintenance cooling system, as applicable, including heat exchanger tube failures
24- High activity in the heat transport system

IV) Heat Sinks

1- Loss of condenser vacuum
2- Loss of condenser cooling water
3- Loss of condensate, including pipe breaks
4- Deaerator level control failures, including:
   a) drifts and failures of input and output signals
   b) single and dual control program failures, where applicable
5- Loss of feedwater to any combination of boilers
6- Failures associated with inter-unit feedwater ties, where applicable
7- Loss of emergency feedwater to the boilers
8- Boiler level control failures, including:
   a) drifts and failures of input and output signals
   b) single and dual failures of the Boiler Level Control program (Pickering NGS A and B excepted)
9- Symmetric and asymmetric boiler feed line breaks, inside and outside containment
10- Boiler pressure control failures, including:
   a) drifts and failures of input and output signals of the Boiler Pressure Control program
   b) single and dual failures of the Boiler Pressure Control program
11- Failure open or close of one or more ASDVs or CSDVs (Pickering NGS A and B excepted)
12- Failure open or close of one or more SRVs (Pickering NGS A and B only)
13- Symmetric and asymmetric main steam line breaks outside containment
14- Steam line breaks inside containment, where applicable
15- Loss of moderator system, including:
   a) pipe breaks inside and outside containment or confinement
   b) heat exchanger tube leaks
   c) calandria tube leaks into annulus gas
16- Moderator temperature control failures, including:
   a) drifts and failures of input and output signals
   b) single and dual control program failures, where applicable
   c) spurious crash cooling of the moderator system
17- Loss of End Shield Cooling system, including pipe breaks
18- Loss of service water systems, such as low pressure service water, high pressure service water, recirculated cooling water and common service water, including pipe breaks

V) Electrical Systems

1- Failure of one or more transmission lines
2- Partial and complete main generator load rejections

3- Failures of one or more switchyard breakers and buses
4- Large main generator load variations due to system frequency disturbances
5- Loss of isolated phase bus cooling
6- Loss of Class IV power
7- Loss of Class III power
8- Loss of Class IV and Class III power
9- Failure of any Class IV bus
10- Failure of any Class IV breaker
11- Failure of any Class III bus
12- Failure of any Class III breaker
13- Effects of the loss of any Class II or Class I power supply, bus, panel and fuse
14- Trip and failure to start of one or more standby generators
15- Electrical transfer failures
16- Transformer failures
17- Inverter, converter and rectifier failures
18- Emergency power system failures, including trip or failure to start of one or more emergency power generators

VI) Process Systems
1- Loss of instrument air and service air
2- Partial loss of instrument air and service air
3- Failures associated with inter-unit instrument air and service air ties, at multi unit plants
4- Loss of component cooling, including but not limited to pumps, compressors and heat exchangers
5- Process system instrumentation, alarms and control failures

VII) Overall unit
1- Turbine trips
2- Main generator or exciter trips
3- Failure of any main steam valve
4- Drifts and failures of input and output signals of the turbine governing system and the turbine tripping system
5- Drifts and failures of input and output signals of the Unit Power Regulator control program and Turbine Run-up control program
6- Single and dual failures of Unit Power Regulator control program
7- Single and dual failures of Turbine Run-up control program
8- Manual poison prevent operation and pseudo poison prevent operation
9- Loss of main steam reheat system
10- Failure of the moisture separator drains system
11- Main generator seal failures
12- Loss of main generator hydrogen cooling, including heat exchanger tube leaks
13- Loss of main generator stator cooling, including pipe breaks
14- Condenser tube leaks
15- Loss of any low pressure or high pressure feedwater heater, or heater bank, including tube breaks
16- Deuterium excursions

B) Data Collection Devices

Simulators must be equipped with data recording devices that meet the requirements specified in paragraphs a) to c). These devices must be capable of being synchronized to within two seconds of each other.

a) Simulators must be equipped with an operator action monitor capable of printing in chronological order, with their respective time of occurrence, all malfunctions initiated by the simulator operator and all the actions performed on the control panels during a test scenario.

b) Simulators must have provisions for either:
- tracing, with adequate precision, graphics of any selection of 48 system parameters versus time for up to two hours and for printing those graphics;
- storing and printing the values versus time of any selection of 48 system parameters sampled at an adequate frequency during a period of up to two hours.

c) The simulator must be equipped with a video system that:
i) is capable of recording all actions performed by a candidate in the control room during a test scenario;
ii) has sufficient resolution to permit the examiners to identify, with the aid of the corresponding control panel photographs, the controls and instruments used by a candidate;
iii) is capable of displaying time on the recordings;
iv) is capable of recording clearly all verbal communications and telephone conversations between a candidate and other team members during a test scenario;
v) allows for an easy identification of the voices of the different participants.

The simulator operating facility must be separated from the control room so that a candidate cannot become aware of the data recorded or of the inputs to the simulator being entered by the simulator operator.

C) Other Devices

Simulators must be equipped with the following functional devices which replicate those of the plant's main control room.

a) A telephone system

b) A radiation emergency warning siren

c) A fire emergency warning siren

d) A public address system

A.4 A: Competency Areas and Generic Performance Expectations for RO and U0O candidates

The competency areas and generic performance expectations listed in this appendix should be used for assessing the performance of RO and U0O candidates. The standard of acceptable performance to be used with each generic expectation is dictated by the corresponding detailed specific performance expectations of plant management for the two positions. The number in brackets associated with each generic performance expectation is a weighting factor to be used for calculating the scores obtained by candidates in a competency area. These weighting factors reflect the relative importance of the generic performance expectations.

1 MONITORING

This competency area addresses the ability to maintain an on-going awareness of unit or plant conditions, using appropriate control room devices, either by performing required checks without reference to operating procedures or by performing relevant checks not explicitly mentioned in an operating procedure being implemented.

1.1 (5) Monitors Critical Safety Parameters and their support parameters when necessary.

1.2 (4) Monitors in a timely manner that major system parameters are trending and stabilize as expected.

1.3 (4) Monitors annunciations and panel indications, as necessary, to maintain an awareness of changing equipment, system and unit conditions.

1.4 (5) Checks in a timely manner that major automatic actions occur and have the desired effect, prior to referring to operating procedures.

Note: Major automatic actions are those automatic actions related to any of the following that are required for the system or subsystem to fulfill its purpose:

- SDS1 trip (SDSA trip at Pickering NGS A)
- SDS2 trip (SDSE trip at Pickering NGS A)
- stepback, except at Pickering NGS A
- setback
- turbine-generator trip
- emergency core cooling system actuation
- containment system actuation
- actuation of P trip of main heat transport pumps at Bruce NGS A

1.5 (3) Checks that other automatic actions occur and have the desired effect, as appropriate to the situation.

1.6 (3) Checks in a timely manner that an action performed has the desired effect.

1.7 (1) Acknowledges and resets alarms in the appropriate manner, as appropriate to the situation.

2 ACTIONS TAKEN WITHOUT REFERENCE TO PROCEDURES

This competency area addresses the ability to perform the required actions when reference to operating procedures is not expected, when an operating procedure does not exist or prior to accessing the relevant operating procedures following a transient or an abnormal condition.

2.1 (2) Ensures in a timely manner the assembly of the control room response team.

2.2 (5) Executes in a timely manner the required corrective actions when a major automatic action fails to occur.

2.3 (3) Executes in a timely manner the required corrective actions when other automatic actions fail to occur.

2.4 (5) Executes in a timely manner the required actions, based on diagnosis, prior to accessing the relevant procedures.

2.5 (3) Executes other required actions, as appropriate, when reference to operating procedures is not expected.

2.6 (4) Executes, correctly, in a timely manner and following shift supervisor approval, the actions required when a transient, an abnormal condition, an additional malfunction, equipment unavailability or any other unit condition is not addressed by procedures.

2.7 (4) Ensures in a timely manner that the appropriate corrective or preventive actions are initiated when unit conditions are such that they could threaten plant personnel or public safety.

2.8 (5) Executes in a timely manner corrective actions not specified in operating procedures when Critical Safety Parameters or their support parameters are deviating unsafely.

3 DIAGNOSIS AND DECISION MAKING

This competency area addresses the ability to recognize abnormalities, to independently diagnose malfunctions, to select the relevant operating procedures and, when no relevant procedure exists, to determine or recommend an appropriate course of actions.

3.1 (5) Recognizes in a timely manner when Critical Safety Parameters or their support parameters are deviating unsafely.

3.2 (4) Recognizes in a timely manner when a system parameter, a system configuration or a unit state deviates from an acceptable value, configuration or state defined in operating procedures.

3.3 (5) Recognizes in a timely manner when a requirement specified in the *Operating Policies and Principles* (OP&Ps) is not met.

3.4 (5) Identifies, independently, in a timely manner and without procedure, the alarms and indications that characterize the nature of a malfunction and, when applicable, recognizes the entry conditions to the relevant procedure.

3.5 (3) Identifies in a timely manner the relevant procedures, based on diagnosis.

3.6 (2) With reference to procedures, determines in a timely manner the nature of a malfunction or identifies the specific procedures to be used.

3.7 (2) Confirms the diagnosis or confirms that the correct procedure has been selected, using other available information such as plant documentation or information from the field.

3.8 (5) Determines or recommends in a timely manner an appropriate course of actions when procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

3.9 (4) Recognizes in a timely manner when concurrent abnormal plant conditions need to be addressed and assigns priorities to the actions required to address them, taking into account their relative importance.

3.10 (3) When time permits, determine the specific cause of a malfunction using all the information available.

4 PROCEDURE COMPLIANCE

This competency area addresses the ability to correctly perform the actions and checks required by any relevant approved procedure.

4.1 (3) Executes each step a relevant procedure correctly and in the correct sequence.

4.2 (4) Performs the actions considered as standard operating practices necessary for completing a step of a procedure.

4.3 (5) Executes in a timely manner a Critical Safety Parameter restoration procedure when required.

5 COMMUNICATION AND CREW INTERACTION SKILLS

This competency area addresses the ability to communicate with other crew members clearly and accurately and to interact with them effectively and efficiently.

5.1 (5) Gives in a timely manner clear and accurate instructions to crew members.

5.2 (3) Acknowledges clearly the requests and the information received.

5.3 (5) Communicates clearly, accurately and in a timely manner the outcome of a request to its originator.

5.4 (3) Communicates clearly, accurately and in a timely manner the required information to crew members.

5.5 (2) Makes the necessary notifications clearly, accurately and in a timely manner.

5.6 (3) Obtains in a timely manner the necessary approvals from the shift supervisor.

A.4 B: Competency Areas and Generic Performance Expectations for SS candidates at Single-unit Plants

The competency areas and generic performance expectations listed in this appendix should be used for assessing the performance of SS candidates at single-unit plants. The standard of acceptable performance to be used with each generic expectation is dictated by the corresponding detailed specific performance expectations of plant management for the SS position. The number in brackets associated with each generic performance expectation is a weighting factor to be used for calculating the scores obtained by candidates in a competency area. These weighting factors reflect the relative importance of the generic performance expectations.

1 MONITORING

This competency area addresses the ability to maintain an on-going awareness of plant conditions, using appropriate control room devices, either by performing required checks without reference to operating procedures or by performing relevant checks not explicitly mentioned in an operating procedure being implemented.

1.1 (5) Monitors Critical Safety Parameters and their support parameters when necessary.

1.2 (4) Monitors in a timely manner that major system parameters are trending and stabilize as expected.

1.3 (4) Monitors annunciations and panel indications, as necessary, to maintain an awareness of changing equipment, system and plant conditions.

1.4 (5) Checks, independently and in a timely manner, that major automatic actions occur and have the desired effect, prior to referring to operating procedures.

Note: Major automatic actions are those automatic actions related to any of the following that are required for the system or subsystem to fulfill its purpose:

- SDS1 trip
- SDS2 trip
- stepback
- setback
- turbine-generator trip
- emergency core cooling system actuation
- containment system actuation

1.5 (3) Checks that other automatic actions occur and have the desired effect, as appropriate to the situation.

1.6 (3) Checks in a timely manner that an action performed has the desired effect.

1.7 (5) Checks relevant system and plant conditions before approving or initiating an action.

1.8 (1) Acknowledges and resets alarms in the appropriate manner, when the RO is temporarily absent from the control room.

2 ACTIONS TAKEN WITHOUT REFERENCE TO PROCEDURES

This competency area addresses the ability to direct the execution of the required actions or to perform these actions when reference to operating procedures is not expected, when an operating procedure does not exist or prior to accessing the relevant operating procedures following a transient or an abnormal condition.

2.1 (2) Ensures in a timely manner the assembly and the deployment of the control room response team.

2.2 (5) Executes or directs the execution of the required corrective actions in a timely manner when a major automatic action fails to occur.

2.3 (3) Executes or directs the execution of the required corrective actions in a timely manner when other automatic actions fail to occur.

2.4 (5) Executes or directs the execution of the required actions in a timely manner, based on diagnosis, prior to accessing the relevant procedures.

2.5 (3) Executes or directs the execution of other required actions, as appropriate, when reference to operating procedures is not expected.

2.6 (4) Executes or directs the execution of the actions required in a timely manner when a transient, an abnormal condition, an additional malfunction, equipment unavailability or any other plant condition is not addressed by procedures.

2.7 (4) Ensures in a timely manner that the appropriate corrective or preventive actions are initiated when plant conditions are such that they could threaten plant personnel or public safety.

2.8 (5) Executes or directs the execution of corrective actions not specified in operating procedures in a timely manner when Critical Safety Parameters or their support parameters are deviating unsafely.

3 DIAGNOSIS AND DECISION MAKING

This competency area addresses the ability to recognize abnormalities, to independently diagnose malfunctions, to select the relevant operating procedures and, when no relevant procedure exists, to determine an appropriate course of actions.

3.1 (5) Recognizes in a timely manner when Critical Safety Parameters or their support parameters are deviating unsafely.

3.2 (4) Recognizes in a timely manner when a system parameter, a system configuration or a plant state deviates from an acceptable value, configuration or state defined in operating procedures.

3.3 (5) Recognizes in a timely manner when a requirement specified in the *Operating Policies and Principles* (OP&Ps) is not met.

3.4 (5) Identifies, independently, in a timely manner and without procedure, the alarms and indications that characterize the nature of a malfunction and, when applicable, recognizes the entry conditions to the relevant procedure.

3.5 (3) Identifies in a timely manner the relevant procedures, based on diagnosis.

3.6 (2) With reference to procedures, determines in a timely manner the nature of a malfunction or identifies the specific procedures to be used.

3.7 (2) Confirms the diagnosis or confirms that the correct procedure has been selected, using other available information such as plant documentation or information from the field.

3.8 (5) Determines in a timely manner an appropriate course of actions when procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

3.9 (4) Recognizes in a timely manner when concurrent abnormal plant conditions need to be addressed and assigns priorities to the actions required to address them, taking into account their relative importance.

3.10 (3) When time permits, determine the specific cause of a malfunction using all the information available.

3.11 (5) Determines in a timely manner the corrective actions required when Critical Safety Parameters or their support parameters are deviating unsafely.

3.12 (4) Determines the desired end state of the plant, together with any significant intermediate plant state, and the time frame to establish the end state, following a transient or an abnormal condition.

3.13 (5) Determines the appropriateness of a request that requires SS approval, based on a review of the relevant system and plant conditions, constraints and limits, before approving the action.

4 PROCEDURE COMPLIANCE

This competency area addresses the ability to direct the execution of the required actions and checks using a relevant approved procedure. It also addresses the ability to correctly perform the actions and checks required by any relevant approved procedure, when the RO is temporarily absent from the control room, and the ability to carry out the actions and checks specifically assigned to the SS using a relevant approved procedure.

4.1 (3) Executes or directs the execution of a relevant procedure correctly and in the correct sequence.

4.2 (4) Performs the actions considered as standard operating practices necessary for completing a step of a procedure, when the RO is temporarily absent from the control room.

4.3 (1) Practices self-checking (STAR) while performing an action.

4.4 (5) Executes or directs the execution of a Critical Safety Parameter restoration procedure in a timely manner when required.

5 COMMUNICATION AND CREW INTERACTION SKILLS

This competency area addresses the ability to communicate with other crew members clearly and accurately and to interact with them effectively and efficiently.

5.1 (5) Gives in a timely manner clear and accurate instructions and approvals to crew members.

5.2 (3) Acknowledges clearly the requests and the information received.

5.3 (5) Communicates clearly, accurately and in a timely manner the outcome of a request to its originator.

5.4 (3) Communicates clearly, accurately and in a timely manner the required information to crew members.

5.5 (2) Makes the necessary notifications clearly, accurately and in a timely manner.

5.6 (3) Obtains the necessary approvals from plant management in a timely manner.

A.4 C: Competency Areas and Generic Performance Expectations for SS candidates at Multi-unit Plants

The competency areas and generic performance expectations listed in this appendix should be used for assessing the performance of SS candidates at multi-unit plants. The standard of acceptable performance to be used with each generic expectation is dictated by the corresponding detailed specific performance expectations of plant management for the SS position. The number in brackets associated with each generic performance expectation is a weighting factor to be used for calculating the scores obtained by candidates in a competency area. These weighting factors reflect the relative importance of the generic performance expectations.

Note 1 The generic performance expectations that may be addressed in a DTS are in **bold**.

Note 2 The generic performance expectations that may be addressed in a PCTS are underlined.

1 MONITORING

This competency area addresses the ability to maintain an on-going awareness of unit or plant conditions, using appropriate control room devices, either by performing required checks without reference to operating procedures or by performing relevant checks not explicitly mentioned in an operating procedure being implemented.

1.1 (5) **Monitors Critical Safety Parameters and their support parameters when necessary.**

1.2 (4) **Monitors in a timely manner that major system parameters are trending and stabilize as expected.**

1.3 (4) **Monitors annunciations and panel indications, as necessary, to maintain an awareness of changing equipment, system and unit conditions.**

1.4 (5) **Checks, independently and in a timely manner, that major automatic actions occur and have the desired effect, prior to referring to operating procedures.**

Note: Major automatic actions are those automatic actions related to any of the following that are required for the system or subsystem to fulfill its purpose:

- **SDS1 trip (SDSA trip at Pickering NGS A)**
- **SDS2 trip (SDSE trip at Pickering NGS A)**
- **stepback, except at Pickering NGS A**
- **setback**
- **turbine-generator trip**
- **emergency core cooling system actuation**
- **containment system actuation**
- **actuation of P trip of main heat transport pumps, at Bruce NGS A**

1.5 (3) **Checks that operator actions are having the desired effect.**

1.6 (5) Checks relevant system, unit and plant conditions before approving or initiating an action.

2 ACTIONS TAKEN WITHOUT REFERENCE TO PROCEDURES

This competency area addresses the ability to direct the execution of the required actions when reference to operating procedures is not expected, when an operating procedure does not exist or prior to accessing the relevant operating procedures following a transient or an abnormal condition.

2.1 (2) Ensures in a timely manner the assembly and the deployment of the control room response team.

2.2 (5) **Directs in a timely manner the execution of the required corrective actions when a major automatic action fails to occur.**

2.3 (5) Directs in a timely manner the execution of the required actions, based on diagnosis, prior to accessing the relevant procedures.

2.4 (3) Directs the execution of other required actions, as appropriate, when reference to operating procedures is not expected.

2.5 (4) Executes in a timely manner the actions specifically required of the SS when reference to operating procedures is not expected.

2.6 (4) Directs in a timely manner the execution of the actions required when a transient, an abnormal condition, an additional malfunction, equipment unavailability or any other unit condition is not addressed by procedures.

2.7 (4) Initiates in a timely manner the appropriate corrective or preventive actions when plant conditions are such that they could threaten plant personnel or public safety.

2.8 (5) Directs in a timely manner the execution of corrective actions not specified in operating procedures when Critical Safety Parameters or their support parameters are deviating unsafely.

3 DIAGNOSIS AND DECISION MAKING

This competency area addresses the ability to recognize abnormalities, to independently diagnose malfunctions, to select the relevant operating procedures and, when no relevant procedure exists, to determine an appropriate course of actions.

3.1 (5) **Recognizes in a timely manner when Critical Safety Parameters or their support parameters are deviating unsafely.**

3.2 (4) **Recognizes in a timely manner when a system parameter, a system configuration or a unit state deviates from an acceptable value, configuration or state defined in operating procedures.**

3.3 (5) **Recognizes in a timely manner when a requirement specified in the *Operating Policies and Principles* (OP&Ps) is not met.**

3.4 (5) **Identifies, independently, in a timely manner and without procedure, the alarms and indications that characterize the nature of the malfunction and, when applicable, recognizes the entry conditions to the relevant procedure.**

3.5 (3) **Identifies in a timely manner the relevant procedures, based on diagnosis.**

3.6 (2) **With reference to procedures, determines in a timely manner the nature of the malfunction or identifies the specific procedures to be used.**

3.7 (2) **Confirms the diagnosis or confirms that the correct procedure has been selected, using other available information such as plant documentation or information from the field.**

3.8 (5) **Determines in a timely manner an appropriate course of actions when procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.**

3.9 (4) **Recognizes in a timely manner when concurrent abnormal plant conditions need to be addressed and assigns priorities to the actions required to address them, taking into account their relative importance.**

3.10 (3) **When time permits, determine the specific cause of a malfunction using all the information available.**

3.11 (5) **Determines in a timely manner the corrective actions required when Critical Safety Parameters or their support parameters are deviating unsafely.**

3.12 (4) **Determines the desired end state of the units, together with any significant intermediate unit state, and the time frame to establish the end state, following a transient or an abnormal condition.**

3.13 (5) Determines the appropriateness of a request that requires SS approval, based on a review of the relevant system, unit and plant conditions, constraints and limits, before approving the action.

4 PROCEDURE COMPLIANCE

This competency area addresses the ability to direct the execution of the required actions and checks using a relevant approved procedure. It also addresses the ability to carry out the actions and checks specifically assigned to the SS using a relevant approved procedure.

4.1 (3) Directs the execution of a relevant procedure correctly and in the correct sequence.

4.2 (5) Directs the execution of a Critical Safety Parameter restoration procedure in a timely manner when required.

4.3 (3) Executes each step of an approved procedure specifically assigned to the SS, correctly and in the correct sequence.

5 COMMUNICATION AND CREW INTERACTION SKILLS

This competency area addresses the ability to communicate with other crew members clearly and accurately and to interact with them effectively and efficiently.

5.1 (5) Gives in a timely manner clear and accurate instructions and approvals to crew members.

5.2 (3) Acknowledges clearly the requests and the information received.

5.3 (5) Communicates clearly, accurately and in a timely manner the outcome of a request to its originator.

5.4 (3) Communicates clearly, accurately and in a timely manner the required information to crew members.

5.5 (2) Makes the necessary notifications clearly, accurately and in a timely manner.

5.6 (3) Obtains the necessary approvals from plant management in a timely manner.

A.5 Categories of Primary Malfunctions

This appendix describes the categories of Primary Malfunctions used in simulator based examinations for RO, U0O and SS candidates. Category 1 Primary Malfunctions are not to be used in examinations for SS candidates.

A) Category 1: Malfunctions Requiring the Execution of a Routine Operation

Any deterioration or failure of one or more components or pieces of equipment affecting a single system that requires the candidate to perform a routine equipment changeover, within a limited time frame, to prevent equipment damage or a system transient due to an impending automatic action to protect the equipment involved. If properly addressed, such a Primary Malfunction will not cause any significant system or unit transient.
For example:

a) Increasing temperature of a bearing of an operating pump that requires a changeover to a standby pump before pump damage occurs.

b) A field report of a problem with an operating piece of equipment that requires a reconfiguration of a system.

c) A request from an RO or the electrical grid operator that requires a routine reconfiguration of a system operated by U0Os.

B) Category 2: Malfunctions Requiring the Execution of a Non-routine Operation with no Immediate Significant Reactor Unit Transient

Any deterioration or failure of one or more components or pieces of equipment affecting one or more systems that requires the candidate to perform or direct non-routine actions, within a limited time frame, for one of the following reasons:

- to prevent equipment or system damage while minimizing the deterioration of system, unit or plant conditions resulting from these actions;
- to minimize the deterioration of system, unit or plant conditions following any automatic action to protect the equipment involved;
- to prevent or correct an impairment of a safety or safety support system.

If properly addressed, such a Primary Malfunction occurring on a reactor unit will not by itself cause a change in reactor power or in turbine-generator load of greater than 10%. However a change in reactor power or in turbine-generator load of greater than 10% may subsequently take place due to the required operator actions.
For example:

a) While operating at full power, increasing temperature of a bearing of a main heat transport pump that requires the pump to be shut down before damage occurs (example valid for plants designed with no standby main heat transport pump).

b) Loss of both heat transport feed pumps.

c) Heat transport pressure and inventory control program instrumentation failures that require a controlled reduction of reactor power and a transfer of pressure and inventory control to an analogue control circuit.

d) Loss of heat transport system inventory outside the heat transport system boundary that is within the make-up capability of the available feed pumps.

e) Failure of an electrical distribution panel that supplies instrumentation and equipment of a single channel of one or more special safety systems, with no immediate effect on reactor power.

f) A failure in the plant switchyard that requires a non-routine reconfiguration of the main output system.

g) Loss of pressure control in the negative pressure containment system at multi unit plants.

C) Category 3: Malfunctions Causing a Significant Reactor Unit Transient

Any failure of one or more components or pieces of equipment that causes a change in reactor power or in turbine-generator load of greater than 10%. For example:

a) Main heat transport pump trip during full power operation.

b) Main generator load rejection.

c) Any malfunction other than those causing an emergency condition, as defined under category 4 below, that results in any one or any sequence of the following:

- reactor setback
- reactor stepback
- reactor trip
- turbine trip

D) Category 4: Malfunctions Causing an Emergency Condition

Only those category 4 Primary Malfunctions that require a complex intervention by U0Os may be credited as a category 4 Primary Malfunction in test scenarios for U0O candidates.

Any failure of one or more components or pieces of equipment that causes one of the following emergency conditions affecting one or more reactor units:

a) **Loss of heat transport system inventory on a reactor unit**: defined as a sustained loss of inventory outside the heat transport system envelope that is greater than the make-up capability of the available feed pumps or that requires the manual or automatic initiation of the emergency core cooling system. The Primary Malfunctions that may cause this emergency condition include boiler tube failures.

b) **Loss of steam pressure on a reactor unit:** defined as any sustained loss of steam pressure that causes a shutdown system trip on low heat transport system pressure or any steam line break that creates a widespread hazard to plant personnel and equipment.

c) Total loss of Class IV, Class III or Class II electrical power on one or more units, as appropriate.

d) Total loss of Class IV and Class III electrical power on one or more units, as appropriate.

e) **Loss of instrument air on a reactor unit**: defined as a non-recoverable loss of instrument air pressure.

f) **Loss of boiler feedwater on a reactor unit**: defined as a sustained loss of feedwater to the boilers that requires the use of a back-up heat sink. Auxiliary boiler feed pumps or feedwater ties are not considered as back-up heat sinks in this context.

g) **Total loss of high or low pressure service water on a reactor unit**: includes a loss of Powerhouse Upper Level Service Water at Darlington NGS, if the loss is due to a break, and a loss of Recirculated Service Water System at a 600 MW plant.

h) Complete loss of both control computers of a reactor unit.

Due to the differences in design of the CANDU plants in Canada, emergency conditions may be added to or deleted from this core list for each individual plant.

Emergency conditions that meet either of the following criteria can be added to the list for a given plant:

- Other accident conditions analysed in the plant safety report.
- Any other condition resulting from a major failure that represents a threat to the integrity of the fuel sheath, of the heat transport system or of the containment boundary.

Exceptionally, a condition may be deleted from the core list at a plant where, due to system design, it does not have the importance, extent or complexity required to warrant its categorization as an emergency. Any addition to or deletion from the core list of emergency conditions at a particular plant should be acceptable to the CNSC.

A.6 Criteria for Secondary Malfunctions

This appendix specifies the criteria that Secondary Malfunctions, namely Additional and Monitoring Malfunctions, should meet. Additional Malfunctions are included in CTSs, ATSs and DTSs to aid in assessing the ability of the candidates to monitor changes in system and unit conditions and to respond to these changes. Monitoring Malfunctions are included to aid in assessing the ability of the candidates to monitor system and unit conditions.

A) Additional Malfunctions

Each Additional Malfunction should meet all of the following criteria:

a) It has an observable effect on the indications on the control room panels at the simulator or it is reported from the field.

b) It is an equipment or component failure that may occur during plant operation, including failure of poised equipment to respond.

c) If not addressed, it will cause deviation to an unacceptable value of one or more system parameters, or it will create another undesirable system condition.

d) It only requires a limited number of corrective actions from the candidates.

B) Monitoring Malfunctions

Each Monitoring Malfunction should meet all of the following criteria:

a) The indicating device should fail as it could during operation at the reference unit.

b) The indicating device is expected to be used by the candidates during the test scenario.

c) There are at least two other means to obtain or derive the same information from control room or field indications.

d) The failure of the indicating device does not influence the process.

A.7 Examiner's Guide Cover Sheet

File:

CERTIFICATION EXAMINER'S GUIDE

Plant: **Examination Date:**
Test Scenario Title:
Test Scenario Type: **Test Scenario No.:**
Estimated Duration: **Actual Duration:**

Candidate's Name: **Employee Number:**
Candidate's Position:

Examination Team Members: [**Names**]

Approved for conduct by:

_____ _____
[Name] **Date**
Training Manager

Examiners:

_____ _____
[Name] **[Name]**

Authorized by:

_____ _____
[Name] **Date**
Training Manager

A.8 A: Examiner's Guide Section 1 - Test Scenario Summary for CTSs, ATSs or DTSs

Part A

a) General Description of the Scenario

b) Primary Malfunctions/Category | **Procedures to Be Used with Revision Number**

c) Additional Malfunctions | **Procedures to Be Used with Revision Number**

d) Monitoring Malfunctions | **Impact**

e) Equipment out of service | **Impact**

Part B

System parameters to be recorded during the conduct of the examination

Part C

Adjustments Made During Conduct	Reasons

A.8 B: Examiner's Guide Section 1 - Test Scenario Summary for PCTSs

Part A

a) Verification Task to Be Performed

b) Panel Anomalies to Be Identified | **Impact**

Part B

Adjustments Made During Conduct | **Reasons**

A.9 A: CTS Design Checklist for RO Candidates

Plant: _____ **File:** _____

Examination Date: _____

Test Scenario Title: _____

The CTS meets the following criteria:

[ ] The initial plant conditions are well defined in section 2 of the examiner's guide.

[ ] Not all of the equipment out of service during the CTS has an impact on the response expected from the candidates.

[ ] The initial plant conditions do not violate requirements in the plant operating documentation.

[ ] Primary and Additional Malfunctions are arranged in a credible sequence.

[ ] The CTS dynamic duration is not expected to significantly exceed 50 minutes.

[ ] There is a category 2 or category 3 Primary Malfunction that requires a complex intervention by the candidates.
Or
[ ] There is a category 4 Primary Malfunction.

[ ] There is no more than one category 4 Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.2f).

[ ] The total number of category 3 and category 4 Primary Malfunctions is not greater than three.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.2f).

[ ] There are no more than four Primary Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.2f).

[ ] Each Secondary Malfunction satisfies the criteria in Appendix A.6.

[ ] The total number of Primary and Additional Malfunctions is at least 4.

[ ] The total number of Primary and Secondary Malfunctions is not greater than 10.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.3i).

[ ] There are no more than 5 Additional Malfunctions for a given Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.3i).

[ ] There are no more than 3 Monitoring Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.3i).

[ ] There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.3i).

[ ] There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.3i).

[ ] There are no more than 3 Secondary Malfunctions of poised standby safety support systems.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.1.2.3i).

[ ] The conditions that apply to the participation of the members of the control room support team are well defined.

[ ] The endpoint of the CTS is well defined and will be clearly recognizable by the examiners.

[ ] Any operating documentation identified for use in responding to the malfunctions in the CTS has been selected from the frozen documentation.

[ ] The appropriate response to each Primary and Secondary Malfunction is clear and unique.

[ ] A typically qualified RO should have sufficient time to respond as expected to each malfunction.

[ ] The CTS requires the candidates to demonstrate their skills in each competency area.

[ ] The system parameters whose evolution will be recorded during the conduct of the examination have been identified.

Indicate which of the following features are included in the CTS:

[ ] Initial plant conditions different from normal full power conditions have a significant impact on the actions to be taken by the candidates.

[ ] A failure of a major automatic action during a transient must be detected by the candidates and requires them to respond immediately.

[ ] One or more situations require the candidates to determine or recommend an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] Concurrent malfunctions or unit conditions require the candidates to assign priorities to their actions or to the actions of the support team.

[ ] A requirement in the OP&Ps that is not met must be recognized and addressed by the candidates.

[ ] An impairment of a special safety system or standby safety support system must be recognized and addressed by the candidates.

At multi unit plants only

[ ] Conditions on one or more reactor units, other than the simulated reactor unit, prevent or significantly delay the arrival at this reactor unit of one or both assisting ROs from other units, or require one or both assisting ROs to subsequently leave the simulated reactor unit during the CTS.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
printed signature

A.9 B: CTS Design Checklist for U0O Candidates

Plant: _____ **File:** _____

Examination Date: _____

Test Scenario Title: _____

The CTS meets the following criteria:

[ ] The initial plant conditions are well defined in section 2 of the examiner's guide.

[ ] Not all of the equipment out of service during the CTS has an impact on the response expected from the candidates.

[ ] The initial plant conditions do not violate requirements in the plant operating documentation.

[ ] Primary and Additional Malfunctions are arranged in a credible sequence.

[ ] The CTS dynamic duration is not expected to significantly exceed 60 minutes.

[ ] There is a category 2 Primary Malfunction of systems operated by the U0Os that has a potential impact on reactor safety and that requires a complex intervention by the candidates.
Or
[ ] There is a category 2, category 3 or category 4 Primary Malfunction on the simulated reactor unit that requires a complex intervention on the systems operated by U0Os.

[ ] There is no more than one category 4 Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.2f).

[ ] There are no more than three Primary Malfunctions that require a complex intervention by the candidates.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.2f).

[ ] There are no more than four Primary Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.2f).

[ ] Each Secondary Malfunction satisfies the criteria in Appendix A.6.

[ ] The total number of Primary and Additional Malfunctions is at least 4.

[ ] The total number of Primary and Secondary Malfunctions is not greater than 10.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.3i).

[ ] There are no more than 5 Additional Malfunctions for a given Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.3i).

[ ] There are no more than 3 Monitoring Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.3i).

[ ] There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.3i).

[ ] There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.3i).

[ ] There are no more than 3 Secondary Malfunctions of poised standby safety support systems.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.2.2.3i).

[ ] The arrival of the second U0O in the control room is delayed for approximately 15 minutes.

[ ] The conditions that apply to the participation of the members of the control room support team are well defined.

[ ] The endpoint of the CTS is well defined and will be clearly recognizable by the examiners.

[ ] Any operating documentation identified for use in responding to the malfunctions in the CTS has been selected from the frozen documentation.

[ ] The appropriate response to each Primary and Secondary Malfunction is clear and unique.

[ ] A typically qualified U0O should have sufficient time to respond as expected to each malfunction.

[ ] The CTS requires the candidates to demonstrate their skills in each competency area.

[ ] The system parameters whose evolution will be recorded during the conduct of the examination have been identified.

Indicate which of the following features are included in the CTS:

[ ] Initial conditions of systems operated by U0Os different from normal operating conditions specified in operating procedures have a significant impact on the actions to be taken by the candidates.

[ ] A category 4 Primary Malfunction affecting one or more reactor units requires a complex intervention by the candidates.

[ ] A failure of a major automatic action during complex operations of unit 0 systems must be detected by the candidates and requires them to respond immediately.

[ ] One or more situations require the candidates to determine or recommend an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] Concurrent malfunctions or conditions of systems operated by U0Os require the candidates to assign priorities to their actions or to the actions of the support team.

[ ] A requirement in the OP&Ps that is not met must be recognized and addressed by the candidates.

[ ] An impairment of a special safety system or standby safety support system must be recognized and addressed by the candidates.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.9 C: CTS Design Checklist for SS Candidates at Single-unit Plants

Plant: _____ **File:** _____

Examination Date: _____

Test Scenario Title: _____

The CTS meets the following criteria:

[ ] The initial plant conditions are well defined in section 2 of the examiner's guide.

[ ] Not all of the equipment out of service during the CTS has an impact on the response expected from the candidates.

[ ] The initial plant conditions do not violate requirements in the plant operating documentation.

[ ] Primary and Additional Malfunctions are arranged in a credible sequence.

[ ] The CTS dynamic duration is not expected to significantly exceed 50 minutes.

[ ] There is a category 2 or category 3 Primary Malfunction that requires a complex intervention by the candidates.
Or
[ ] There is a category 4 Primary Malfunction.

[ ] There is no more than one category 4 Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.2f).

[ ] The total number of category 3 and category 4 Primary Malfunctions is not greater than three.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.2f).

[ ] There are no more than four Primary Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.2f).

[ ] Each Secondary Malfunction satisfies the criteria in Appendix A.6.

[ ] The total number of Primary and Additional Malfunctions is at least 4.

[ ] The total number of Primary and Secondary Malfunctions is not greater than 10.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.3i).

[ ] There are no more than 5 Additional Malfunctions for a given Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.3i).

[ ] There are no more than 3 Monitoring Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.3i).

[ ] There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.3i).

[ ] There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.3i).

[ ] There are no more than 3 Secondary Malfunctions of poised standby safety support systems.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.2.3i).

[ ] Concurrent malfunctions or plant conditions require the candidates to assign priorities to the actions required to address them.

[ ] The conditions that apply to the participation of the members of the control room support team are well defined.

[ ] The endpoint of the CTS is well defined and will be clearly recognizable by the examiners.

[ ] Any operating documentation identified for use in responding to the malfunctions in the CTS has been selected from the frozen documentation.

[ ] The appropriate response to each Primary and Secondary Malfunction is clear and unique.

[ ] A typically qualified SS should have sufficient time to respond as expected to each malfunction.

[ ] The CTS requires the candidates to demonstrate their skills in each competency area.

[ ] The system parameters whose evolution will be recorded during the conduct of the examination have been identified.

Indicate which of the following features are included in the CTS:

[ ] Initial plant conditions different from normal full power conditions have a significant impact on the response expected from the candidates.

[ ] A failure of a major automatic action during a transient must be detected by the candidates and requires them to respond immediately.

[ ] One or more situations require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] The candidates have to give directions to the support team on the execution of two complex procedures or courses of actions that need to be implemented promptly.

[ ] Concurrent malfunctions or plant conditions require the candidates to assign priorities to their actions or to the actions of the support team.

[ ] A requirement in the OP&Ps that is not met must be recognized and addressed by the candidates.

[ ] An impairment of a special safety system or standby safety support system must be recognized and addressed by the candidates.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.9 D: CTS Design Checklist for SS Candidates at Multi-unit Plants

Plant: _____ **File:** _____

Examination Date: _____

Test Scenario Title: _____

The CTS meets the following criteria:

[ ] The initial plant conditions are well defined in section 2 of the examiner's guide.

[ ] Not all of the equipment out of service during the CTS has an impact on the response expected from the candidates.

[ ] The initial plant conditions do not violate requirements in the plant operating documentation.

[ ] Primary and Additional Malfunctions are arranged in a credible sequence.

[ ] The CTS dynamic duration is not expected to significantly exceed 50 minutes.

[ ] There is a category 2 or category 3 Primary Malfunction that requires a complex intervention by the candidates.
Or
[ ] There is a category 4 Primary Malfunction.

[ ] There is no more than one category 4 Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.2f).

[ ] The total number of category 3 and category 4 Primary Malfunctions is not greater than three.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.2f).

[ ] There are no more than four Primary Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.2f).

[ ] Each Secondary Malfunction satisfies the criteria in Appendix A.6.

[ ] The total number of Primary and Additional Malfunctions is at least 4.

[ ] The total number of Primary and Secondary Malfunctions is not greater than 10.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.3i).

[ ] There are no more than 5 Additional Malfunctions for a given Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.3i).

[ ] There are no more than 3 Monitoring Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.3i).

[ ] There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.3i).

[ ] There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.3i).

[ ] There are no more than 3 Secondary Malfunctions of poised standby safety support systems.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.4.2.3i).

[ ] Concurrent malfunctions or plant conditions require the candidates to assign priorities to the actions required to address them.

[ ] The conditions that apply to the participation of the members of the control room support team are well defined.

[ ] The endpoint of the CTS is well defined and will be clearly recognizable by the examiners.

[ ] Any operating documentation identified for use in responding to the malfunctions in the CTS has been selected from the frozen documentation.

[ ] The appropriate response to each Primary and Secondary Malfunction is clear and unique.

[ ] A typically qualified SS should have sufficient time to respond as expected to each malfunction.

[ ] The CTS requires the candidates to demonstrate their skills in each competency area.

[ ] The system parameters whose evolution will be recorded during the conduct of the examination have been identified.

Indicate which of the following features are included in the CTS:

[ ] Initial plant conditions different from normal full power conditions have a significant impact on the response expected from the candidates.

[ ] A failure of a major automatic action during a transient must be detected by the candidates and requires them to respond immediately.

[ ] One or more situations require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] The candidates have to give directions to the support team on the execution of two complex procedures or courses of actions that need to be implemented promptly.

[ ] Concurrent malfunctions on the reactor unit and on unit 0, or on the reactor unit and on simulated systems common to more than one reactor unit, require the candidates to assign priorities to their actions or to the actions of the support team.

[ ] A requirement in the OP&Ps that is not met must be recognized and addressed by the candidates.

[ ] An impairment of a special safety system or standby safety support system must be recognized and addressed by the candidates.

[ ] The candidates are required to give detailed instructions to the support team on the course of actions to be taken in a situation that necessitates a prompt execution of a complex sequence of operator actions because the RO or the U0O needs assistance from the SS.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.9 E: ATS Design Checklist

Plant: _____ **File:** _____

Examination Date: _____

Test Scenario Title: _____

The ATS meets the following criteria:

[ ] The initial plant conditions are well defined in section 2 of the examiner's guide.

[ ] Not all of the equipment out of service during the ATS has an impact on the response expected from the candidates.

[ ] The initial plant conditions do not violate requirements in the plant operating documentation.

[ ] Primary and Additional Malfunctions are arranged in a credible sequence.

[ ] The ATS dynamic duration is not expected to significantly exceed 25 minutes.

[ ] There is a category 2 or category 3 Primary Malfunction that requires a complex intervention by the candidates.
Or
[ ] There is a category 4 Primary Malfunction.

[ ] There is no more than one category 4 Primary Malfunction.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.3.2e).

[ ] There are no more than 2 Primary Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.3.2e).

[ ] Each Secondary Malfunction satisfies the criteria in Appendix A.6.

[ ] The total number of Primary and Additional Malfunctions is at least 2.

[ ] There is a category 3 or category 4 Primary Malfunction.
Or
[ ] There are at least 3 Secondary Malfunctions of which at least two are Additional Malfunctions since the ATS does not include a category 3 or a category 4 Primary Malfunction.

[ ] The total number of Primary and Secondary Malfunctions is not greater than five.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.3.3j).

[ ] There are no more than 3 Additional Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.3.3j).

[ ] There are no more than 2 Monitoring Malfunctions.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.3.3j).

[ ] There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.3.3j).

[ ] There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.3.3j).

[ ] There are no more than 2 Secondary Malfunctions of poised standby safety support systems.
Or
[ ] This limit has been exceeded in accordance with the provisions of paragraph 6.3.3.3j).

[ ] The Secondary Malfunctions only affect indicators, equipment, components or control devices that the candidates are expected to check during the ATS dynamic duration.

[ ] The conditions that apply to the participation of the members of the control room support team are well defined.

[ ] The endpoint of the ATS is well defined and will be clearly recognizable by the examiners.

[ ] Any operating documentation identified for use in responding to the malfunctions in the ATS has been selected from the frozen documentation.

[ ] The appropriate response to each Primary and Secondary Malfunction is clear and unique.

[ ] A typically qualified SS should have sufficient time to respond as expected to each malfunction.

[ ] The system parameters whose evolution will be recorded during the conduct of the examination have been identified.

Indicate which of the following features are included in the ATS:

[ ] Initial plant conditions different from normal full power conditions have a significant impact on the response expected from the candidates.

[ ] A failure of a major automatic action during a transient must be detected by the candidates and requires them to respond immediately.

[ ] One or more situations require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] Concurrent malfunctions or plant conditions require the candidates to assign priorities their actions or to the actions of the support team.

[ ] A requirement in the OP&Ps that is not met must be recognized and addressed by the candidates.

[ ] An impairment of a special safety system or of a standby safety support system must be recognized and addressed by the candidates.

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A.9 F: DTS Design Checklist

Plant: _____ **File:** _____

Examination Date: _____

Test Scenario Title: _____

The DTS meets the following criteria:

[ ] The initial plant conditions are well defined in section 2 of the examiner's guide.

[ ] Not all of the equipment out of service during the DTS has an impact on the diagnosis expected or on the course of actions to be taken.

[ ] The initial plant conditions do not violate requirements in the plant operating documentation.

[ ] The DTS dynamic duration is not expected to significantly exceed 15 minutes.

[ ] The Primary Malfunction is a category 2, category 3 or category 4 Primary Malfunction that, under the defined initial plant conditions, requires a sufficiently complex analysis of the available information to make the correct diagnosis and to determine the appropriate course of actions.

[ ] The Primary Malfunction does not create abnormal plant conditions that would require prompt implementation of more than two complex procedures or courses of actions.

[ ] The specific diagnosis that the candidates are expected to make is well defined.

[ ] The control room and field information required to make this diagnosis have been identified.

[ ] If the Primary Malfunction were to occur at the plant, sufficient information would be available within the DTS dynamic duration to make the correct diagnosis.

[ ] Each Secondary Malfunction satisfies the criteria in Appendix A.6.

[ ] There is at least 1 Secondary Malfunction.

[ ] There are no more than 4 Secondary Malfunctions.

[ ] There is no more than one Secondary Malfunction causing a level 1 or a level 2 impairment of a special safety system.

[ ] There are no more than 3 Secondary Malfunctions causing an impairment of a special safety system.

[ ] There are no more than 3 Secondary Malfunctions of poised standby safety support systems.

[ ] The Secondary Malfunctions only affect indicators, equipment, components or control devices that the candidates are expected to check during the DTS dynamic duration.

[ ] The number and the nature of the Secondary Malfunctions are such that a typically qualified SS should be able to respond as expected to these malfunctions and to formulate the correct diagnosis within the DTS dynamic duration.

The abnormal plant conditions that exist during the DTS raise at least one significant concern with respect to:

[ ] control of reactor power
[ ] cooling of the fuel
[ ] containment of radioactivity
[ ] impairment of special safety systems
[ ] impairment of standby safety support systems
[ ] compliance with OP&Ps
[ ] safe operation of plant systems and equipment
[ ] safety of plant personnel
[ ] protection of the environment

[ ] Any operating documentation identified for use in responding to the malfunctions in the DTS has been selected from the frozen documentation.

[ ] The time when the simulator will be frozen and questioning of the candidates will begin is well defined.

[ ] Any appropriate course of actions to respond to a failure of a major automatic action prior to diagnosing the Primary Malfunction does not have an impact on unit conditions that would prevent, or excessively interfere with, making the correct diagnosis.

[ ] Unit conditions at the end of the DTS dynamic duration will not have deteriorated to a level that would prevent, or excessively interfere with, making the correct diagnosis.

[ ] A typically qualified SS would have sufficient information and time to respond as expected to the Secondary Malfunctions and to make the correct diagnosis within the DTS dynamic duration.

[ ] The appropriate course of actions to respond to the malfunctions is clear.

[ ] The system parameters whose evolution will be recorded during the conduct of the examination have been identified.

Indicate which of the following features are included in the DTS:

[ ] Initial plant conditions different from normal full power conditions have a significant impact on the response expected from the candidates.

[ ] The Primary Malfunction is a category 4 Primary Malfunction.

[ ] A failure of a major automatic action during a transient must be detected by the candidates and requires them to respond immediately.

[ ] One or more situations require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] Concurrent abnormal plant conditions require the candidates to assign priorities to the actions required to address those conditions.

[ ] A requirement in the OP&Ps that is not met must be recognized and addressed by the candidates.

[ ] An impairment of a special safety system or of a standby safety support system must be recognized and addressed by the candidates.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.9 G: PCTS Design Checklist

Plant: _____ **File:** _____

Examination Date: _____

Test Scenario Title: _____

The PCTS meets the following criteria:

[ ] The initial plant conditions are well defined in section 2 of the examiner's guide.

[ ] Not all of the equipment out of service during the PCTS has an impact on the significance of the panel anomalies or on the course of actions to be taken.

[ ] The equipment out of service during the PCTS does not create conditions that violate requirements in the plant operating documentation.

[ ] The verification task to be performed is related to the responsibilities of the SS.

[ ] The duration of the verification task is not expected to significantly exceed 15 minutes.

[ ] There are at least 3 panel anomalies that indicate abnormal situations that would be referred to the SS for resolution, such as abnormal system configurations, impairments of special safety systems or of standby safety support systems, a violation of a requirement in the OP&Ps, or problems related to the control of reactor power, cooling of the fuel or containment of radioactivity.

[ ] There are no more than 10 panel anomalies.

[ ] The panel anomalies can be detected from the control room panels during the execution of the verification task.

[ ] The control room indications associated with each panel anomaly and any field information required to assess the corresponding abnormal system condition have been identified.

[ ] A typically qualified SS should be able to complete the verification task within the time allocated.

[ ] Any operating documentation identified for use in responding to the panel anomalies has been selected from the frozen documentation.

[ ] The course of actions to address the panel anomalies is clear.

[ ] A typically qualified SS should have sufficient time to decide how to address the panel anomalies as expected.

Indicate which of the following features are included in the PCTS:

[ ] Initial plant conditions different from normal full power conditions have a significant impact on the response expected from the candidates.

[ ] One or more situations require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] Concurrent abnormal plant conditions require the candidates to assign priorities to the actions required to address those conditions.

[ ] A requirement in the OP&Ps is not met and must be addressed by the candidates.

[ ] An impairment of a special safety system or of a standby safety support system must be addressed by the candidates.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.10 A: Simulator-based Examination Design Checklist for RO Candidates

Plant: _____ **File:** _____

Examination Date: _____

The examination meets the following criteria:

[ ] The examination consists of three CTSs.

[ ] Duplication in the required operator actions is minimized among CTSs.

[ ] Initial plant conditions, including reactor power, are varied among CTSs.

[ ] At least one CTS starts with initial plant conditions different from normal full power conditions that have a significant impact on the actions to be taken by the candidates.

[ ] The CTSs cover a broad range of system operations, equipment malfunctions and unit transients.

[ ] At least one CTS includes a category 4 Primary Malfunction.

[ ] At least one CTS includes a failure of a major automatic action during a transient that must be detected by the candidates and that requires them to respond immediately.

[ ] At least two CTSs include one or more situations that require the candidates to determine or recommend an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] At least two CTSs include concurrent malfunctions or unit conditions that require the candidates to assign priorities to their actions or to the actions of the support team.

[ ] At least one CTS includes a situation where a requirement in the OP&Ps is not met that must be recognized and addressed by the candidates.

[ ] At least one CTS includes the occurrence of an impairment of a special safety system or standby safety support system that must be recognized and addressed by the candidates.

[ ] Over the entire examination, candidates are expected to be tested in each of competency areas 1, 3, 4 and 5 at least 25 times and in competency area 2 at least 15 times.

[ ] The examination dynamic duration is expected to be between 2 and 3 hours.

<u>At multi unit plants only</u>

[ ] At least one CTS includes conditions on one or more reactor units, other than the simulated reactor unit, that prevent or significantly delay the arrival at this reactor unit of one or both assisting ROs from other units, or that require one or both assisting ROs to subsequently leave the simulated reactor unit during the CTS.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.10 B: Simulator-based Examination Design Checklist for U0O Candidates

Plant: _____ **File:** _____

Examination Date: _____

The examination meets the following criteria:

[ ] The examination consists of two CTSs.

[ ] Duplication in the required operator actions is minimized among CTSs.

[ ] Initial plant conditions, including conditions of the reactor units, are varied among CTSs.

[ ] At least one CTS starts with initial conditions of systems operated by U0Os different from normal operating conditions specified in operating procedures that have a significant impact on the actions to be taken by the candidates.

[ ] The CTSs cover a broad range of system operations, equipment malfunctions and transients relevant to the U0O position.

[ ] At least one CTS includes a category 4 Primary Malfunction affecting one or more reactor units that requires a complex intervention by the candidates.

[ ] At least one CTS includes a failure of a major automatic action during complex operations of unit 0 systems that must be detected by the candidates and that requires them to respond immediately.

[ ] There are at least two situations that require the candidates to determine or recommend an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] There are at least two occurrences of concurrent malfunctions or conditions of systems operated by U0Os that require the candidates to assign priorities to their actions or to the actions of the support team.

[ ] At least one CTS includes a situation where a requirement in the OP&Ps is not met that must be recognized and addressed by the candidates.

[ ] At least one CTS includes the occurrence of an impairment of a special safety system or standby safety support system that must be recognized and addressed by the candidates.

[ ] Over the entire examination, candidates are expected to be tested in each of competency areas 1, 3, 4 and 5 at least 25 times and in competency area 2 at least 15 times.

[ ] The examination dynamic duration is expected to be between 1.5 and 2.5 hours.

[ ] In both CTSs, the arrival of the second U0O in the control room is delayed for approximately 15 minutes.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.10 C: Simulator-based Examination Design Checklist for SS Candidates at Single-unit Plants

Plant: _____ **File:** _____

Examination Date: _____

The examination meets the following criteria:

[ ] The examination consists of two CTSs and two ATS.

[ ] Duplication in the required actions is minimized among test scenarios.

[ ] Initial plant conditions, including reactor power, are varied among test scenarios.

[ ] At least one test scenario starts with initial plant conditions different from normal full power conditions that have a significant impact on the response expected from the candidates.

[ ] Test scenarios cover a broad range of system operations, equipment malfunctions and plant transients.

[ ] At least one test scenario includes a category 4 Primary Malfunction.

[ ] At least one test scenario includes a failure of a major automatic action during a transient that must be detected by the candidates and that requires them to respond immediately.

[ ] At least two test scenarios include one or more situations that require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] At least one CTS includes a situation where the candidates have to give directions to the support team on the execution of two complex procedures or courses of actions that need to be implemented promptly.

[ ] At least one ATS includes concurrent malfunctions or plant conditions that require the candidates to assign priorities to their actions or to the actions of the support team.

[ ] At least two test scenarios include a situation where a requirement in the OP&Ps is not met that must be recognized and addressed by the candidates.

[ ] At least one test scenario includes the occurrence of an impairment of a special safety system or standby safety support system that must be recognized and addressed by the candidates.

[ ] Over the entire examination, candidates are expected to be tested in each of competency areas 1, 3, 4 and 5 at least 25 times and in competency area 2 at least 15 times.

[ ] The dynamic duration of the two CTSs is expected to be between 75 and 120 minutes.

[ ] The dynamic duration of the two ATSs is expected to be between 45 and 60 minutes.

[ ] The examination duration is expected to be between 2 and 3 hours.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.10 D: Simulator-based Examination Design Checklist for SS Candidates at Multi-unit Plants

Plant: _____ **File:** _____

Examination Date: _____

The examination meets the following criteria:

[ ] The examination consists of two CTSs, three DTSs and one PCTS.

[ ] Duplication in the required actions is minimized among test scenarios.

[ ] Initial plant conditions, including reactor power, are varied among test scenarios.

[ ] At least one CTS starts with initial plant conditions different from normal full power conditions that have a significant impact on the response expected from the candidates.

[ ] Test scenarios cover a broad range of system operations, equipment malfunctions and plant transients.

[ ] At least one CTS or DTS includes a category 4 Primary Malfunction.

[ ] At least one CTS or DTS includes a failure of a major automatic action during a transient that must be detected by the candidates and that requires them to respond immediately.

[ ] At least two test scenarios include one or more situations that require the candidates to determine an appropriate course of actions because procedures do not exist, do not fully address the situation, give conflicting directions or are ineffective.

[ ] At least one CTS includes a situation where the candidates have to give directions to the support team on the execution of two complex procedures or courses of actions that need to be implemented promptly.

[ ] At least one CTS includes concurrent malfunctions on the reactor unit and on unit 0, or on the reactor unit and on simulated systems common to more than one reactor unit, that require the candidates to assign priorities to their actions or to the actions of the support team.

[ ] At least one DTS includes concurrent abnormal plant conditions that require the candidates to assign priorities to the actions required to address those conditions.

[ ] At least two test scenarios include a situation where a requirement in the OP&Ps is not met that must be recognized and addressed by the candidates.

[ ] At least one test scenario includes the occurrence of an impairment of a special safety system or standby safety support system that must be recognized and addressed by the candidates.

[ ] During one CTS, the candidates are required to give detailed instructions to the support team on the course of actions to be taken in a situation that necessitates a prompt execution of a complex sequence of operator actions because the RO or the U0O needs assistance from the SS.

[ ] Over the entire examination, candidates are expected to be tested in each of competency areas 1, 3, 4 and 5 at least 25 times and in competency area 2 at least 15 times.

[ ] The dynamic duration of the two CTSs is expected to be between 75 and 120 minutes.

[ ] The dynamic duration of the three DTSs is expected to be between 30 and 45 minutes.

[ ] The time to complete the verification task during the PCTS is expected to be approximately 15 minutes.

[ ] The examination duration is expected to be between 2 and 3 hours.

Lead Examiner's Name: _____ _____
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Training Manager's Name: _____ _____
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A.11 Test Scenario Verification Checklist for CTSs, ATSs or DTSs

Plant: _____ **File:** _____

Examination Date: _____ **Test Scenario Type:** _____

Test Scenario Title: _____ **Test Scenario No.:** _____

The simulation of the test scenario meets the following criteria:

[ ] The key alarms are received when expected and in the correct sequence.

[ ] The response of the following parameters have approximately the correct magnitude and their excursions, if any, have approximately the correct magnitude and duration, based on the applicable laws of physics and the characteristics of the equipment and systems of the reference unit.

- Reactor power
- Heat transport system reactor outlet header pressure (each header)
- Heat transport system reactor outlet header temperature (each header)
- Heat transport system storage tank level
- Heat transport system pressurizer level (except for Pickering NGS A and B)
- Heat transport system feed and bleed flows (all measured flows)
- Boiler level (each boiler)
- Boiler feed line pressure
- Boiler feed flows (all measured flows)
- Deaerator level
- Condenser level
- Main steam boiler pressure
- Main steam boiler pressure error
- Turbine-generator load (MWe)
- Moderator level (for Pickering NGS A only)
- Any other system parameter to be recorded during the conduct of the test scenario, as specified in the examiner's guide (Appendix A.8, part B)

[ ] The relevant system logic control circuits operate correctly.

[ ] The simulator response to the malfunctions and other conditions of the test scenario and to the expected operator actions is realistic.

[ ] No misleading difference between the unit response as seen from the control room at the simulator and the response of the reference unit was observed during the final verification of the test scenario.

Lead Examiner's Name: _____ _____

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A.12 A: Preparation of Instructions for the Support Team for CTSs and ATSs

This appendix contains the guidelines for the preparation of instructions for the support team for CTSs and ATSs.

A) Rules for the Support Team

a) Candidates are tested individually with the support team members playing the role of typical operating crew members at the plant.

b) The maximum number of persons in the support team during a test scenario is limited to the number of persons expected to respond, in the control room and in the field, to a transient on a single unit when the plant is manned with the absolute minimum shift complement, as defined by the staffing document referred to in the plant's Power Reactor Operating Licence.

c) At multi unit plants, the number of support team members available to the candidates in the control room and in the field should take into account the conditions of the other units specific to the scenario.

d) The individual members of the control room support team should be able to correctly perform the tasks that qualified persons in the corresponding positions are performing at the plant.

B) Instructions for Support Team Members

Restrictions are placed on the performance of the support team members during test scenarios, when compared to the performance of an actual operating crew at the plant. Restrictions may also be placed on the number of the support team members available in the control room. Such restrictions are necessary to give candidates the opportunity to demonstrate that they have acquired specific elements of knowledge and skills.

a) When preparing instructions for the support team members for a CTS or an ATS, the following practices are acceptable:

   i) delaying the arrival of members of the control room support team;

   ii) at multi-unit plants, postulating conditions on one or more units, other than the simulated unit affected by the transient, that prevent or delay the arrival at this unit of one or more certified individuals who are summoned, or that require one or more of the certified individuals to subsequently leave that unit during a CTS;

   iii) delaying the completion of control room activities expected to be requested by the candidates;

   iv) delaying the completion of field activities expected to be requested by the candidates, such as manual closure of a large isolating valve;

   v) delaying providing information expected to be requested by the candidates;

   vi) asking for advice on priorities when told to perform several tasks by a candidate;

   vii) requesting assistance from the candidate on the course of actions to be taken to address a malfunction or abnormal plant condition;

viii) prescribing field operator errors that result in either a Primary or an Additional Malfunction, such as pulling the wrong fuse or closing the wrong valve.

b) When preparing instructions for the support team members for a CTS or an ATS, the following practices are **not acceptable**:

i) pointing out abnormalities that the candidates are expected to recognize;

ii) diagnosing a malfunction that the candidates are expected to diagnose;

iii) the members playing the role of other certified individuals during a CTS or an ATS recommending a corrective action to the candidates, or recommending the course of actions required in the event of any occurrence at a unit not specifically addressed by the approved operating procedures;

iv) correcting an error made by a candidate;

v) instructing support team members to give incorrect information to the candidates;

vi) instructing members of the control room support team to perform wrong actions when asked to execute tasks by the candidates.

c) The instructions for the members of the control room support team should specify:

i) the number of members available and their respective roles;

ii) where each member will be at the start of the test scenario;

iii) when each member summoned will be instructed to arrive at a unit after a transient;

iv) all requests for operations or verifications in the control equipment room or in the field expected from the candidates and for each activity, the time that would be required for completing it at the plant and the information to be reported back to the candidate by the member involved once the activity is completed;

v) at multi unit plants, when any member playing the role of a certified individual will be instructed to leave the simulated reactor unit or unit 0 during the CTS and, if applicable, when the member will be instructed to return to the relevant unit.

d) The instructions regarding the expected actions of field operators should specify:

i) the number of field operators available;

ii) the field conditions and any other information to be communicated to the candidates by the field operators and when they must be communicated;

iii) all requests for field activities expected from the candidates and for each activity, the number of field operators and the time that would be required for completing it at the plant and the information to be reported back to the candidates once the activity is completed.

e) The instructions regarding the expected actions of any support team member expected to be summoned to the control room during a test scenario should specify:

i) the position filled by the support team member;

ii) the alarms, annunciations, equipment malfunctions and any other information to be communicated to the candidates by the support team member and when they must be communicated.

f) In the event of any occurrence in the unit not specifically addressed by the approved operating procedures during a CTS for RO or U0O candidates, the support team member designated to play the role of the SS is expected to give the necessary approval regarding the course of actions required only after receiving from the candidate a recommendation with justification on the approach to be followed. The SS will only give the required guidance for cases involving systems or areas for which an RO or a U0O is not accountable.

A.12 B: Preparation of Instructions for the Support Team for DTSs

This appendix contains the guidelines for the preparation of instructions for the support team for DTSs.

A) Rules for the Support Team

a) Candidates are tested individually with the assistance in the control room of one or two support team members playing the role of the RO and, where applicable, of the U0O. These will respond to any specific request from the candidates:
   i) to call up a display, trend, annunciation number or alarm summary;
   ii) to acknowledge and reset alarms;
   iii) to execute corrective actions when a major automatic action fails to occur;
   iv) to obtain a particular procedure;
   v) to obtain information in the control equipment room or from the field.

b) One support team member should be available to play the role of the field operators.

B) Instructions for Support Team Members

During DTSs, restrictions are placed on the number of support team members in the control room and on their individual performance to give candidates the opportunity to demonstrate their ability to independently monitor the evolution of plant conditions, recognize abnormalities and diagnose malfunctions.

a) When preparing instructions for the support team members for a DTS, the following practices are **not acceptable**:
   i) pointing out abnormalities that the candidates are expected to recognize;
   ii) diagnosing a malfunction that the candidates are expected to diagnose;
   iii) instructing support team members to give incorrect information to the candidates;
   iv) instructing members of the control room support team to perform wrong actions when asked to execute corrective actions by the candidates.

b) The instructions for the members of the control room support team should specify all requests for verifications in the control equipment room expected from the candidates and for each verification, the time that would be required for completing it at the plant and the information to be reported back to the candidate by the member involved.

c) The instructions regarding the expected actions of the support team member playing the role of the field operators should specify:
   i) the field conditions and any other information to be communicated to the candidates by the field operators and when they must be communicated;
   ii) all requests for verifications in the field expected from the candidates and for each verification, the minimum time that would be required for completing it at the plant and the information to be reported back to the candidates. For field information that is essential to make the correct diagnosis, it is acceptable to

report the information back to a candidate before the minimum time, once the candidate has made all control room checks relevant to the diagnosis that are expected at that point in time and is waiting for that field information to complete the diagnosis.

d) The instructions regarding the expected actions of any support team member expected to be summoned to the control room during a DTS should specify:

i) the position filled by the support team member;

ii) the alarms, annunciations, equipment malfunctions and any other information to be communicated to the candidates by the role player and when they must be communicated.

A.13 Format of a Candidate Action Checklist

Part A: Partial Checklist before Assessment

Examiner's Guide Section 3 - Candidate Action Checklist

START TIME: ____:____

After the panel review time, at the request of the Lead Examiner, the Simulator Operator will initiate Lesson Plan 92, Step 2.

The Simulator Operator will then check Lesson Plan 92, Steps 3, 4, 5, 6, and 7, are automatically initiated.

Expected response:
- **Drifting high of SDS1 NOP detectors 9E and 16F.**
- **Candidate should respond to Margin to Trip and reduce power to ≈96% FP.**

Window: **MARGIN TO TRIP LOW (SDS1)**
MONITOR COMPUTER MESSAGE (SDS1)
Annunciation: **AN-3197 MARGIN TO TRIP LOW**

Responds to NOP detector high readings:

1)	(2.9)	**[ ]**	Acknowledges and resets the annunciations.
2)	(1.3)	**[ ]**	Checks SDS1 Channels D, E and F NOP Margin to Trip via Display/Test CRTs or via SDS1 Monitor Computer.
3)	(3.2)	**[ ]**	Recognizes BOTH NOP 9E and
4)	(3.2)	**[ ]**	NOP 16F are within 5% of Margin to Trip.
5)	(1.3)	**[ ]**	Checks SDS2 Channels G, H and J NOP Margin to Trip via Display/Test CRTs.
6)	(3.5)	**[ ]**	References NK38-OM-37000-4.3.
7)	(3.4)	**[ ]**	
8)	(4.1)	**[ ]**	Checks cover sheet for Operating Memos.
9)	(4.1)	**[ ]**	Checks the Fuelling List to determine that NOPs detectors 9E and 16F not expected to be affected by recent fuelling of Channel H20.

10) (1.3) **[ ]** Checks for annunciation number (AN-3197).

11) (3.5) **[ ]** Obtains NK38-OM-68200-6.2 (AN-3197),
12) (4.1) **[ ]** checks cover sheet for Operating Memos and
13) (3.7) **[ ]** references NK38-OM-68200-4.5.1.
14) (3.7) **[ ]** References NK38-OM-60040-4.7.1,
15) (4.1) **[ ]** checks cover sheet for Operating Memos and
16) (3.8) **[ ]** ensures that Operating Memo does not apply.

Reduces reactor power 1%:

17) (4.1) **[ ]** Calls up ALTERNATE MODE REACTOR POWER RATE AND SETPOINT display and
18) (4.1) **[ ]** enters a reactor power decrease at rate 1 or 2 to 97 %,
19) (4.2) **[ ]** confirms entry correct, and then
20) (4.1) **[ ]** executes new setpoint.

21) (4.1) **[ ]** Checks reactor power decreasing via RRS STATUS display, RRS trend, or SDS NOPs.

22) (1.2) **[ ]** Checks HT ROH pressures at setpoint via PHT-MAIN CIRCUIT STATUS display or trend.

23) (1.2) **[ ]** Checks HT Pressurizer level at power dependent setpoint via PHT-P&IC SETPOINT display or trend.

24) (1.2) **[ ]** Checks SG levels at power dependent setpoint via BOILER SWELL/SHRINK display.

25) (1.2) **[ ]** Checks SG pressures at setpoint via SGPC STATUS display, trend, or PAMs.

26) (1.5) **[ ]** Checks turbine unloading (≈ 888 MW) via MWe meter or trend.

27) (4.2) **[ ]** When power decreases completed, depresses HOLD POWER push-button,
28) (1.6) **[ ]** checks rate set to 0 via ALTERNATE MODE REACTOR POWER RATE AND SETPOINT display, and
29) (1.2) **[ ]** checks reactor power at setpoint via RRS STATUS display, or SDS NOPs.

30) (1.3) **[ ]** Checks SDS1 Margin to Trip annunciation (AN 3197) has not cleared.

31) (1.3) **[ ]** Checks SDS1 Channels D, E and F NOP Margin to Trip not cleared via Display/Test CRTs or via SDS1 Monitor Computer.

Reduces power 1%:

32) (4.1) **[ ]** Calls up ALTERNATE MODE REACTOR POWER RATE AND SETPOINT display and
33) (4.1) **[ ]** enters a reactor power decrease at rate 1 or 2 to 96 %,
34) (4.2) **[ ]** confirms entry correct, and then
35) (4.1) **[ ]** executes new setpoint.

36) (4.1) **[ ]** Checks reactor power decreasing via RRS STATUS display, RRS trend, or SDS NOPs.

37) (1.2) **[ ]** Checks HT ROH pressures at setpoint via PHT-MAIN CIRCUIT STATUS display or trend.

38) (1.2) **[ ]** Checks HT Pressurizer level at power dependent setpoint via PHT-P&IC SETPOINT display or trend.

39) (1.2) **[ ]** Checks SG levels at power dependent setpoint via BOILER SWELL/SHRINK display.

40) (1.2) **[ ]** Checks SG pressures at setpoint via SGPC STATUS display, trend, or PAMs.

41) (1.5) **[ ]** Checks turbine unloading (≈ 888 MW) via MWe meter or trend.

42) (4.2) **[ ]** When power decreases completed, depresses HOLD POWER push-button,
43) (1.6) **[ ]** checks rate set to 0 via ALTERNATE MODE REACTOR POWER RATE AND SETPOINT display, and
44) (1.2) **[ ]** checks reactor power at setpoint via RRS STATUS display, or SDS NOPs.

Annunciation: OK AN-3197 SDS1 MARGIN TO TRIP LOW

45) (1.3) **[ ]** Checks SDS1 Margin to Trip annunciation (AN 3197) has cleared.

46) (2.9) **[ ]** Acknowledges and resets the annunciation.

47) (5.1) **[ ]** Clearly and accurately informs Shift Supervisor
48) (5.4) **[ ]** of power reduction to increase NOP Margin to Trip.

If the candidate calls for the Shift Supervisor, the Shift Supervisor will call the control room immediately, acknowledge the information received, and inform the candidate that the Shift Supervisor will arrive shortly.

49) (5.2) **[ ]** Acknowledges clearly instructions and information received.

Part B: Partial Checklist with Modifications and Comments Made During Assessment

Examiner's Guide Section 3 - Candidate Action Checklist

START TIME: ____:____

After the panel review time, at the request of the Lead Examiner, the Simulator Operator will initiate Lesson Plan 92, Step 2.

The Simulator Operator will then check Lesson Plan 92, Steps 3, 4, 5, 6, and 7, are automatically initiated.

Expected response:
- **Drifting high of SDS1 NOP detectors 9E and 16F.**
- **Candidate should respond to Margin to Trip and reduce power to ≈96% FP.**

Window: MARGIN TO TRIP LOW (SDS1)
MONITOR COMPUTER MESSAGE (SDS1)
Annunciation: AN-3197 MARGIN TO TRIP LOW

Responds to NOP detector high readings:

1)	(2.9)	**[*]**	Acknowledges and resets the annunciations.
2)	(1.3)	**[*]**	Checks SDS1 Channels D, E and F NOP Margin to Trip via Display/Test CRTs or via SDS1 Monitor Computer.
3)	(3.2)	**[ ]**	Recognizes BOTH NOP 9E and
4)	(3.2)	**[ ]**	NOP 16F are within 5% of Margin to Trip.
5)	(1.3)	**[ ]**	Checks SDS2 Channels G, H and J NOP Margin to Trip via Display/Test CRTs.
6)	(3.5)	**[*]**	References NK38-OM-37000-4.3.
7)	(3.4)	**[*]**	
8)	(4.1)	**[*]**	Checks cover sheet for Operating Memos.
9)	(4.1)	**[*]**	Checks the Fuelling List to determine that NOPs detectors 9E and 16F not expected to be affected by recent fuelling of Channel H20.

10) (1.3) **[ ]** Checks for annunciation number (AN-3197).

11) (3.5) **[ ]** Obtains NK38-OM-68200-6.2 (AN-3197),
12) (4.1) **[ ]** checks cover sheet for Operating Memos and
13) (3.7) **[ ]** references NK38-OM-68200-4.5.1.

[&**Comment on steps 10 to 13:**
Candidate did not check annunciation number.&

14) (3.7) **[*]** References NK38-OM-60040-4.7.1,
15) (4.1) **[*]** checks cover sheet for Operating Memos and
16) (3.8) **[*]** ensures that Operating Memo does not apply.

Reduces reactor power 1%:

17) (D4.1) **[*]** Calls up ALTERNATE MODE REACTOR POWER RATE AND SETPOINT display and
18) (D4.1) **[*]** enters a reactor power decrease at rate 1 or 2 to 97 %,
19) (D4.2) **[*]** confirms entry correct, and then
20) (D4.1) **[*]** executes new setpoint.

21) (D4.1) **[*]** Checks reactor power decreasing via RRS STATUS display, RRS trend, or SDS NOPs.

22) (D1.2) **[*]** Checks HT ROH pressures at setpoint via PHT-MAIN CIRCUIT STATUS display or trend.

23) (D1.2) **[*]** Checks HT Pressurizer level at power dependent setpoint via PHT-P&IC SETPOINT display or trend.

24) (D1.2) **[*]** Checks SG levels at power dependent setpoint via BOILER SWELL/SHRINK display.

25) (D1.2) **[*]** Checks SG pressures at setpoint via SGPC STATUS display, trend, or PAMs.

26) (D1.5) **[*]** Checks turbine unloading (≈ 888 MW) via MWe meter or trend.

27) (D4.2) **[*]** When power decreases completed, depresses HOLD POWER push-button,
28) (D1.6) **[*]** checks rate set to 0 via ALTERNATE MODE REACTOR POWER RATE AND SETPOINT display, and
29) (D1.2) **[*]** checks reactor power at setpoint via RRS STATUS display, or SDS NOPs.

30) (D1.3) **[*]** Checks SDS1 Margin to Trip annunciation (AN 3197) has not cleared.

31) (D1.3) **[*]** Checks SDS1 Channels D, E and F NOP Margin to Trip not cleared via Display/Test CRTs or via SDS1 Monitor Computer.

[&**Steps 17 to 31 are deleted because candidate took reactor power directly to 96% FP.**&

Reduces power 1%:

32) (4.1) **[*]** Calls up ALTERNATE MODE REACTOR POWER RATE AND SETPOINT display and
33) (4.1) **[*]** enters a reactor power decrease at rate 1 or 2 to 96 %,
34) (4.2) **[*]** confirms entry correct, and then
35) (4.1) **[*]** executes new setpoint.

36) (4.1) **[*]** Checks reactor power decreasing via RRS STATUS display, RRS trend, or SDS NOPs.

37) (1.2) **[*]** Checks HT ROH pressures at setpoint via PHT-MAIN CIRCUIT STATUS display or trend.

38) (1.2) **[ ]** Checks HT Pressurizer level at power dependent setpoint via PHT-P&IC SETPOINT display or trend.

39) (1.2) **[*]** Checks SG levels at power dependent setpoint via BOILER SWELL/SHRINK display.

40) (1.2) **[*]** Checks SG pressures at setpoint via SGPC STATUS display, trend, or PAMs.

41) (1.5) **[*]** Checks turbine unloading (≈ 888 MW) via MWe meter or trend.

42) (4.2) **[*]** When power decreases completed, depresses HOLD POWER push-button,
43) (1.6) **[ ]** checks rate set to 0 via ALTERNATE MODE REACTOR POWER RATE AND SETPOINT display, and
44) (1.2) **[*]** checks reactor power at setpoint via RRS STATUS display, or SDS NOPs.

Annunciation: OK AN-3197 SDS1 MARGIN TO TRIP LOW

45) (1.3) **[*]** Checks SDS1 Margin to Trip annunciation (AN 3197) has cleared.

46) (2.9) **[*]** Acknowledges and resets the annunciation.

47) (1.3M) **[*]** Checks SDS1 Channels D, E and F NOP Margin to Trip is cleared via Display/Test CRTs or via SDS1 Monitor Computer.

48) (5.1) **[ ]** Clearly and accurately informs Shift Supervisor
49) (5.4) **[ ]** of power reduction to increase NOP Margin to Trip.

If the candidate calls for the Shift Supervisor, the Shift Supervisor will call the control room immediately, acknowledge the information received, and inform the candidate that the Shift Supervisor will arrive shortly.

50) (N5.2) **[ ]** Acknowledges clearly instructions and information received.

[&**Step 50 excluded because candidate did not inform Shift Supervisor.**&

A.14 Standard Questions SS Candidates

Part A: Standard Questions for CTSs and ATSs

The standard questions listed below will be asked to SS candidates at the end of each CTS or ATS. The expected answer to each question should be documented in the examiner's guide for the test scenario.

1. a) State the significant concerns you have as an SS considering the plant conditions existing at the end of the test scenario.

   Candidates are expected to identify the significant concerns they may have at this time with respect to control of reactor power, cooling of the fuel, containment of radioactivity, impairments of special safety systems and standby safety support systems, compliance with OP&Ps, safe operation of plant systems and equipment, safety of plant personnel and protection of the environment. Only significant concerns that candidates are not expected to address during the dynamic portion of the test scenario and that are not addressed by the procedures being implemented at the endpoint of the test scenario should be included in the answer to this question documented in the examiner's guide.

   The generic performance expectations that may be associated with the answer to this question are: 3.1, 3.2 and 3.3.

   b) In what order would you address these concerns?

   Candidates are expected to assign priorities to their concerns taking into account their relative importance.

   The generic performance expectation that may be associated with the answer to this question is: 3.9.

2. Outline the course of actions that should be taken to address these concerns.

   Candidates are expected to select the procedures, other than those already implemented during the simulation of the test scenario, that would need to be implemented to address their concerns and to use them to outline the course of actions that should be taken.

   Whenever more than one procedure is to be implemented, candidates are expected to outline in the appropriate sequence the course of actions to be taken.

   Whenever approved procedures do not exist, do not fully address the actual situation or give conflicting instructions, candidates are expected to describe the actions and checks they would ask control room personnel to perform.

   The generic performance expectations that may be associated with the answer to this question are: 3.5, 3.6, 3.8, 3.9, 3.11 and 3.12.

Part B: Standard Questions for DTSs

The standard questions listed below should be used as the basis for preparing the specific questions that will be asked to SS candidates at the end of each DTS. Some of the standard questions may have to be modified, as appropriate, to reflect the actual conditions of the scenario and to elicit the specific answers expected. The expected answer to each question should be documented in the DTS examiner's guide.

1. a) What main abnormal plant condition did you diagnose?
   b) What failure, or combination of failures, caused this condition?

   Candidates are expected to diagnose as specifically as possible the failure, or combination of failures, that caused the main abnormal plant condition that must be addressed, taking into account the severity of the deterioration of plant conditions and the urgency to take an appropriate course of actions. Question 1 b) will be asked when the rate of deterioration of plant conditions caused by the Primary Malfunction is sufficiently slow to give the candidates time to make a more specific diagnosis or when a specific diagnosis is required before taking the appropriate course of actions.

   The generic performance expectation that may be associated with the answer to question 1a) is: 3.4 or 3.6. The generic performance expectation that may be associated with the answer to question 1b) is: 3.10.

2. Explain how you came to this conclusion?

   When answering this question, candidates are expected to demonstrate that their diagnosis was based on control room and field information that supports a unique conclusion.

   When there is more than one approach to reach the correct diagnosis, each acceptable combination of checks that supports a unique conclusion should be documented in the DTS examiner's guide. The answer given by a candidate will allow the examiners to determine which approach the candidate used to unambiguously reach the correct diagnosis and to eliminate the checks that should not be used for assessment because they are not relevant to the approach used by the candidate.

   The generic performance expectations that may be associated with the answer to this question are: 3.4, 3.6, 3.7 and 3.10.

3. What other problems did you observe while performing your diagnosis?

   Candidates are expected to identify any other malfunction of indicator, equipment, component or control device that occurred while performing their diagnosis, including failure of any major automatic action.

   The generic performance expectation that may be associated with the answer to this question is: 3.2.

4. Outline the course of actions that should be taken, based on your diagnosis.

   Candidates are expected to select the procedures that should be implemented and to use them to outline the course of actions that should be taken to address the main abnormal plant condition diagnosed and any other significant problem observed.

   Whenever more than one procedure is to be implemented, candidates are expected to outline in the appropriate sequence the course of actions to be taken.

   Whenever approved procedures do not exist, do not fully address the actual situation or give conflicting instructions, candidates are expected to describe the actions and checks they would ask control room personnel to perform.

   The generic performance expectations that may be associated with the answer to this question are: 3.5, 3.6, 3.8, 3.9, 3.11 and 3.12.

5. a) State the significant concerns you have as an SS considering the plant conditions existing at the end of the DTS.

   Candidates are expected to identify the significant concerns they may have with respect to control of reactor power, cooling of the fuel, containment of radioactivity, impairments of special safety systems and standby safety support systems, compliance with OP&Ps, safe operation of plant systems and equipment, safety of plant personnel and protection of the environment.

   The generic performance expectations that may be associated with the answer to this question are: 3.1, 3.2 and 3.3.

   b) Which of those concerns do you consider the most important?

   The generic performance expectation that may be associated with the answer to this question is: 3.9.

Part C: Standard Questions for PCTSs

The standard questions listed below will be asked to SS candidates at the end of the PCTS. The specific answers expected should be documented in the examiner's guide for the PCTS.

1. What panel anomalies or abnormal conditions did you find?

   After candidates have answered this question, they will be given access to operating documentation and up to 10 minutes to prepare for answering the two questions below.

   The generic performance expectation that may be associated with the answer to this question is: 3.2.

2. Explain the significance of each anomaly or abnormal condition.

   The generic performance expectations that may be associated with the answer to this question are: 3.2 and 3.3.

3. Outline the course of actions to address the anomalies and abnormal conditions.

   Candidates are expected to outline in an appropriate sequence the course of actions that would address the anomalies and abnormal conditions, considering their relative importance for assigning priorities to the actions required.

   The generic performance expectations that may be associated with the answer to this question are: 3.5, 3.6, 3.8, 3.9 and 3.12.

A.15 Data Collection Checklist

Candidate's Name: _____

Test Scenario Title: _____

Test Scenario No.: _____

Examination Date: _____

Operator Action Monitor Printouts [ ]

Video Tape or Disc [ ]

Parameter Trends [ ]

Alarm Printouts [ ]

All logs [ ]

Flowsheets [ ]

Others: _____ [ ]

_____ [ ]

_____ [ ]

_____ [ ]

Comments

_____

_____

_____

_____

_____

_____

Data Collector's Name: _____ _____

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Lead Examiner's Name: _____ _____

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A.16 Briefing of the Support Team

The purpose of this briefing by the lead examiner is to review with the members of the support team, before beginning the rehearsals of the test scenarios developed for an examination, their responsibilities during the rehearsals of the test scenarios and the conduct of the examination, and the rules they must abide by.

A) Responsibilities

a) To play the role of the control room operating crew members, as prescribed in the examiner's guides (support team members in the control room).

b) To direct the activities or to play the role of the field operators, as prescribed in the examiner's guides (field operator coordinator).

c) To operate the simulator, as prescribed in the examiner's guides (simulator operator).

d) To operate the video system to record the performance of the candidate during the conduct of an examination (video operator).

e) To identify simulator shortcomings that may affect the simulation of the test scenarios.

f) To advise the lead examiner, preferably during the conduct of a test scenario, or immediately after its completion, of any supplementary malfunction or alarm that should be or should have been activated as a result of unexpected directives or actions, or lack of proper directives or actions, by a candidate (simulator operator).

g) To bring to the immediate attention of the lead examiner during the conduct of a test scenario any simulator deficiency or other circumstance that may affect the validity of the test scenario and possibly necessitate its termination (simulator operator).

Note: The field operator coordinator, the video operator and the simulator operator cannot be the same individual.

B) Rules of Conduct

a) Support team members must not remove any material related to the examination from the control room at the simulator. The simulator operator must control copies of all documents used by the candidates and the data collected during the examination.

b) Support team members must reset the simulator to a configuration which does not reveal the nature and content of the test scenarios rehearsed or conducted before releasing the simulator for other uses.

c) Support team members must not modify or otherwise tamper with the simulation programs in any way that may significantly impair the fidelity of simulation of the reference unit during an examination.

d) The simulator operator must not enter any malfunction or alarm not specified in the examiner's guides without the prior approval of the lead examiner.

e) Support team members must only perform the activities and communicate to the candidate the information specified by the instructions of the examiner's guides, unless otherwise necessary to respond to additional specific requests made by the candidate or unless directed by the lead examiner.

f) Any request for a field activity by the candidate that is not covered in the examiner's guide will be addressed, taking into consideration the time that it would take for completing the activity at the plant.

g) Support team members must ask clarification questions if any request for an activity by the candidate is not to the level of detail specified in the examiner's guide, or is otherwise incomplete or unclear.

h) Support team members must not give at any time suggestions regarding the diagnoses of malfunctions, the decisions and the actions that the candidates are expected to make or to perform. Specifically, the following practices are **not acceptable**:

   i) Pointing out abnormalities that the candidates are expected to recognize.

   ii) Diagnosing a malfunction that the candidates are expected to diagnose.

   iii) The members playing the role of other certified individuals during a CTS or an ATS recommending a corrective action to the candidates, or recommending the course of actions required in the event of any occurrence at a unit not specifically addressed by the approved operating procedures.

   iv) Correcting an error made by a candidate.

i) In order not to interfere with the conduct of the examination, support team members must limit verbal communications among themselves to those specified by the instructions of the examiner's guides and those necessary to respond to additional specific requests made by the candidate.

j) Support team members must remain in the control room during the conduct of any test scenario, unless directed to perform activities in the control equipment room or in the field, or unless specified otherwise by the instructions of the examiner's guides.

k) In the event of any occurrence in the unit not specifically addressed by the approved operating procedures during a CTS for RO or U0O candidates, the support team member designated to play the role of the SS is expected to give the necessary approval regarding the course of actions required only after receiving from the candidate a recommendation with justification on the approach to be followed. The SS will only give the required guidance for cases involving systems or areas for which an RO or a U0O is not accountable.

A.17 Participation of Observers

A) Administrative Arrangements

A person wishing to observe the conduct of a certification simulator based examination must obtain the concurrence of the Training Manager and of any candidate that would be observed. Arrangements regarding the participation of observers should be made as soon as possible and no later than one week before the date of observation. A maximum of two observers may be present at a time and their presence must in no way interfere with the normal conduct of the examination.

B) Briefing of Observers

The purpose of this briefing by the lead examiner is to review with observers, before allowing them to observe the conduct of an examination, the rules they must abide by.

Rules of conduct

a) Observers must not remove any material related to the examination from the control room at the simulator.

b) Observers must remain silent and stay at a predetermined location in the control room at the simulator during a test scenario, in order not to interfere with the conduct of the examination.

c) Observers must not comment under any circumstance on the performance of a candidate or participate in the evaluation of that performance.

A.18 A: Briefing of RO and U0O Candidates

The purpose of this briefing by the lead examiner is to communicate to the candidates, before the examination begins, some general information regarding the examination and to review with them the rules they must abide by and what they will be expected to do during the conduct of the examination.

A) Introduction

The lead examiner covers the following points of general interest:

a) Introduction of the examination team members with a general description of their behaviour during the examination.

b) Introduction of the support team members with an explanation of their roles during the examination.

c) Overall duration and general characteristics of the examination.

B) Characteristics of Test Scenarios and Performance Expected of the Candidates

The lead examiner describes to the candidates the main characteristics of a CTS and the performance expected of them during the conduct of a CTS.

CTSs

A CTS is a test scenario consisting of an integrated sequence of Primary and Secondary Malfunctions that simulates a succession of abnormal plant conditions, failures or transients and that requires candidates to demonstrate their skills in each of the five competency areas measured by the examination. Each CTS comprises the following parts:

a) Turnover

i) Candidates will be given a written turnover describing the initial plant conditions for the test scenario. It will specify the initial conditions of the simulated units, including the equipment out of service and other applicable plant conditions. It will also specify where each member of the control room support team will be at the start of the test scenario. The lead examiner will also describe these conditions to the candidates.

ii) All equipment that is out of service will be identified on the control room panels according to approved plant procedures. There will be no abnormal conditions other than those mentioned in the form until the simulation of the test scenario begins.

iii) Candidates will be given a maximum of five minutes to review control panels and alarm summaries. During this time, they may ask the lead examiner any question they have regarding plant conditions.

iv) The test scenario will begin after the five minutes have elapsed or sooner at the candidate's request.

b) Simulation of the CTS

i) The dynamic duration of a CTS should not significantly exceed 50 minutes for RO candidates and 60 minutes for U0O candidates.

ii) Candidates are tested individually with the support team members playing the role of typical operating crew members at the plant.

iii) The maximum number of persons in the support team is limited to the number of persons expected to respond, in the control room and in the field, to a transient on a single unit when the plant is manned with the absolute minimum shift complement, as defined by the staffing document referred to in the plant's Power Reactor Operating Licence.

iv) At multi unit plants, the number of support team members available to the candidates in the control room and in the field takes into account the conditions of the other units specific to the scenario.

v) Restrictions are placed on the performance of support team members, when compared to the performance of an actual operating crew at the plant. Restrictions may also be placed on the number of support team members available in the control room. Such restrictions are necessary to give the candidates the opportunity to demonstrate that they have acquired specific elements of knowledge and skills.

vi) Candidates are expected to respond to the succession of abnormal plant conditions, failures or transients in a CTS according to the specific performance expectations of plant management for their position.

vii) During CTSs, candidates should:

(1) clearly indicate, either by pointing at the appropriate panel indicators, CRT displays or alarm windows, or by stating out loud, the checks of indications and system parameters performed on the control room panels to diagnose malfunctions and to select operating procedures. Similarly, candidates should clearly indicate the checks that are being made in accordance with the expectations of plant management during the implementation of operating procedures and when taking any corrective action.

Note: Candidates are **not expected** to verbalize their reasoning when diagnosing abnormal plant conditions, failures or transients, when determining the operating procedures to be used or when performing any action. Similarly, the candidates are **not expected** to state the rationale for the actions and checks being performed.

(2) make an independent diagnosis of the abnormal plant conditions, failures or transients that must be addressed;

(3) perform the RO or U0O actions in response to each of these abnormal plant conditions, failures or transients;

(4) direct the execution of the required actions and checks by the support team;

(5) in the event of any occurrence in the reactor unit not specifically addressed by the approved operating procedures, recommend to the SS the course of actions to be followed with a justification.

viii) The SS will only give guidance on problems involving systems or areas for which an RO or a U0O is not accountable.

ix) The performance of the candidates will be recorded by the examiners on a checklist in the approved CTS examiner's guide.

x) Each CTS has a clearly defined end point specified in its examiner's guide.

xi) At multi unit plants, in one of the CTSs:

(1) RO candidates will be tested in the role of an RO from an adjacent unit who assists the incident unit RO.

(2) U0O candidates will be tested in the absence of the second U0O.

c) Question Period

At the end of a CTS, the lead examiner may ask questions to the candidate, as necessary, to clarify unexpected performance observed during the simulation of the CTS. Normally, this question period should not last more than ten minutes.

C) Rules of Conduct

a) Candidates must remain in the control room at the simulator during the conduct of any test scenario until given permission to leave by the lead examiner.

b) Candidates must hand over to the lead examiner all material related to the examination before leaving the control room.

c) Candidates may voluntarily withdraw at any time during the conduct of the examination. Such an action automatically results in a fail result.

A.18 B: Briefing of the SS Candidates at Single-unit Plants

The purpose of this briefing by the lead examiner is to communicate to the candidates, before the examination begins, some general information regarding the examination and to review with them the rules they must abide by and what they will be expected to do during the conduct of each type of test scenario.

A) Introduction

The lead examiner covers the following points of general interest:

a) Introduction of the examination team members with a general description of their behaviour during the examination.

b) Introduction of the support team members with an explanation of their roles during the examination.

c) Overall duration and general characteristics of the examination.

B) Types of Test Scenarios and Performance Expected of the Candidates

The lead examiner describes to the candidates the main characteristics of the two types of test scenarios and the performance expected of them during each type of test scenario.

1 CTSs

A CTS is a test scenario consisting of an integrated sequence of Primary and Secondary Malfunctions that simulates a succession of abnormal plant conditions, failures or transients and that requires candidates to demonstrate their skills in each of the five competency areas measured by the examination.
Each CTS comprises the following parts:

1a) Turnover

i) Candidates will be given a written turnover describing the initial plant conditions for the test scenario. It will specify the initial conditions of the simulated unit, including the equipment out of service, and other applicable plant conditions. It will also specify where each member of the control room support team will be at the start of the test scenario. The lead examiner will also describe these conditions to the candidates.

ii) All equipment that is out of service will be identified on the control room panels according to approved plant procedures. There will be no abnormal conditions other than those mentioned in the turnover until the simulation of the test scenario begins.

iii) Candidates will be given a maximum of five minutes to review control panels and alarm summaries. During this time, they may ask the lead examiner any question they have regarding plant conditions.

iv) The test scenario will begin after the five minutes have elapsed or sooner at the candidate's request.

1b) Simulation of the CTS

i) The dynamic duration of a CTS should not significantly exceed 50 minutes.

ii) Candidates are tested individually with the support team members playing the role of typical operating crew members at the plant.

iii) The maximum number of persons in the support team is limited to the number of persons expected to respond, in the control room and in the field, to a transient when the plant is manned with the absolute minimum shift complement, as defined by the staffing document referred to in the plant's Power Reactor Operating Licence.

iv) Restrictions are placed on the performance of support team members, when compared to the performance of an actual operating crew at the plant. Restrictions may also be placed on the number of support team members available in the control room. Such restrictions are necessary to give the candidates the opportunity to demonstrate that they have acquired specific elements of knowledge and skills.

v) Candidates are expected to respond to the succession of abnormal plant conditions, failures or transients in a CTS according to the specific performance expectations of plant management for the SS position.

vi) During CTSs, candidates should:

(1) clearly indicate, either by pointing at the appropriate panel indicators, CRT displays or alarm windows, or by stating out loud, the checks of indications and system parameters performed on the control room panels to diagnose malfunctions and to select operating procedures. Similarly, candidates should clearly indicate the checks that are being made in accordance with the expectations of plant management during the implementation of operating procedures and when taking any corrective action.

Note: Candidates are **not expected** to verbalize their reasoning when diagnosing abnormal plant conditions, failures or transients, when determining the operating procedures to be used or when performing any action. Similarly, the candidates are **not expected** to state the rationale for the actions and checks being performed.

(2) make an independent diagnosis of the abnormal plant conditions, failures or transients that must be addressed;

(3) direct the support team to the operating procedures to be followed in each of these abnormal plant conditions, failures or transients;

(4) direct the execution of the required actions and checks by the support team in the event of any occurrence not specifically addressed by the approved operating procedures.

vii) The performance of the candidates will be recorded by the examiners on a checklist in the approved CTS examiner's guide.

viii) Each CTS has a clearly defined end point specified in its examiner's guide.

1c) Question Period

i) At the end of a CTS, the lead examiner will ask the candidates the two questions in part A of Appendix A.14. Candidates will have access to operating documentation for answering these questions.

ii) When this questioning is complete, the lead examiner may ask supplementary questions to the candidates, as necessary, to clarify unexpected performance observed during the simulation of the CTS.

2 ATSs

An ATS is a test scenario consisting of a number of Primary and Secondary Malfunctions that simulates a number of abnormal plant conditions, failures or transients and that requires SS candidates to demonstrate their ability to respond to these abnormal situations when the RO is temporarily absent from the control room. Each ATS comprises the following parts:

2a) Turnover

The turnover for an ATS is identical to that for a CTS.

2b) Simulation of the ATS

i) The dynamic duration of an ATS should not significantly exceed 25 minutes.

ii) Candidates are tested individually with the support team members playing the role of typical operating crew members at the plant when the RO is temporarily absent from the control room.

iii) Restrictions on support team members are identical to those for a CTS.

iv) Candidates are expected to respond to the succession of abnormal plant conditions, failures or transients in an ATS according to the specific performance expectations of plant management for the SS position, when the RO is temporarily absent from the control room.

v) During ATSs, candidates should:
   (1) clearly indicate the checks they perform on the control room panels, as specified for CTSs under paragraph 1b) vi)(1);
   (2) diagnose the abnormal plant conditions, failures or transients that must be addressed;
   (3) perform the RO actions in response to each of these abnormal plant conditions, failures or transients;
   (4) direct the support team as during CTSs.

vi) The performance of the candidates will be recorded by the examiners on a checklist in the approved ATS examiner's guide.

vii) Each ATS has a clearly defined end point specified in its examiner's guide.

2c) Question Period

Identical to the question period conducted at the end of a CTS.

C) Rules of Conduct

a) Candidates must remain in the control room at the simulator during the conduct of any test scenario until given permission to leave by the lead examiner.

b) Candidates must hand over to the lead examiner all material related to the examination before leaving the control room.

d) Candidates may voluntarily withdraw at any time during the conduct of the examination. Such an action automatically results in a fail result.

A.18 C: Briefing of the SS Candidates at Multi-unit Plants

The purpose of this briefing by the lead examiner is to communicate to the candidates, before the examination begins, some general information regarding the examination and to review with them the rules they must abide by and what they will be expected to do during the conduct of each type of test scenario.

A) Introduction

The lead examiner covers the following points of general interest:

a) Introduction of the examination team members with a general description of their behaviour during the examination.

b) Introduction of the support team members with an explanation of their roles during the examination.

c) Overall duration and general characteristics of the examination.

B) Types of Test Scenarios and Performance Expected of the Candidates

The lead examiner describes to the candidates the main characteristics of the three types of test scenarios and the performance expected of them during each type of test scenario.

1 CTSs

A CTS is a test scenario consisting of an integrated sequence of Primary and Secondary Malfunctions that simulates a succession of abnormal plant conditions, failures or transients and that requires candidates to demonstrate their skills in each of the five competency areas measured by the examination.
Each CTS comprises the following parts:

1a) Turnover

i) Candidates will be given a written turnover describing the initial plant conditions for the test scenario. It will specify the initial conditions of the simulated units, including the equipment out of service, and other applicable plant conditions. It will also specify where each member of the control room support team will be at the start of the test scenario. The lead examiner will also describe these conditions to the candidates.

ii) All equipment that is out of service will be identified on the control room panels according to approved plant procedures. There will be no abnormal conditions other than those mentioned in the turnover until the simulation of the test scenario begins.

iii) Candidates will be given a maximum of five minutes to review control panels and alarm summaries. During this time, they may ask the lead examiner any question they have regarding plant conditions.

iv) The test scenario will begin after the five minutes have elapsed or sooner at the candidate's request.

1b) Simulation of the CTS

i) The dynamic duration of a CTS should not significantly exceed 50 minutes.

ii) Candidates are tested individually with the support team members playing the role of typical operating crew members at the plant.

iii) The maximum number of persons in the support team is limited to the number of persons expected to respond, in the control room and in the field, to a transient on a single unit when the plant is manned with the absolute minimum shift complement, as defined by the staffing document referred to in the plant's Power Reactor Operating Licence.

iv) The number of support team members available to the candidates in the control room and in the field takes into account the conditions of the other units specific to the scenario.

v) Restrictions are placed on the performance of support team members, when compared to the performance of an actual operating crew at the plant. Restrictions may also be placed on the number of support team members available in the control room. Such restrictions are necessary to give the candidates the opportunity to demonstrate that they have acquired specific elements of knowledge and skills.

vi) Candidates are expected to respond to the succession of abnormal plant conditions, failures or transients in a CTS according to the specific performance expectations of plant management for the SS position.

vii) During CTSs, candidates should:

(1) clearly indicate, either by pointing at the appropriate panel indicators, CRT displays or alarm windows, or by stating out loud, the checks of indications and system parameters performed on the control room panels to diagnose malfunctions and to select operating procedures. Similarly, candidates should clearly indicate the checks that are being made in accordance with the expectations of plant management during the implementation of operating procedures and when taking any corrective action.

Note: Candidates are **not expected** to verbalize their reasoning when diagnosing abnormal plant conditions, failures or transients, when determining the operating procedures to be used or when performing any action. Similarly, the candidates are **not expected** to state the rationale for the actions and checks being performed.

(2) make an independent diagnosis of the abnormal plant conditions, failures or transients that must be addressed;

(3) direct the support team to the operating procedures to be followed in each of these abnormal plant conditions, failures or transients;

(4) direct the execution of the required actions and checks by the support team in the event of any occurrence at the reactor unit or at unit 0 not specifically addressed by the approved operating procedures.

viii) During part of one CTS, the candidates will be required to give detailed instructions to the support team on the course of actions to be taken in a situation that necessitates a prompt execution of a complex sequence of operator actions because the RO or the U0O will request assistance from the SS. Candidates are then expected to specify in their instructions to the members of the support team all the necessary operations and checks in the control room and in the field for completing each action, including the specific devices to be operated and the displays, trends or indicators to be used.

ix) The performance of the candidates will be recorded by the examiners on a checklist in the approved CTS examiner's guide.

x) Each CTS has a clearly defined end point specified in its examiner's guide.

1c) Question Period

i) At the end of a CTS, the lead examiner will ask the candidates the two questions in part A of Appendix A.14. Candidates will have access to operating documentation for answering these questions.

ii) When this questioning is complete, the lead examiner may ask supplementary questions to the candidates, as necessary, to clarify unexpected performance observed during the simulation of the CTS.

2 DTSs

A DTS is a test scenario consisting of a single Primary Malfunction and a number of Secondary Malfunctions which requires the candidates to demonstrate their ability to independently monitor the evolution of plant conditions, recognize abnormalities, determine their significance, diagnose malfunctions, and select the relevant procedures to address them or determine the required course of actions when procedures do not exist or are deficient. Each DTS comprises the following parts:

2a) Turnover

The turnover for a DTS is identical to that for a CTS.

2b) Simulation of the DTS

i) The dynamic duration of a DTS should not significantly exceed 15 minutes.

ii) Candidates are tested individually with the assistance in the control room of one or two support team members playing the role of the RO and, where applicable, of the U0O. These will respond to any specific request from the candidates:
   (1) to call up a display, trend, annunciation number or alarm summary;
   (2) to acknowledge and reset alarms;
   (3) to execute corrective actions when a major automatic action fails to occur;
   (4) to obtain a particular procedure;
   (5) to obtain information in the control equipment room or from the field.

iii) Restrictions are placed on the number of support team members in the control room and on their individual performance to give the candidates the opportunity to demonstrate their ability to independently monitor the evolution of plant conditions, recognize abnormalities and diagnose malfunctions.

iv) During the dynamic part of a DTS, candidates are expected to independently monitor the evolution of plant conditions, recognize abnormalities, direct the execution of the required corrective actions when a major automatic action fails to occur, and diagnose the main abnormal plant condition, failure or transient that must be addressed.

v) Candidates may refer to operating documentation, according to the specific performance expectations of plant management for the SS position, when responding to the conditions of a DTS and performing their diagnosis.

vi) Any field information requested by the candidates to complete their diagnosis will be given after the minimum time that would be required at the plant to obtain this information has elapsed, as specified in the examiner's guide. For field information that is essential to make the correct diagnosis, the information may be reported back to a candidate, as soon as the candidate has made all expected control room checks relevant to the diagnosis and is waiting for that field information to complete the diagnosis.

vii) The simulation of a DTS will be stopped when the unit conditions necessary to perform the correct diagnosis have been reached and sufficient time has been allowed for a typically qualified SS to make this diagnosis, as specified in the approved DTS examiner's guide.

viii) The actions and checks performed by the candidates during the dynamic part of a DTS will be recorded by the examiners on a checklist in the examiner's guide. This checklist includes the actions and checks required to complete a logical diagnosis.

ix) During DTSs, candidates should clearly indicate the checks they perform on the control room panels, as specified for CTSs under paragraph 1b) vii)(1).

2c) Question Period

i) At the end of a DTS, the lead examiner will ask the candidates the five questions in part B of Appendix A.14, modified as appropriate to reflect the actual conditions of the scenario. Candidates will have access to operating documentation for answering these questions.

ii) When this questioning is complete, the lead examiner may ask supplementary questions to the candidates, as necessary, to clarify unexpected performance observed during the simulation of the DTS.

3 PCTS

A PCTS is a test scenario during which plant conditions are stable and that requires candidates to demonstrate their ability to perform verifications of control room panels relevant to the SS position, by recognizing panel anomalies or abnormal conditions and by determining their significance. The PCTS also requires candidates to demonstrate their ability to determine the required course of actions to address these anomalies and abnormal conditions.

A PCTS consists of one verification task to be performed by the candidates that relate to the responsibilities of the SS such as independent verification of system operating configurations and unit state; verification of system, unit and plant conditions before granting approvals; verification of available heat sinks.

The PCTS comprises the following parts:

3a) Introduction

i) Candidates will be given a written turnover describing the initial plant conditions for the test scenario. It will specify the initial conditions of the simulated units, including the equipment out of service, and other applicable plant conditions. The lead examiner will also describe these conditions to the candidates.

ii) Candidates will also be given a written statement of the specific verification task that they are required to perform. The lead examiner will also describe the task to the candidates.

iii) All equipment out of service will be identified on the control room panels according to approved plant procedures. In this type of scenario however, there will be panel anomalies not mentioned in the form. These panel anomalies may indicate situations such as abnormal system configurations, impairments of special safety systems or of standby safety support systems, a violation of a requirement in the OP&Ps, or problems related to the control of reactor power, cooling of the fuel or containment of radioactivity.

iv) The lead examiner will inform the candidates of the maximum time, specified in the approved PCTS examiner's guide, allowed for reviewing and performing the verification task. No time will be allowed to review the control room panels before the start of the test scenario.

3b) Simulation of the PCTS

i) The time required to complete the selected task should not significantly exceed 15 minutes.

ii) Candidates are tested individually and without assistance.

iii) Candidates are expected to independently perform the task, according to the applicable specific performance expectations of plant management for the SS position, and to identify the existing panel anomalies.

iv) Any field information requested by the candidates to assess the abnormal condition associated with a panel anomaly will be given immediately by the lead examiner.

v) This part of the PCTS will be stopped when the maximum time allowed to complete the verification task has expired, or earlier if the candidates indicate to the lead examiner that they have completed the task.

3c) Question Period

i) At the end of the PCTS, the lead examiner will ask the candidate what panel anomalies or abnormal conditions were found (question 1 in part C of Appendix A.14).

ii) When this question has been answered, the lead examiner will give the candidate a copy of questions 2 and 3 in part C of Appendix A.14. Candidates will then be given up to 10 minutes to prepare to answer these questions orally, with access to operating documentation.

iii) Finally, the lead examiner may ask supplementary questions to the candidate, as necessary, to clarify unexpected performance observed during the PCTS.

C) Rules of Conduct

a) Candidates must remain in the control room at the simulator during the conduct of any test scenario until given permission to leave by the lead examiner.

b) Candidates must hand over to the lead examiner all material related to the examination before leaving the control room.

e) Candidates may voluntarily withdraw at any time during the conduct of the examination. Such an action automatically results in a fail result.

A.19 Test Scenario Abort Guidelines

The lead examiner can abort a CTS, an ATS or a DTS when one of the following conditions arise.

1. The candidate or the lead examiner must leave the simulator due to unforeseen circumstances.

2. A member of the support team, the simulator operator or the second examiner has to leave the simulator during the test scenario and the absence of the person jeopardizes the reliable assessment of the performance of the candidate.

3. Any failure of data collection devices that jeopardizes a reliable and auditable assessment of the performance of the candidate.

4. A simulator fault causes a significant unexplainable deviation, seen by the candidate, between the response of the systems at the simulator and that which would occur at the reference unit.

5. Any occurrence that changes the planned evolution of the test scenario to such an extent that the Candidate Action Checklist in the approved examiner's guide can no longer be used to reliably record the performance of the candidate.

A.20 Critical and Significant Errors

The critical and significant errors described below are used for assessing the seriousness of omissions of, or deviations from, expected actions and checks by RO, U0O and SS candidates. The following criteria must be met to assign a critical or a significant error to a candidate:

a) The performance of the candidate is described unambiguously by the applicable critical or significant error.

b) There is no doubt that the candidate made the error.

c) For those errors associated with a failure to properly respond to a condition, the candidate had sufficient time and information to detect the condition and to respond as expected to that condition, considering other existing plant conditions and the performance expectations of plant management for the position sought by the candidate.

The lists of critical and significant errors will be reviewed periodically and revised as necessary, based on feedback from the CNSC or from the licensees.

Note The type of test scenario for which each error is applicable is indicated at the end of each error statement.

A) Critical Error.

A critical error is made when a candidate:

C.1 Caused a level 1 or 2 impairment of a Special Safety System, unless directed to do so by a relevant operating procedure that took priority under the prevailing conditions. (CTSs and ATSs)

C.2 Failed to take or initiate, in a timely manner, all required actions following a level 1 or 2 impairment of a Special Safety System, taking into consideration competing priorities. (CTSs and ATSs)

C.2a Failed to determine, in a timely manner, all required actions following a level 1 or 2 impairment of a Special Safety System. (DTSs and PCTSs)

C.3 Caused a Standby Safety Support System to become unavailable or totally ineffective, unless the prevailing conditions justified taking such an action. (CTSs and ATSs)

C.4 Failed to take or initiate, in a timely manner, all required actions when a Standby Safety Support System became unavailable or totally ineffective, taking into consideration competing priorities. (CTSs and ATSs)

C.4a Failed to determine, in a timely manner, all required actions when a Standby Safety Support System was unavailable or totally ineffective. (DTSs and PCTSs)

C.5 Caused a process system transient that led to the actuation of a Special Safety System, unless the prevailing conditions justified taking such an action or the process system in question, due to a design limitation or deficiency, is overly sensitive to transients under the prevailing conditions. (CTSs and ATSs)

C.6 Did not take any corrective action in response to a process system transient, when the appropriate course of actions was clear and ample time was available to take those actions, and this led to the actuation of a Special Safety System. (CTSs and ATSs)

C.7 Caused a process system transient or a condition that resulted in the violation of one or more OP&P requirements related to the control of reactor power, the cooling of the fuel or the containment of radioactivity, unless the prevailing conditions justified taking such an action or the process system in question, due to a design limitation or deficiency, is overly sensitive to transients under the prevailing conditions. (CTSs and ATSs)

C.8 Failed to take or initiate, in a timely manner, all required actions when one or more OP&P requirements related to the control of reactor power, the cooling of the fuel or the containment of radioactivity were not met. (CTSs and ATSs)

C.8a Failed to determine, in a timely manner, all required actions when one or more OP&P requirements related to the control of reactor power, the cooling of the fuel or the containment of radioactivity were not met. (DTSs and PCTSs)

C.9 Failed to perform, in a timely manner, all required checks to determine whether or not a Special Safety System was operating or had operated effectively after it had been actuated. (CTSs, ATSs and DTSs)

C.10 Failed to perform, in a timely manner, all required checks to determine that reactor power was being adequately controlled following a reactor setback or stepback, or following an occurrence that had caused a significant change in reactor power, unless a reactor trip had occurred. (CTSs, ATSs and DTSs)

B) Significant Error

A significant error is made when the candidate:

S.1 Caused a level 3 impairment of a Special Safety System, unless directed to do so by a relevant operating procedure that took priority under the prevailing conditions. (CTSs and ATSs)

S.2 Failed to take or initiate, in a timely manner, all required actions following a level 3 impairment of a Special Safety System, taking into consideration competing priorities. (CTSs and ATSs)

S.2a Failed to determine, in a timely manner, all required actions following a level 3 impairment of a Special Safety System. (DTSs and PCTSs)

S.3 Caused a process system transient that led to the initiation of a reactor setback, a reactor stepback, a turbine-generator trip or a main generator load rejection, or to the actuation of a Standby Safety Support System, unless the prevailing conditions justify taking such an action or the process system in question, due to a design limitation or deficiency, is overly sensitive to transients under the prevailing conditions. (CTSs and ATSs)

S.4 Did not take any corrective action in response to a process system transient, when the appropriate course of actions was clear and ample time was available to take those actions, and this led to the initiation of a reactor setback, a reactor stepback, a turbine-generator trip or a main generator load rejection, or to the actuation of a Standby Safety Support System. (CTSs and ATSs)

S.5 Did not take all corrective actions in response to a process system transient, when the course of actions to be taken was clear and ample time was available to take those actions, and this led to the actuation of a Special Safety System. (CTSs and ATSs)

S.6 Caused an unwarranted actuation of a Special Safety System. (CTSs and ATSs)

S.7 Caused an unwarranted initiation or actuation of a reactor setback or stepback, of a turbine-generator trip or of a main generator load rejection. (CTSs and ATSs)

S.8 Failed to take or initiate, in a timely manner, all required actions when one or more OP&P requirements, other than those related to the control of reactor power, the cooling of the fuel or the containment of radioactivity, were not met. (CTSs and ATSs)

S.8a Failed to determine, in a timely manner, all required actions when one or more OP&P requirements, other than those related to the control of reactor power, the cooling of the fuel or the containment of radioactivity, were not met. (DTSs and PCTSs)

S.9 Caused a process system transient or a condition that resulted in the violation of one or more OP&P requirements, other than those related to the control of reactor power, the cooling of the fuel or the containment of radioactivity, unless the prevailing conditions justified taking such an action or the process system in question, due to a design limitation or deficiency, is overly sensitive to transients under the prevailing conditions. (CTSs and ATSs)

S.10 Failed to perform, in a timely manner, all required checks to determine whether or not a reactor setback, a reactor stepback, a turbine-generator trip, a main generator load rejection, or an actuation of a Standby Safety Support System was occurring or had occurred effectively as required, taking into consideration competing priorities. (CTSs, ATSs and DTSs)

S.11 Caused an emergency condition as defined under category 4 Primary Malfunctions in Appendix A.5, unless the prevailing conditions justified taking such an action or the process system in question, due to a design limitation or deficiency, is overly sensitive to transients under the prevailing conditions. (CTSs and ATSs)

S.12 Failed to take or initiate, in a timely manner, the appropriate corrective or preventive actions when plant conditions are such that they threaten plant personnel safety or public safety. (CTSs and ATSs)

S.13 Negligently exposed plant personnel to hazards that could seriously endanger their health. (CTSs and ATSs)

A.21 Critical or Significant Error Assessment Form

Candidate's Name: **Examination Date:**

Competency Area:

Error Description:

Error Categorization

The error described above is considered to be critical error no.:

Or

The error described above is considered to be significant error no.:

See Appendix A.20, section A or section B for the definition of this error.

Justification:

Examiners:

[Name] **[Name]**

A.22 Calculation of Examination Scores

This appendix describes how to calculate the various scores used for assessing the performance of a candidate in an examination from the consolidated Candidate Action Checklists of the candidate.

A) The Score for a Generic Performance Expectation in the Entire Examination

This score is obtained by dividing the total number of items associated with a given generic performance expectation that have been credited to a candidate in all consolidated Candidate Action Checklists by the total number of such items in those checklists.

B) The Score for a Competency Area in a Test Scenario

This score is obtained by dividing the weighted sum of all items associated with the generic performance expectations in a given competency area that have been credited to a candidate in the consolidated Candidate Action Checklist for a given test scenario by the weighted sum of all such items in that checklist.

The weighted sum is obtained by summing all relevant items, each multiplied by the weighting factor for the associated generic performance expectation.

C) The Score for a Competency Area in an Entire Examination

This score is obtained by dividing the weighted sum of all items associated with the generic performance expectations in a given competency area that have been credited to a candidate in all consolidated Candidate Action Checklists by the weighted sum of all such items in those checklists.

A.23 Simulator-based Examination Result Form

Candidate's Name: **Employee Number:**
Candidate's Position:
Plant:
Examination Date:

Examination Result:

Justification of the Result:

Deficiencies Requiring Remedial Training:
(for a conditional pass only)

Examiners:

_____ _____
[Name] **[Name]**

Authorized by:

_____ _____
[Name] **Date**
Training Manager