

# 2017 Region III OL Workshop

Operating Test Changes  
NUREG 1021, Revision 11  
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# Sections

- ES-301: Preparing Initial Operating Tests
- ES-302: Administering Operating Tests
- ES-303: Documenting and Grading Initial Operating Tests
- Appendix C: JPM Guidelines
- Appendix D: Simulator Testing Guidelines

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# Preparing Op Tests (ES-301)

- Terminology
  - JPM and walkthrough mean the same thing
  - Simulator operating test = simulator test, which consists of a set of simulator scenarios
  - Simulator scenario consists of a set of events
- Admin JPMs are typically administered in a classroom walkthrough format
- Facility Licensee Responsibilities
  - Prepare and Review *proposed* material instead of final material
  - If requested/coordinated, meet with the NRC exam team to review comments otherwise, do over the phone with the NRC chief examiner
  - Make the simulation facility available for NRC examiners to develop/validate the op tests (for NRC developed exams) and the onsite validation visit
- All SRO Admin JPMS MUST be written at the SRO level

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# Preparing Op Tests (ES-301) cont'd

- Simulator Op Test Overlap Criteria:
  - Every scenario MUST be new or significantly modified
  - Significantly modified means that for each scenario, at least two events have not been used on the previous 2 NRC exams
  - Reactivity manipulation events are exempt from this overlap limit
- Events that do not require an operator to take one or more ~~substantive~~ verifiable actions will not count toward the minimum number of events required for each operator

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# Preparing Op Tests (ES-301) cont'd

- Chief examiners and exam writers should ensure that each scenario includes at least two preidentified critical tasks
- Applicants should be evaluated on a similar number of preidentified critical tasks

# Form ES-301-4 Changes

ES-301

Simulator Scenario Quality Checklist

Form ES-301-4

Facility:	Date of Exam:	Scenario Numbers: / /	Operating Test No.:		
<b>QUALITATIVE ATTRIBUTES</b>			Initials		
			a	b*	c#
1. The initial conditions are realistic in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.					
2. The scenarios consist mostly of related events.					
3. Each event description consists of the following: <ul style="list-style-type: none"> <li>• the point in the scenario when it is to be initiated</li> <li>• the malfunction(s) or conditions that are entered to initiate the event</li> <li>• the symptoms/cues that will be visible to the crew</li> <li>• the expected operator actions (by shift position)</li> <li>• the event termination point (if applicable)</li> </ul>					
4. The events are valid with regard to physics and thermodynamics.					
5. Sequencing and timing of events is reasonable and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.					
6. If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.					
7. The simulator modeling is not altered.					
8. The scenarios have been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.					
9. Scenarios are new or significantly modified in accordance with Section D.5 of ES-301.					
10. All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).					
11. The scenario set provides the opportunity for each applicant to be evaluated in each of the applicable rating factors. (Competency rating factors as described on Forms ES-303-1 and ES-303-3.)					
12. Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).					
13. Applicants are evaluated on a similar number of preidentified critical tasks across scenarios, when possible.					
14. The level of difficulty is appropriate to support licensing decisions for each crew position.					
<b>Target Quantitative Attributes per Scenario (See Section D.5.d)</b>			Actual Attributes	-	-
1. Malfunctions after EOP entry (1-2)			/ /		
2. Abnormal events (2-4)			/ /		
3. Major transients (1-2)			/ /		
4. EOPs entered/requiring substantive actions (1-2)			/ /		
5. Entry into a contingency EOP with substantive actions (≥ 1 per scenario set)			/ /		
6. Preidentified critical tasks (≥ 2)			/ /		
* The facility licensee signature is not applicable for NRC-developed tests.					
# An independent NRC reviewer initials items in column "c"; chief examiner concurrence is required.					





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# Preparing Op Tests (ES-301) cont'd

- Facility Licensee Management Review: If the facility licensee prepared the operating test, a supervisor or manager familiar with both the exam contents and the examination standards in this NUREG shall independently review the preliminary outline and the proposed test before they are submitted to the NRC regional office for review and approval in accordance with ES- 201
- NRC Examiner Review: The chief examiner shall determine the acceptability of the submitted operating test by reviewing every JPM and simulator operating test scenario using Form ES-301-7





# New Form: ES-301-7

## Operating Test Review Worksheet p.2

Facility:				Scenario:					Exam Date:
1	2	3	4	5	6	7	8	9	10
Event	Realism/Cred.	Required Actions	Verifiable actions	LOD	TS	CTs	Scen. Overlap	U/E/S	Explanation

**Instructions for Completing This Table:**

Use this table for each scenario for evaluation.

2 Check this box if the events are not related (e.g., seismic event followed by a pipe rupture) OR if the events do not obey the laws of physics and thermodynamics.

3, 4 In columns 3 and 4, check the box if there is no verifiable or required action, as applicable. Examples of required actions are as follows: (ES-301, D.5f)

- opening, closing, and throttling valves
- starting and stopping equipment
- raising and lowering level, flow, and pressure
- making decisions and giving directions
- acknowledging or verifying key alarms and automatic actions (Uncomplicated events that require no operator action beyond this should not be included on the operating test unless they are necessary to set the stage for subsequent events. (Appendix D, B.3).)

5 Check this box if the level of difficulty is not appropriate.

6 Check this box if the event has a TS.

7 Check this box if the event has a critical task (CT). If the same CT covers more than one event, check the event where the CT started only.

8 Check this box if the event overlaps with another event on any of the last two NRC examinations. (Appendix D, C.1.f)

9 Based on the reviewer's judgment, is the event as written (U)nacceptable (requiring repair or replacement), in need of (E)nhancement, or (S)atisfactory? Mark the answer in column 9.

10 Record any explanations of the events here.

In the shaded boxes, sum the number of check marks in each column.

- In column 1, sum the number of events.
- In columns 2–4, record the total number of check marks for each column.
- In column 5, based on the reviewer's judgement, place a checkmark only if the scenario's LOD is not appropriate.
- In column 6, TS are required to be  $\geq 2$  for each scenario. (ES-301, D.5.d)
- In column 7, preidentified CTs should be  $\geq 2$  for each scenario. (Appendix D; ES-301, D.5.d; ES-301-4)
- In column 8, record the number of events not used on the two previous NRC initial licensing exams. A scenario is considered unsatisfactory if there is  $< 2$  new events. (ES-301, D.5.b; Appendix D, C.1.f)
- In column 9, record whether the scenario as written (U)nacceptable, in need of (E)nhancement, or (S)atisfactory from column 11 of the simulator scenario table.

# New Form: ES-301-7

## Operating Test Review Worksheet p.3

Facility:									Exam Date:
Scenario	1 Event Totals	2 Events Unsat.	3 TS Total	4 TS Unsat.	5 CT Total	6 CT Unsat.	7 % Unsat. Scenario Elements	8 U/E/S	11 Explanation

**Instructions for Completing This Table:**

Check or mark any item(s) requiring comment and explain the issue in the space provided.

1, 3, 5 For each simulator scenario, enter the total number of events (column 1), TS entries/actions (column 3), and CTs (column 5). This number should match the respective scenario from the event-based scenario tables (the sum from columns 1, 6, and 7, respectively).

2, 4, 6 For each simulator scenario, evaluate each event, TS, and CT as (S)atisfactory, (E)nhance, or (U)nsatisfactory based on the following criteria:

- a. **Events.** Each event is described on a Form ES-D-2, including all switch manipulations, pertinent alarms, and verifiable actions. Event actions are balanced between at-the-controls and balance-of-plant applicants during the scenario. All event-related attributes on Form ES-301-4 are met. Enter the total number of unsatisfactory events in column 2.
- b. **TS.** A scenario includes at least two TS entries/actions across at least two different events. TS entries and actions are detailed on Form ES-D-2. Enter the total number of unsatisfactory TS entries/actions in column 4. (ES-301, D.5d)
- c. **CT.** Check that a scenario includes at least two preidentified CTs. This criterion is a target quantitative attribute, not an absolute minimum requirement. Check that each CT is explicitly bounded on Form ES-D-2 with measurable performance standards (see Appendix D). Enter the total number of unsatisfactory CTs in column 6.

7 In column 7, calculate the percentage of unsatisfactory scenario elements:  $\left(\frac{2 + 4 + 6}{1 + 3 + 5}\right) 100\%$

8 If the value in column 7 is > 20%, mark the scenario as (U)nsatisfactory in column 8. If column 7 is ≤ 20%, annotate with (E)nhancement or (S)atisfactory.

9 In column 9, explain each unsatisfactory event, TS, and CT. Editorial comments can also be added here.

Save initial review comments and detail subsequent comment resolution so that each exam-bound scenario is marked by a (S)atisfactory resolution on this form.

# New Form: ES-301-7

## Operating Test Review Worksheet p.4

Site name:				Exam Date:		
OPERATING TEST TOTALS						
	Total	Total Unsat.	Total Edits	Total Sat.	% Unsat.	Explanation
Admin. JPMs						
Sim./In-Plant JPMs						
Scenarios						
Op. Test Totals:						
<p><b>Instructions for Completing This Table:</b></p> <p>Update data for this table from quality reviews and totals in the previous tables and then calculate the percentage of total items that are unsatisfactory and give an explanation in the space provided.</p> <ol style="list-style-type: none"> <li>Enter the total number of items submitted for the operating test in the "Total" column. For example, if nine administrative JPMs were submitted, enter "9" in the "Total" items column for administrative JPMs. For scenarios, enter the total number of simulator scenarios.</li> <li>Enter the total number of (U)nsatisfactory JPMs and scenarios from the two JPMs column 5 and simulator scenarios column 8 in the previous tables. Provide an explanation in the space provided.</li> <li>Enter totals for (E)nhancements needed and (S)atisfactory JPMs and scenarios from the previous tables. This task is for tracking only.</li> <li>Total each column and enter the amounts in the "Op. Test Totals" row.</li> <li>Calculate the percentage of the operating test that is (U)nsatisfactory (<math>\text{Op. Test Total Unsat.} / \text{Op. Test Total}</math>) and place this value in the bolded "% Unsat." cell. <ul style="list-style-type: none"> <li>Refer to ES-501, E.3.a, to rate the overall operating test as follows: <ul style="list-style-type: none"> <li>satisfactory, if the "Op. Test Total" "% Unsat." is <math>\leq 20\%</math></li> <li>unsatisfactory, if "Op. Test Total" "% Unsat." is <math>&gt; 20\%</math></li> </ul> </li> </ul> </li> <li>Update this table and the tables above with post-exam changes if the "as-administered" operating test required content changes, including the following: <ul style="list-style-type: none"> <li>The JPM performance standards were incorrect.</li> <li>The administrative JPM tasks/keys were incorrect.</li> <li>CTs were incorrect in the scenarios (not including postscenario critical tasks defined in Appendix D).</li> <li>The EOP strategy was incorrect in a scenario(s).</li> <li>TS entries/actions were determined to be incorrect in a scenario(s).</li> </ul> </li> </ol>						

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# Administering Operating Tests (ES-302)

- Applicant withdrawal prior to completion of operating test – submit request to regional office (10 CFR 55.5)
- If facility licensee withdraws , the application is considered incomplete and will not be evaluated further by the NRC
- In either case, 10 CFR 55.35(a) is not applicable

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# Administering Operating Tests (ES-302)

cont'd

- For simulator scenarios, a single NRC examiner **SHALL** be assigned to evaluate the same applicant
- For exam efficiency or to minimize the use of surrogates, it may be acceptable for another examiner, other than the examiner of record, to administer one of the scheduled scenarios provided that the examiner of record is present during the scenario administration (e.g., examining one of the other applicants) and that the scenario is in addition to the minimum required for that applicant. This exception requires NRC program office approval.



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# Administering Operating Tests (ES-302)

cont'd

- NRC chief examiner ensures that the licensee develops an efficient schedule
- Facility picks the operating crews, however Chief Examiner may make adjustments with justification
- Clarified that facility licensees are responsible for laws associated with video and audio recording
- Clarified that applicants who preliminarily or finally fail the simulator operator test will be given an opportunity to view the video recording of the test if applicable
  - The facility licensee shall notify the NRC chief examiner before providing this opportunity to an applicant

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# Administering Operating Tests (ES-302)

cont'd

- Added language from a FAQ to explain the reason for limiting the simulator operating test to only one SRO position. Expanded on guidance for SRO duties
- The chief examiner **SHALL** coordinate with the facility to identify, record and retain simulator data recordings for important plant parameters during the simulator operating test scenarios
  - These documents are to be retained until all licensing actions are complete

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# Administering Operating Tests (ES-302)

cont'd

- Emergency classification during/after simulator operating test scenario:
  - Event classification is NOT required to be part of the scenario
  - Event classification does NOT meet the critical task criteria in Appendix D

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# Administering Operating Tests (ES-302)

cont'd

- **Deleted** this example of a reason to run additional scenario for an applicant:  
For example, if an applicant has only one opportunity to demonstrate competence on a particular rating factor, but makes an error that does not affect his or her performance of a critical task, the examiners shall give the applicant another opportunity to demonstrate competence or to make a second error that would justify an unsatisfactory score for the subject rating factor

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# Documenting and Grading Operating Tests (ES-303)

- Terminology: **performance deficiency** replaces error
- Identify the cause of each performance deficiency and code each deficiency with no more than two different Rating Factors. Ensure that the documentation for each performance deficiency appropriately justifies the RF(s) assigned
- Each missed or incorrect Tech Spec entry is a performance deficiency and affects grade
- A TS performance deficiency is not carried forward within the RF 6 area unless follow-up questions reveal additional knowledge deficiencies in these sub-competencies



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# Documenting and Grading Operating Tests (ES-303) cont'd

- Terminology:
  - critical error, critical task error and missed CT all refer to a performance deficiency associated with a CT failure
  - non-critical errors are all other performance deficiencies not associated with a CT failure

# Documenting and Grading Operating Tests (ES-303) cont'd

- Rating Factor Determination:

	No. of Non-Critical Performance Deficiencies			
	1	2	3	4 or more
Communications Competency	3	2	2	1*
All other Competencies	2	1	0	0

	No. of Critical Performance Deficiencies	
	1	
Communications Competency	1*	*Min RF score for Communication
All other Competencies	0	

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# Documenting and Grading Operating Tests (ES-303) cont'd

- Removal of assigning a point back for correct performance after 2 performance deficiencies noted in the same rating factor (sub-competency area)

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# Documenting and Grading Operating Tests (ES-303) cont'd

- ES-303-3 RO Competency Grading Worksheet changes reflect 0-3 grading scale
- ES 303-4 SRO Competency Grading Worksheet changed to reflect 0-3 grading scale and addition of a third sub-competency to Technical Specifications area to reduce overemphasis on Technical Specifications

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# Appendix C JPM Guidelines

- In general, critical steps should consist of verifiable actions
- Some JPM steps may still be critical steps in that they are necessary to meet the task standard but they do not meet the verifiable action definition in ES 301 Attachment 2 (for example, control room JPM requires applicant to direct manual valve manipulation in field)
- Under no circumstances should a control room or in plant JPM consist solely of critical steps that are not verifiable actions



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# Appendix D Simulator Testing Guidelines

- *Should* changed to *shall* or *must*
  - Example: *NRC and facility licensee ~~should~~ shall review each CT to ensure it is objective*
- Term measurable performance indicator is now measurable performance standard
- Added a new qualitative attribute for simulator scenarios: Scenario Overlap:
  - Every scenario must be new or contain at least two events NOT used on the past 2 NRC initial licensing exams
  - Events found in spare scenarios count as previously used if scenario made public in ADAMS
  - Reactivity manipulations are exempt from limit

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# Appendix D Simulator Testing Guidelines

## cont'd

- Quantitative attribute for simulator scenarios: Critical Tasks:
  - The difficulty level **and equitable administration of the operating test** must be considered when assessing the appropriateness of the number of CTs in a scenario or scenario set
  - Deleted references to EOP-based CTs. CTs are CTs and not restricted to EOPs
  - Defined **preidentified CTs**: CTs initially incorporated into the scenario
  - Scenario should be written with at least 2 preidentified CTs
  - Defined **post-scenario CTs**: Additional events that an individual or the crew created that meet the CT methodology determined after the scenario

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# Appendix D Simulator Testing Guidelines

## cont'd

- Critical Tasks methodology:
  - Every error that reveals an operator's competence is considered equal unless it is related to the performance of a CT
  - Clarified how CTs are used in initial licensing exams verses requalification exams
  - Cueing is now initiating cue: an expected signal or notice (indication, alarm communication, procedure step) that designates when a CT should be performed
  - Measurable Performance Indicators is now Measurable Performance Standard

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# Appendix D Simulator Testing Guidelines

## cont'd

- Measurable Performance Standard consists of:
  - Expected action(s)- observable
  - Safety significant boundary conditions
- For preidentified CTs where applicants inaction/incorrect action could result in an unintentional RPS or ESF action:
  - Measureable performance standard is THAT ACTION taken to preclude the actuation
  - Example
- Applicants will be held accountable for errors that are corrected by other members of the crew:
  - Exam team will determine impact of inaction/incorrect action and the measurable performance standard depends on the consequence of the inaction/incorrect action HAD IT NOT BEEN CORRECTED by the crew
  - Example

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# Appendix D Simulator Testing Guidelines

## cont'd

- Taking a preemptive manual action when an automatic action is imminent because of an incorrect action or inaction does not mitigate the initial incorrect action/inaction (in other words, it is still a CT)
  - Example: An applicant fails to manually control pressurizer pressure (where pressure is controllable per the validated scenario), and the pressure reaches a threshold at which the crew initiates a manual trip.
    - >>This is a CT because pressure was intended to be a controllable variable in the scenario guide

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# Appendix D Simulator Testing Guidelines

## cont'd

- Before exam, developers and examiners should make an effort to identify events for which applicant inaction or common applicant error has the potential to result in an automatic RPS or ESF actuation
  - Recommend adding this statement in the scenario guide: *Causing an unnecessary plant trip or ESF actuation may constitute a CT failure. Actions taken by the applicant(s) will be validated using the methodology for critical tasks in Appendix D to NUREG 1021*

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# Appendix D Simulator Testing Guidelines

## cont'd

- Emergency event classifications during simulator scenarios:
  - Not required
  - Improper classifications do not meet CT criteria because applicant not provided performance feedback
- Added CTs to examples ES-D-1 and ES-D-2
- Form ES-D-1: added place to list CTs



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# Questions