

JPM Issues

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Goals

- ▶ For developing any type of JPM, discuss:
 - problems with initiating cue statements
 - problems with the “standard”, i.e., with the “answer key” for JPM procedure steps
 - what constitutes a critical step? Can immediate operator actions qualify as the *only* critical step? Is it acceptable to have one critical step?

Goals

- ▶ For Admin JPMs, discuss:
 - OL Feedback Question # 301.17 (Rad Worker JPMs)
 - Whether the same (identical) admin JPM can be used for ROs and SROs
- ▶ For Alternate Path JPMs, discuss the following:
 - Do “respond to plant conditions” type JPMs qualify as alternate path?
 - Does having to trip a diesel or a pump qualify as alternate path?
 - Choosing 5 instead of 4 or 6

Problems with Initiating Cue Statements

Problems w/ Initiating Cue Statements

- ▶ Statements that inappropriately limit the applicant's actions to only the right answer or path (should not tip-off the applicant to the right or wrong things to do)
- ▶ Statements that don't elicit everything from the applicant that the JPM requires (without leading them to the answer)
- ▶ Statements that include stuff that's more appropriate in the list of initial conditions

INITIAL CONDITIONS:

- 1.** The Unit is being shutdown to cold shutdown.
- 2.** “B” loop of RHR is in Shutdown Cooling with the “B” heat exchanger inlet partially open and the heat exchanger bypass valve fully open.
- 3.** Unit 2 RWL has decreased below +3”.
- 3.** The CBO will handle RC-1, RC-2, and RC-3.

INITIATING CUES:

For “B” loop of RHR, **VERIFY Group 2 and Group 6 Isolations per 34AB-C71-001-2**

INITIAL CONDITIONS:

1. The Unit is being shutdown to cold shutdown.
2. "B" loop of RHR is in Shutdown Cooling with the "B" heat exchanger inlet partially open and the heat exchanger bypass valve fully open.
3. Unit 2 RWL has decreased below +3".
3. The CBO will handle RC-1, RC-2, and RC-3.

INITIATING CUES:

Better

Verify the proper response of the RHR system to the lowering level per 34AB-C71-001-2.

Read the following to trainee.

TASK CONDITIONS:

1. You are an operator in the Work Control Center. PASSPORT (Equipment Tag Out) is not available for use. No historical clearances are available for review.
2. A Clearance has been requested by maintenance to place RBCCW Pump 2C under clearance for pump packing replacement.
3. RBCCW Pumps 2A and 2B will be running.

INITIATING CUE:

The WCC SRO directs you to propose a Clearance Boundary for RBCCW Pump 2C by completing Attachment 4 of OPS-NGGC-1301. The Attachment 4 columns for Sequence, Position, and Equipment/Component are to be filled in. Other columns of Attachment 4 may be filled in later. Your proposed boundary should include a Clearance Information Tag for the control switch.

TASK CONDITIONS:

1. You are an operator in the Work Control Center. PASSPORT (Equipment Tag Out) is not available for use. No historical clearances are available for review.
2. A Clearance has been requested by maintenance to place RBCCW Pump 2C under clearance for pump packing replacement.
3. RBCCW Pumps 2A and 2B will remain running.

INITIATING CUE:

Better

The WCC SRO directs you to propose a Clearance Boundary for RBCCW Pump 2C by completing Attachment 4 of OPS-NGGC-1301, Equipment Clearance procedure.

INITIAL CONDITIONS:

1. Both units are at 100% RTP.
2. All systems are OPERABLE, except for the 1B-B D/G, 0-GO-16 has been completed on all the A train equipment.
3. Maintenance has been completed on the 1B-B D/G and the clearance has been removed.
4. The D/G has been rolled and is in standby alignment using 0-SO-82-2.
5. The AUO at the D/G building has completed Appendix A of 1-SI-OPS-082-007.B and all parameters are within limits.
6. The U1 Control Room AUO has verified breaker 1934 is in the Disconnect position.
7. SI-166.36 is NOT required.
8. D/G-DAQ has been installed per Appendix J.
9. Applicable steps of Appendix J, Monitoring the D/G Starting Air System, completed.
10. Room fire protection is in service.
11. Section 4.0 of 1-SI-OPS-082-007.B is complete.

INITIATING CUES:

1. The U1 US/SRO has reviewed the completed work package for the 1B-B D/G, all that remains is to perform 1-SI-OPS-082-007.B for the PMT.
2. You are an extra unit operator and have been assigned to perform the SI on 1B-B D/G.
3. The PMT requires the AMBIENT MANUAL START method for testing.
4. Notify the US when the test is complete.

Initiating Cue clear??

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All steps shall be performed for this JPM. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

1. Unit 1 is currently stable at 20 %.
2. Control rod Bank D is at 160 steps.
3. RCS boron concentration is 1400 ppm.
4. Core burnup is 600 MWD/MTU.
5. Reactor Engineering has provided following Xenon data:
 $XE_1 = -2430$ pcm
 $XE_2 = -2250$ pcm

INITIATING CUES:

Perform 0-SO-62-7 Appendix E, Reactivity Balance calculation, in preparation for a change in reactor power from 20% with Control Rods at 160 steps on D Bank to 70% with Control Bank D at 228 steps, using a 3%/hour power increase rate.

Repeat info

Problems with the standard,
i.e., the “answer key” for
how a procedure step is
supposed to be performed

Problems with the standard, i.e., the “answer key” for a procedure step

- ▶ Using the same wording for the standard that’s provided in the procedure – – even though the procedure step doesn’t specify the expected actions, checks, and communications, if any.
- ▶ Not including tolerance bands and inappropriate tolerance bands
- ▶ Not including clear and concise grading tools in the body of the JPM

Problems w/ standards

<p><u>STEP 19.:</u> ENSURE 0-HS-82-42, DG 1B-B voltage Regualtor Switch in the Pull-to P-AUTO position</p> <p><u>STANDARD:</u> Operator ensures 0-HS-82-42 in the Pull To PAUTO position.</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP 20.:</u> DECREASE voltage to 6700 volts on 0-EI-82-34 B 0-HS-82-42.</p> <p><u>STANDARD:</u> Operator ensures voltage decreases to 6700 volts on EI-82-34.</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

<p><u>STEP 4.:</u> START RHR Pump A-A with <u>[HS-74-10A]</u>.</p> <p><u>STANDARD:</u> Operator should address making a plant announcement prior to starting 1A-A RHR Pump, Starts pump and verifies RED light LIT on HS, verifies amps.</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
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Better

<p><u>STEP 9.:</u> ENSURE [1-FCV-70-85] Excess Letdown HX CCS FCV is CLOSED.</p> <p><u>NOTE</u> Operator should address the need to have a CV (Concurrent Verifier) present prior to operating the valve.</p> <p><u>STANDARD:</u> Operator takes the HS for 1-FCV-70-85 to CLOSE position (to the left) and verifies green light illuminated and red light dark.</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>CRITICAL STEP</p>
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Tolerance Bands

2. Walk-Through Criteria		--	--	--
a.	<p>Each JPM includes the following, as applicable:</p> <ul style="list-style-type: none"> • initial conditions • initiating cues • references and tools, including associated procedures • reasonable and validated time limits (average time allowed for completion) and specific designation if deemed to be time-critical by the facility licensee • operationally important specific performance criteria that include: <ul style="list-style-type: none"> – detailed expected actions with exact criteria and nomenclature – system response and other examiner cues – statements describing important observations to be made by the applicant – criteria for successful completion of the task – identification of critical steps and their associated performance standards – restrictions on the sequence of steps, if applicable 			

[Form ES-301-3, Item 2.a.]

The JPM shall identify specific *performance standards*, or check points, that will permit the examiner to evaluate successful progress toward completing the task in accordance with the procedural references. Detailed control and indication nomenclature and criteria (e.g., switch positions and meter readings) should be identified whenever possible, even if these criteria are not specified in the procedural step. The JPM should also note any *important observations* that the examinee should make while performing the task.

[Appendix C, Section B.3]

Thumb Rule for Tolerance Bands

<u>Type of Step</u>	<u>Suggested Band</u>
<p>Procedure step provides the value or requires the applicant to use a table to obtain a value; no possibility of interpolation.</p>	<p>None - because this is a direct lookup of a value.</p>
<p>Procedure step requires the applicant to use a table (to determine a value) with the requirement to interpolate.</p>	<p>The JPM standard (for the value that the applicant must choose) should include a +/- band based on the potential rounding error associated between the two values listed in the table.</p>
<p>Procedure step requires the applicant to use a curves or graph (to determine a value)</p>	<p>The JPM standard (for the value the applicant must choose) should include a tolerance band based on the width of the divisions on the curve/graph – or -- bounded by the upper and lower divisions on the graph.</p>

Example

<p>Step 2.2 Determine the volume of makeup desired. Total desired makeup: _____ gal</p> <p><u>STANDARD:</u> Based on existing VCT level and final required VCT level, operator performs the following using the OAC Databook curve or calculation.</p> <p><u>OAC Calculation</u> is made by inserting the Initial and Final levels in Percent then subtract the gallons at each level to determine the batch volume required. For 30% (1127 gal) – 58% (1664 gal) this should be approximately 537 gallons.</p> <p><u>OAC CURVE:</u> Acceptable range is 500 to 600 gallons</p> <p><u>COMMENTS:</u></p>	<p>Critical Step</p> <p>___ SAT</p> <p>___ UNSAT</p>
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Example

<p><u>STEP 16.:</u> [f] Change in Boron Concentration</p> <p>Substep [e] / Boron Worth</p> <p><u>STANDARD:</u> Operator Records change in boron reactivity and determines the Boron Worth pcm/ppm from Figure 7. Substep [e] / -6.25 pcm/ppm Boron worth = 14.4 (Acceptable Range 19.2 – 7.2 pcm)</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
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Critical Steps

What constitutes a critical step?

The JPM must clearly identify the *task standard* (i.e., the predetermined qualitative and/or quantitative outcome) against which task performance will be measured. Every procedural step that the examinee must perform correctly (i.e., accurately, in the proper sequence, and at the proper time) in order to accomplish the task standard shall be identified as a *critical step* and shall have an associated performance standard.

[NUREG 1021, Appendix C, Section B.3]

(i.e., those that if omitted or performed incorrectly would prevent the completion of the task standard)

INITIATING CUES:

The Control Room Supervisor (CRS) has instructed you to depressurize the NC System per step 20 of EP/1/A/5000/E-3 (Steam Generator Tube Rupture).

<p><u>STEP 20:</u> Depressurize NC System using PZR spray as follows: a. Verify normal Pzr spray flow available</p> <p><u>STANDARD:</u> Verifies NC pump A or B in operation to support spray flow.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
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<p><u>STEP 20:</u> b. Verify PZR level – less than 76% (73% ACC)</p> <p><u>STANDARD:</u> Verifies PZR level less than 76 %.</p> <p><u>COMMENTS:</u></p>	<p>Critical Step</p> <p>___ SAT</p> <p>___ UNSAT</p>
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Is having only one critical step acceptable?

Although an operating test does not require every JPM to be alternate path or demonstrate detailed system understanding, simple one-step JPMs or JPMs that only require directly looking up the correct answer are not appropriate.

[NUREG 1021, Appendix C, Section B.3]

Can a JPM *only* test immediate operator actions?

JPMs that incorporate the testing of immediate actions steps from memory are acceptable. However, JPMs should not solely test immediate action steps, and should include testing additional steps or items that are not from memory.

[NUREG 1021, Appendix C, Section B.1.3]

Critical step



<p>STEP 1 : ✓</p>	<p>Perform Immediate actions of 3-ONOP-059.5, SOURCE RANGE NUCLEAR INSTRUMENTATION MALFUNCTION.</p> <p>4.0 IMMEDIATE ACTIONS</p> <p>4.5 Mode 6 – Refueling</p> <p>4.5.1 Malfunction of ONE channel:</p> <ol style="list-style-type: none"> 1. Switch the AUDIO COUNT RATE CHANNEL SELECTOR to the operable source range. 2. Verify at least 2 out of 4 Source Range and Backup NIS (Gamma Metrics) channels are operable, with one Source Range having audible count rate in the Control Room and Containment. <ol style="list-style-type: none"> a. IF the above requirement is not met, THEN suspend all operations involving core alterations OR positive reactivity changes. 3. IF applicable, THEN notify plant personnel of erroneous Containment Evacuation Alarm. 	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STANDARD:</u></p>	<ol style="list-style-type: none"> 1. Switches AUDIO COUNT RATE CHANNEL SELECTOR from N-31 to N-32. 2. Suspends all operations involving core alterations since only one of four source range NIs are operable. * 3. Notifies plant personnel of erroneous Containment Evacuation Alarm <p>Operator may reference procedure to verify / perform actions.</p>	

Standard should prohibit the use of the procedure!!



Admin JPMs

- OL Feedback Question # 301.17 (Rad Worker JPMs)
- Can the same (identical) admin JPM be RO and SRO

OL Feedback Question #301.17

Why are GET-type radiation area, contaminated area, radiological work permit (RWP) JPMs involved in a license exam? These are not discriminatory to a SAFE LICENSED operator. GET should be left to GET and eliminated as a part of the licensing exam.

INITIATING CUES:



You are to do a pre-job brief with the rounds operator and provide the following information:

- What are the minimum dress requirements for entry.
- Assuming the highest current General Area Dose Rate, calculate the maximum stay time before the DAD alarms on dose accumulated.
- Required actions if the DAD alarms on dose accumulated.
- Assuming plant conditions change, determine the minimum General Area Dose Rate which would REQUIRE an HP brief prior to entry.



Answer to Feedback Question #301.17

The regulations currently require the written examination and the operating test to cover a representative sample of the items listed in 10 CFR 55.41/43 (depending on the license level) and 55.45, respectively, to the extent that they are applicable to the facility. With regard to testing GET-type topics, exam developers should strive to write questions or JPMS that test the applicants at a licensed level, such as their response to a problem that would be part of their licensed duties. Refer to FAQ #2 for a discussion of "representative sampling."

As discussed in response to FAQ#15 above, Revision 9 of [NUREG-1021](#) has restructured the walk-through operating test to de-emphasize the administrative topics, particularly for RO applicants. As outlined in Section D.3.a of ES-301, RO applicants will be tested on four, rather than five, administrative tasks, and they generally need not be evaluated on each of the four administrative topics ("Equipment Control," "Radiation Control," or "Emergency Plan" can be omitted by performing two tasks related to "Conduct of Operations"). This affords the test developer greater flexibility in tailoring the content of the test to ROs' job requirements at the facility.

Are rad worker (GET knowledge only) JPMs acceptable?

- ▶ Yes
- ▶ Strive to write a JPM that tests the applicant's knowledge associated with something he/she would encounter *as part of their licensed duties*
 - Gaseous or liquid releases
 - Containment purge
 - Knowledge of component locations (i.e., selecting the right RWP from a group of RWPs) in conjunction with the dose limits, DAD alarms, etc.

INITIAL CONDITIONS:

1. Unit 2 is at 100% power with no significant problems.
2. 34SV-E11-001-2, Residual Heat Removal Pump Operability, is to be performed this shift on "B" Loop RHR pumps.
3. The current OPS RWP is 09-0004.
4. The RWP and HP Survey Maps are available.

INITIATING CUES:

You are assigned to locally perform the pre-start checks for 34SV-E11-001-2, Residual Heat Removal Pump Operability, "B" loop RHR and are to:

- Determine the correct survey map for "B" loop RHR.
- Calculate the maximum stay time before the DAD alarms on dose accumulated, assuming you:
 - remain near the RHR pumps and
 - are at the highest current General Area Dose Rate
- State your required actions if the DAD alarms on dose accumulated.

Rad Control Topic – Admin JPMs

- ▶ IF the proposed JPM requires the applicant to use a survey map, THEN provide copies of the actual in-plant maps, including all the symbols that are normally provided on the in-plant map, i.e., smearable, hot spots, airborne, etc.

INITIAL CONDITIONS:

- The operating crew is preparing to release the Waste Gas Tank 'D'.
- O-RM-90-118A, Waste Gas Radiation Monitor, is inoperable.
- The monthly projected offsite dose limits have not been exceeded.

INITIATING CUES:

You are to identify...

- (4) Who must approve the release if the tank is to be released on the night shift at 2300.
- (5) The required actions to allow a release with O-RM-90-118A out of service.
- (6) The required action if it takes 40 days to get parts to restore the monitor to Operable status.

INITIATING CUES:



1. **DETERMINE** Total Offsite Dose Rate per 73EP-EIP-018-0, “Prompt Offsite Dose Assessment”.

2. **NOTIFY** the SM/ED if:
 - A release is in progress
 - An emergency classification should be addressed

3. **PROVIDE** the Shift Manager with completed:
 - MIDAS Dose Projection “ENN Form” printout
 - TRN-52 form “Meteorological and Radiological Data Entry”

1. An ATWS has occurred with fuel damage.
2. A General Emergency has been declared.
3. You are the Emergency Director.
4. The OSC is manned and requests you to review and approve emergency radiation exposure for the following missions:
 - Mission 1: 3 people have volunteered (Long, Smith, Harms) to rescue someone in the plant; however only 2 rescuers are needed.
 - Mission 2: 1 volunteer (Jones) needs to vent the scram air header.

INITIATING CUES:

- Choose two volunteers to rescue someone in the plant
- Review and approve for TRN-0115, Authorization to Exceed 10CFR20 Limits for the selected individuals (Long, Smith, Harms and Jones)

Topic	Number of Subjects	
	RO	SRO and RO Retakes
"Conduct of Operations"	1 (or 2)	2
"Equipment Control"	1 (or 0)	1
"Radiation Control"	1 (or 0)	1
"Emergency Procedures/Plan"	1 (or 0)	1
Total	4	5

Leaving out the Rad Control topic is an option for the RO applicants

Can the same admin JPM be administered to RO and SRO?

- c. In general, SROs have more administrative responsibilities than ROs, so SRO applicants should be evaluated in greater depth on the administrative topics. RO applicants need only understand the mechanics and intent of the related subjects, as they pertain to tasks at the facility. [ES-301, Section D.3.c]

Topic	Number of Subjects	
	RO	SRO and RO Retakes
“Conduct of Operations”	1 (or 2)	2
“Equipment Control”	1 (or 0)	1
“Radiation Control”	1 (or 0)	1
“Emergency Procedures/Plan”	1 (or 0)	1
Total	4	5

Can the same admin JPM be administered to RO and SRO?

- ▶ *ALL* of the SRO's admin JPMs should not be the same as the RO's admin JPMs; this is unacceptable
- ▶ Typically the "Emergency Procedures/Plan" admin category is always different because of E-plan classification, PARS, etc.
- ▶ For "Equipment Control", "Conduct of Ops", and "Rad Control" categories, the SRO applicants should be tested at a greater depth than the RO applicants
- ▶ No hard and fast rule on how many admin JPMs have to be different

Alternate Path JPMs

“Malfunctions of instrumentation or components that require the examinee to perform actions other than those performed when the system responds normally.”

[NUREG 1021, Appendix C, Section C]

All alternate path JPMs should include the following five characteristics

[NUREG 1021, Appendix C, Section C]

- ▶ Success Path
- ▶ Procedurally Driven
- ▶ Logical Sequence
- ▶ Independent of Crew Dynamics
- ▶ Validated in Advance

Success Path

- ▶ Should have a valid, facility–endorsed success path
 - May require the applicant to analyze initial conditions to determine an alternative method for completing the task, mitigating a system–related problem that occurs during the task, or realigning the system
 - The Operations management team and Exam Development team must agree to the technical validity of the “alternate” path.

Procedurally Driven

- ▶ A procedure should address the actions that are required
 - Alarm response procedure
 - Abnormal or Off-Normal Procedures (or sections of System Operating Procedure)
 - RNO (response not obtained) column
 - generic administrative procedures or documented policies, for example
 - When shifting controls to manual is allowed/required
 - Expectations for manually performing failed automatic actions
 - Conduct of Operations

Logical Sequence

- ▶ The sequence of procedurally driven actions should be logical.
 - For example, during a normal evolution, the examinee would first attempt to correct the problem by referring to the ARP or AOP vs. requiring the applicant to refer to an EOP table or graph
 - Encountering a situation requiring a reactor trip is acceptable
 - should not contain a cascading sequence of malfunctions (mini-scenario), for which several procedures must be used simultaneously

Litmus Test for Alternate Path

- ▶ The actions required to complete the task are different than the procedure actions listed in the initiating cue for the task, i.e.:
 - An alternative method to perform the task OR
 - While performing a task, malfunctions of instrumentation or components occur that require actions other than those performed when the system responds normally

Do “respond-to-plant conditions” JPMs (a.k.a. “no-tell” JPMs) qualify as alternate path?

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is operating at ~46% reactor power, all controls are in AUTOMATIC.

INITIATING CUES:

1. You are the OATC and are to monitor the control board and respond per licensed duties to operating conditions.
2. You will be required to respond, as a *single performer*, to any abnormality that occurs.
3. When any required actions/procedures have been completed notify the SM.

Bam!



Relief Valve fails open !

Relief Valve fails open!

- ▶ What is the “normal” way of responding to the event?
- ▶ What instrumentation or component malfunction *subsequently* occurs that requires a different method of stopping the steam flow?

Do “respond-to-plant conditions” JPMs (a.k.a. “no-tell” JPMs) qualify as alternate path?

- ▶ If a “no-tell” JPM is used, then the event itself should not be considered as the alternate path
- ▶ After the event, IF an additional failure or malfunction occurs, that requires the applicant to use a different way to stop the steam flow, THEN this is an acceptable alternate path JPM

Other examples of alternate path JPMs

- ▶ While performing a diesel surveillance, a high lube oil temperature condition occurs and the auto-trip fails to occur
 - Applicant required to refer to ARP and then manually trip diesel based on Conduct of Ops that an automatic action failed to occur and the operator is **REQUIRED** to make the action occur

How long does the applicant have to trip the diesel?

- ▶ Determining the standard for the critical step of tripping the diesel can be difficult or impossible
 - Not acceptable to allow an indefinite amount of time
 - IF procedures specify a time limitation for lube oil temperature, THEN this should be used as the standard
 - Exam team and Operations management “consensus” is not equal to a “valid facility endorsed success path” that will withhold scrutiny during an appeal
 - Lack of technical basis may preclude using this JPM

Choosing 5 instead of 4 or 6

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A) Alternate path	4-6 / 4-6 / 2-3
(C) Control room	
(D) Direct from bank	$\leq 9 / \leq 8 / \leq 4$
(E) Emergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(EN) Engineered safety feature	- / - / ≥ 1 (control room system)
(L) Low-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$
(N) New or (M) Modified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P) Previous 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R) CA	$\geq 1 / \geq 1 / \geq 1$
(S) Simulator	

Questions?

- ▶ For developing any type of JPM, discuss:
 - problems with initiating cue statements
 - problems with the “standard”, i.e., with the “answer key” for JPM procedure steps
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 - OL Feedback Question # 301.17 (Rad Worker JPMs)
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 - Do “respond to plant conditions” type JPMs qualify as alternate path?
 - Does having to trip a diesel or a pump qualify as alternate path?
 - Choosing 5 instead of 4 or 6