

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				Ref Req Y/N	5. Other		6. B/M/N NRC	7. U/E/S	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Back-ward		Q=K/A	SRO only			
1	H	2	X			X							Y		B	U	see comments modification history for resolutions
2	F	2	X										Y		N	E	1) Weak KA match because KA would have you test ability to determine position from the controller, when question key answer is can only do so locally at the valve. Possible better match would be to ask determine actual position and source of information from control room indications, give them red light lit and not closed alarm, with answers being, for example, "15% open by alarm", "as-indicated on C05 controller", "as-indicated on Foxboro IA system", "as-indicated on PPC". Rewrote stem and answer choices to address comments.
3	H	2											Y		N	S	
4	H	2	X										Y		N	E	Should tighten stem confused over exactly what is required e.g. Are you asking what is required for safe s/d - one train of SIAS, CIAS, and EBFAS. Is power lost to all of this equipment and it all needs to be started or not? Revised stem and answer choices.
5	F	2													M	E	CA-21 indicates trip the reactor and turbine and stop B RCP this seems like only a partially correct answer? Why is Choice A plausible? Stem states check valve for affected RCP closes. Why would an applicant reasonably think it would block flow from other RCPs? 2) Why is Choice C plausible? Again, why would remaining unaffected RCP bleedoff flow have to be redirected? We just stopped affected pump bleedoff. 3) Recommend change stem question to replace "undesirable effect" with "consequence". Could be argued that stopping B RCP is not undesirable in this circumstance, since it is required and will save the seal. Revised stem and distractors to make more plausible
6	F	2	X												N	E	Add to stem, "assuming current power level is maintained", 2) question has too low a LOD CVCS Lesson Obj RO-2 and RO-3 require an applicant to know the min, max and programmed level in the pressurizer. Applicant is expected to be able to determine pressurizer level setpoint at a given power level or Tavg value, knowing it is a directly proportional relationship with min level = 40% at 15% power, max level = 65% at 80% power. In this power range, level can be determined by: $(25/65) * (\%Pwr - 15) + 40$. Recommend modify start point to "The plant is at 41% power, steady state when ...", change question to complete the following statement "Assuming steady-state plant conditions are maintained, administrative requirements will necessitate a plant trip when pressurizer level lowers to a) 55%, b) 40%, c) 35%, d) 20%. Justification: Lvl SP at 41% power = 50%, admin reqm't is trip at 10% below SP = 40% level. Revised stem and answer choices to address comments
7	H	2	X												M	E	Need to tighten stem regarding "B" LPSI pump status. Revised stem and answer choice "B"

- RO 401-9 - RESOLUTIONS IN "BOLD & ITALICS" PRINT,
 - DETAILED COMMENT/RESOLUTION - SEE ATTACHED NOTES
 - 71.3% RO QUESTIONS UNSAT (16 QUESTIONS)

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8	F	2	X		T								Y	N?		N	U	1) Stem focus problem. Not clear what is being asked. "Additional" indicates something more than conditions given in each choice, yet the choices have imbedded notifications imbedded in the 2) Choice D tense - "continued" should be "continue", 3) Justification for Choice D appears to address conditions other than in the choice, 4) Choices B, C, and D are true/false statements. The stem condition (trip of Pump 'A') can be inferred from each of these choices, 5) References should not be provided. Required actions for loss of running RBCCW should be expected RO knowledge, 6) Weak KA link, in that applicant may get the question right or wrong based on understanding of plant operation rather than knowledge of status that must be reported. 7) K/A is really intended to test SRO reportability SRO 4.1 and RO 2.7. Question is really just collection of T/F. Replaced Q and KA.
9	H	?															E	Stem states fault is loss of VR-21. ALL choices indicate heaters deenergized. Only logical conclusion is that VR21 supplies a level channel associated with control. If not selected, nothing would happen. If selected, a low level due to loss of channel power should turn off all heaters to prevent heater damage. With forcing sprays on, pressure will obviously lower until HPSI injection turns the trend. Better to state steady-state 100% (leave out forcing sprays), with Ch Y the controlling channel. Make two choices assoc with a response that does not include low level htr cutout. Make the other two related to htr cutout - key answer and the other w/all BU hrs off, pressure will control at ... on proportional heaters. Revised stem and distractors to improve LOD.
10	F	2				X											U	1) "D" is not plausible to have NI greater than 20% as an indicator that the reactor is s/d. 2) with page 36 of the proc provided DLO. 3) KA should be stated as "...between the ATWS and the following: Breakers, relays, and disconnects". This is typo in KA catalog. Section EK in each of the EPE sections are intended to be the same structure. Refer to EPE 009 for an example. 4) Agree w/John's comment on Choice D. Recommend reword question from "...reactor was shutdown by..." to "...reactor trip was initiated by..." 5) VERY low LOD. The DSS is simple enough that it doesn't even warrant its own lesson plan. The 1984 addition of 10CFR50.62 mandated a DSS for CE plants as follows: "2) Each pressurized water reactor manufactured by Combustion Engineering or by Babcock and Wilcox must have a diverse scram system from the sensor output to interruption of power to the control rods. This scram system must be designed to perform its function in a reliable manner and be independent from the existing reactor trip system (from sensor output to interruption of power to the control rods)." At Millstone Unit 2,
11	H	3															E	1) "C" distractor doesn't appear to make sense - the colldown is always to 515F stem says to less than 515F also "with the same amt of decay heat" what does that mean? Recommend "SG pressure should be the same with or without RSST". 2) Change stem "...to less than 515. ." to "...to 515..." to align with Choice C. 3) Symmetry is off with only 3 ans stating basis of nat circulation. Recommend rewording choices. Truncate Choices A and C after "... RCS Delta-T". Remove "regardless of the type of RCS flow" from Choice C. Remove "after teh MSIVs are closed" from Choice B. These changes ensure applicant must evaluate pertinent equipment impact without the choices leading him analyze nat circ vs forced circ.

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12	H	3														E	1) Do you have an RO learning objective to know this from memory? Why did you not include LOs for any of the Qs as per the NRC template? 2) Why is SG level given in inches AND in percent? Should you specify instruments used or is this normal convention, to infer based on units? 3) This is LCO basis question. Is it required RO knowledge from memory? Q rewritten to test RO level knowledge.
13	H	2													M	E	This is an SRO topic. Do you have an RO LO for this topic 55.43a.5? Q revised to tighten stem
	F	1				X									M	U	1) UNSAT because LOD1 or non-credible distractors. Choices too generic, can be answered without site-specific knowledge, one of major concerns associated with PWR station blackout anywhere is maintenance of batteries. All PWRs will shutdown on station blackout. All PWRs have CSTs and AFW/EFW to maintain core cooling for extended periods. No PWR should lose DC Control power within 60 minutes. Answer is obvious. Recommend Choices center on plausible specific power supply actions, only one of which is an action directed by EOP2541 App 28 for maintenance of vital batteries. Distractor Choices B and C not plausible. Q revised to address comments
15	F	2													N	E	B&D revise to make more plausible. Revised to address comments.
16	F	2				N							Y		N	E	1) Choice B (do nothing) not plausible as written since question asks what action is req'd, recommend change to wording in comment #3 below, 2) Choices A and C are not mutually exclusive, add 'ONLY' to Choice A, 3) Better question if indications of loss VA-30 provided rather than stating ('crew observes INVERTER INV 3 TROUBLE, SGFP A TROUBLE, multiple C Channel indicators downscale, based on these indications, which of the following BOP actions are required, a) manually raise ONLY SGFP A speed b) verify SGFP A controlling properly in AUTO c) manually raise speed on BOTH SGFP d) start AFW pumps after performing SPTAs' Revised stem and distractors to address comments
17	H	2											Y		N	E	1) The question does not provide a time frame, so applicant can correctly identify battery design for 8 hours and eventual degradation of bkr control power and inverter output (unless inverters auto swap to backup AC sources), 2) Choice A wording "decalibrate" should be modified to enhance distraction, degraded voltage won't decalibrate but will affect accuracy of instrumentation, 3) Choice C as written is obviously correct, low LOD, better to ask impact at 2 hours after the event if charger not restored to service, then choices would be a) accuracy of related AC instrumentation is degraded, b) facility 2 AC breakers can no longer be tripped remotely, c) DC bus voltage lower than normal but still adequate for DC system loads, d) letdown isolates, 4) delete 'due to lowering voltage from stem', it is unnecessary and having it there reduces evaluation value of the given indications. Revised stem and distractors to address comments
18	F2	2													B	S	
19	F	2											Y		B	S	
	F	2											Y		M	E	1) capitalize 'b' in 'bypass' in Choice A, 2) Choice A justification refers to a reactor startup and does not apply to conditions in the stem, 3) for Choice B, lesson matl does not refer to 'arming' PTTI, only states 'initiates', 4) for symmetry, recommend Choice C change from 'now bypassed' to 'will bypass'. Adressed comments

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	H	3	E			E							Y		M	E	1) 'but' identifies situation as unexpected. rephrase to provide indications without value judgement. 2) 'handswitch for both disch valves' is ambiguous, could be read as one switch for both or two separate switches. 4) distractor 'd' not plausible because loss of control power to valves should always close valves, okay if 'd' combines both 'c' and 'd'. Reworded and tightened stem and distractors to address comments.
22	F	1				N							N		N	U	1) Choice D non-credible, 508/509 are in parallel, one from each tank, also flow rate obviously determined by positive displacement pump design, 2) Capitalize 'shutdown' in Choice B 'Hot shutdown Panel', 3) in Choice C, meaning of 'locally' appears ambiguous, could mean local at C-21 or local at valve. Note that 'locally' in stem used to mean at the valve, not at C-21, where use in Choice C intended to mean at C-21, not at valve, 4) Not a KA match. Q rewritten to match KA
23	H	3													N	S	
24	H	2											Y		N	E	1) in stem, remove 'but' in statement regarding leak degradation. CVCS isolation not related to leak degradation. 2) change stem 'all other valves' to 'leak isolated from CVCS by closing 429'. 3) delete 'safety' from stem question, charging isn't safety injection. 4) provide units in stem for '1400' Changes made
25	F	2											N		N	U	1) This is simple memory not High Cog 2) LOD is borderline low and 3) distractor plausibility debatable. 4) Is this a KA match? Reasons for hi FP activity corrective actions, Call HP why? Ans: because of changing dose rates. Call HP is not really a corrective action. It doesn't in any way correct the hi FP activity. 5) the correct answer is so obviously correct that it is difficult to even consider the distractors. Rewrote Q to better test K/A and to increase discriminatory value
26	F	2											Y		M	E	The Q is memory not higher order
27	H	2											Y		M	S	
28	F	1.5											Y		B	U	Borderline low LOD need to increase LOD too simplistic. Q replaced with different bank Q testing same KA
29	H	2				E							Y		B	E	1) Why are "A&B" plausible? - pegged high pressure indicator at 600 psig when stem says failed to 200 psig. Distractors revised to improve plausibility
30	H	2											Y		M	S	
31	H	2?				E							Y		B	E	1) LOD low borderline 2) Distractors don't appear plausible A&C lowest setting on controller 1500 psia and "D" switch only controls power supplies and nothing in stem indicates problem with circuit? The stem and distractors modified to improve LOD and plausibility of distractors.
32	F	2				X							Y		N	U	1) "B" not plausible to have all LPCI valves powered from one power source - violates single failure criteria 2) Choice D not plausible. No action in choice, therefore will do nothing to ensure max flow is established. 3) Obvious from choices that B51 must supply LPSI injection valves. Therefore, Choice C non-discriminating. Why would any applicant think he/she could open a de-energized MOV from the control boards? Revised distractors and correct answer to resolve comments.

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33	F	2?											Y		M	E	1) Borderline low LOD need to increase LOD too simplistic. 2) why is "C" plausible? 3) Possible fix for too low LOD: Change Q to "which of following is procedurally directed to control tank temperature?". Change choices to a) feed from PMW and bleed tank to PDT to maintain temperature <120F b) feed from... <150F c) recirculate tank to maintain temperature <120F d) recirculate tank... <150F. These changes require applicant to demonstrate understanding that feed and bleed, while possible, is not the procedural method for cooling the tank. Requires applicant to know the procedurally maintained temperature (120F vs 150F). Requires applicant to know that recirculation alignment is the same alignment used to cool the tank. Incorporated comments to increase LOD
34	H	2											Y		B	S	1) Q helps to answer #8 also tested in Q 35 24E aligned to 24C maybe overtesting this area? Comment resolved by replacing Q #8.
36	F	3											N		M	E	Revised distractors to improve plausibility
	F	1.5				X							N		N	U	1) Very low LOD - should increase LOD; 2) Why are "A&D" plausible? 2) K/A mismatch. Question does not test knowledge of power supplies to code safety position indicators. Given in stem that tailpipe acoustic monitors (used for indirect position indication) are de-energized. Q and K/A replaced with a bank Q.
37	H	2											Y		B	S	no comments
38	F	2													M	S	changed to memory level Q
39	F	2				N							N?		B	U	1) Seems like fundamental just need to remember bases why these valves need to close during SRAS. 2) "C&D" don't appear to be plausible - if the applicants know basic SRAS actuation scheme answers easy borderline LOD. 3) K/A not too tight since stem already indicates failure vice having to monitor and identify failure? 4) Choices B, C and D not plausible because stem indicates valves should have auto-closed. Since they are expected to auto close by design, should not have to take any preliminary actions prior to manually closing the valves. Basic concept is to immediately actuate manually if auto fails. May be able to fix by changing question from "WHEN and why" to "HOW and why", with choices to match. Changed Q to address comments
40	H					E									N	E	1) Choice B non-credible because nothing in stem to indicate CAR fans unavailable, if unavail by design then, by design, cntmt should not exceed design. Choice C non-credible because nothing in stem to indicate RBCCW flow to SDC affected. 3) in stem, why does SW to RBCCW HX remain throttled?. stem should specifically identify which SW valves are throttled (3.1 inlet, manual inlet), 4) stem states all 'three' TCVs where Print 25203-26009-7 shows six TCVs affected. 5) recommend stem state that air leak isolated by closing 2-IA-255. Air Supply to TCVs, this would eliminate possibility of other unintended affects of air line rupture Modified "B" and "D" distractors to improve plausibility also fixed typos

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41	H					E							Y		N	E	1) Stem enhancements: 1a) Delete "only Fac 1..." 1b) Change Fac 2 elect problem statement to a specific event such as "A small break LOCA caused a Rx trip from 100% pwr 6 hrs ago. Bus ... fault concurrent with the Rx trip results in Lockout" 1c) change "at that very moment" to "subsequently", 2) Choice B non-credible, quest asks actions req'd, choice is stand back and watch, 3) Choice A non-credible because auto response is for fans to shift to slow speed on break in containment, 4) Appendix 25, Att C allows CSAS reset without stopping pump, EOP-2532 Step 58 allows ESAS reset before Step 59 which directs pump shutdown. T EOPs do not need to be entirely committed to memory. 5) regardless of distraction value of Choice D, the key answer would always be a method of addressing the rise in pressure. If kept, the key answer choice needs to be mutually exclusive of the others, as, for example, "CSAS will not start the pump, must manually restart ..." Revised stem and distractors to improve plausibility.
42	H	2				N							?		N	U	1) Why are "A&C plausible? 2) K/A mismatch - what reference material used? What trend is being recognized? 3) Need to add to justification for Choice C. Why is loss of inventory thru ISLOCA not possible cause of vortexing? Q replaced new K/A and Q
	F	2	Y										Y		M	E	1) Loss of extraction results in slightly less MS flow to turbine, resulting initially in rise in Tc. Tc subsequently will lower as the colder feedwater flow reaches the SGs. Recommend modifying question to ask which correctly describes plant parameter response 5 minutes after HV-4494 closes, as compared to initial steady-state conditions (with answers in format of "... is lower". Modified Stem
44	F	1				N							N?		N	U	1) Unnecessary stem info: 1a) "within seconds", 1b) "components unaffected are unchanged", 2) Key choice would be a viable option, even if other choices possible, a loss of control power would not prevent local-manual operation, therefore obvious answer, 2) Choices A and B non-credible since no MFRV controls at C-21 and C-10. 3) Questionable K/A match, answering quest neither demonstrates ability to locate or to operate controls 4) LOD < 2 replace Reselected a bank Q and modified it based on NRC feedback
45	H	2				N							Y		B	U	1) "B" how plausible if flow path does not exist? 2) Choice D implausible. On what basis would an applicant be expected to select this answer, given stem info of "5 minutes into cooldown" and "BOP reports lowering consistent with AFW usage"? Stem will be read as "doing an EOP cooldown on the safety system (AFW) designed for such an emergency, with AFW responding as designed". Under these conditions, applicant would not have any plausible basis for selecting Choice D. 3) Choice C would be a obviously prudent choice anytime CST level is low. Hard to see why this wouldn't always be the safe answer since it is just a verification of capability and requires no realignment. Looks like this answer would be selected even if applicant could not rule out others, making it LOD=1. Replaced Q with a new Q using same K/A.
46	H	2											Y		B	S	No comments

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47	F	2				E	Y						Y		B	E	<p>1) Per OP-2351, CONVEX 345 KV Switchgear, the normal backfeed alignment is 15G-2X1-4 closed, 15G-8T-2 closed, 15G-9T-2 closed. Based on lack of details in stem, wouldn't this make Choice C another possible correct answer? Possible fix, add following to stem: "Main Generator links are installed". Eliminates possibility of backfeed. Could not be in backfeed alignment with links installed. 2) Choice D plausible based on DGs powering buses? Why would applicant choose this answer? Recommend change choices as follows: a) "Verify MO Disc open and gen outputs closed. Verify all ... energized from RSST", b) "Verify MO Disc closed and gen outputs open. Verify all ... energized from RSST", c) "Verify MO Disc closed and gen outputs closed. Verify all ... energized from NSST", d) Verify MO Disc open and gen outputs closed. "Verify all ... energized from NSST".</p> <p>Modified stem and distractors to address NRC comments.</p>
	H														M	E	<p>1) Recommend editorial change to Choice D to say "with NO cooling water flow." This change ensures the negative is not missed by an applicant. 2) Do we need first bullet since last bullet states 24A and C are deenergized? Reworded "D".</p>
49	F	2?											Y		B	E	<p>1) LOD is borderline. Stem indications: component overheating and high indicated supply flow. Obvious Cause: flow is bypassing the component. 2) Choice A is not a generically correct statement. There is no relief valve in the system at that location. 3) Possible alternative. Change stem to high coolant temp and LOW (vice high) flow and change choices to: a) DG SW strainer d/p is 4 psid, b) DG Air Cooling HX SW Inlet is plugged, c) DG SW bypass valve is full open, d) DG SW is cross-tied between DGs. Simple question, but now applicant has to apply <u>plant-specific</u> knowledge. Must know 4 psid is normal to eliminate Choice A. Must know SW flow is in series (from air cooling hx to lube oil hx to jacket cooling hx) in order to recognize Choice B as correct answer due to blockage of air cooling SW inlet limiting flow through downstream heat exchangers. Must know location of SW flow element as upstream of bypass to eliminate Choice C. Must know cross-tie will leave flow unchanged (if both headers at same pressure) to eliminate Choice D. Q modified to address comments.</p>
50	H	2											Y		N	E	<p>1) Is "4.5 X 10 +5" normal MS2 way of indicating "4.5 times 10 to the power of 5"? More used to seeing "4.5 E+5". 2) Choices A and B not highly implausible because both allow continued discharge even while taking plausible actions to determine validity of rad monitor indications. If reading is suspect, logical choice is to stop and regroup. Recommend alternate choice wording as follows: a) Stop the discharge, restart on same permit after chem sample confirms activity comparable to ..., b) Continue the discharge, periodically confirm rad monitor peak readings remain approximately at current value, c) Stop the discharge, discharge not allowed to continue under existing permit, d) Continue the discharge, lower discharge flowrate to reduce rad monitor fluctuations.</p>
51	H	2													B	S	No comments

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52	H	2	X			E							Y		B	E	1) In stem, what injection temp 73F? 2) Choice A implausible. Typical redundant system tech specs permit short term OOS of single train. There are many examples, including ECCS subsystems, cntmt spray trains, cntmt clg trains, RBCCW, service water, CR Emer Vent, AC power sources, on-site pwr distribution, aux feedwater. In all example cases, the spec provides actions for restoration w/in a given time, often 72 hours. This should be common knowledge and therefore, Choice A unlikely choice, low discriminatory value. 3) What is meant by "minimum procedurally required" in stem. Could make argument that no correct answers since there are other required actions such as stop RCPs. Recommend change wording to something like "which choice identifies procedurally directed actions that must be performed to mitigate". 4) Choice B wording of "continue operation" reduces discriminatory value. Applicant may think cross-tie appropriate but would not buy into "continue operation". Recommend change Choice B to "Open both service water cross tie valves and commence a normal plant shutdown". 5)
53	F	2											Y		M	E	Loss of grid should have resulted in automatic rx trip, recommend change stem from manual to auto trip. Made change
54	H	2													B	E	1) Use consistent SG naming, either A/B or 1/2. 2) Correct ans stands out clearly from the distractors ("what action is req'd when integrity lost during refueling?"). Recommend remove "immediately" from A and B, remove "all" from A, change C and D to actions such as "confirm RCS temp < 110F", "ensure contingency plans established to close the B MSL opening if req'd" Why do you state #2 S/G intact in stem? Explain why a path with A MSL safety removed vice B?
55	H	2				E							Y		N	E	1) Explain why "C" plausible closing Enclosure Bldg doors for Cntmt Integrity. 2) Enhance terminology in Choices A and B. "Radiation" does not leak. "Radioactive gas" and "contamination" can leak. 3) Recommend adding to justifications to explain why the distractors are plausible and, for Choice D, why an applicant would potentially choose this answer. 4) Choice B is obviously correct regardless where any of the others may also be correct. Recommend making this choice mutually exclusive of the others such that applicant must think about the distractors. As currently written, applicant can easily lock in on B as it does not preclude other actions. Might also trip the plant or maintain doors closed or realign main exhaust, but will definitely have leakage and will definitely want to filter this leakage. Will increase LOD if Choice B precludes others by addition of a statement like "no plant trip required" or "no other ventilation realignment required". All comments resolved
56	H	2											Y		M	E	1) Typo in Choice D. "where" instead of "were".
57	H	2											Y		B	E	Words common to every answer ("Manual Group rod motion will stop when"). Move these words to the stem and change question to a "complete the following statement" form.
58	F	2											Y		M	E	Very easy to "nuc" this one out. Would be a non-sensical coincidence design to have a single failure of a four channel system cause an unwarranted action (Choice C) or prevent system actuation on a warranted condition (Choice A). And Choice B does not seem to make sense for the modified question. In the original question, Choice B was a potential cause for the failure condition. However, the modified question does not ask what caused the failure that is described in the stem. Recommend replacing Choice B with a plausible distractor and consider ways to improve Choices A and C.

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59	F	2											Y		M	E	1) Tighten stem "Which of the following actions must be verified or taken...think I like original Q better. 2) Typo in stem. "... Loop 1That input..." needs space between "Loop 1" and "That".
60	H	2											Y	Y	M	E	1) Knowing corrective actions from memory is this covered by a valid RO LO? 2) Add to justifications to explain why reducing RCS pressure to raise LPSI flow (assuming it could be accomplished) is NOT a valid mitigation strategy. 3) Choice A justification mentions >200F above sat temp of 511F. Sat temp for 250 psia is approx 400F. What is meant by justification statement? This may be justification from original (pre-modified) question. 4) Recommend justifications explain difference between CET Max and CET High and why CET Max > saturation temp okay. 5) Why is delta-T between HJTC and un-HJTC greater in Choice A than in correct Choice C? Is the delta T an indicator of voiding? 6) Why is cntmt pressure provided in stem? Does not appear to be needed to support applicant evaluation of conditions. All comments resolved
61	F	2											Y		N	E	1) Per lesson material, CIAS signal closes dampers to maintain cntmt integrity, where stem says protect ducting from overpressure. 2) Choices C and D mention Cntmt Purge vice Cntmt Hydrogen Purge. 3) Q asks how protected, making either Choice A or B arguably correct, does not ask the PREFERRED method. Modified to address comments.
62	F												Y		N	S	
63	F	3											Y		N	S	
64	F	2											Y		M	E	1) In stem add What affect "if any"... 2) "D" change the word "has" to "will" to be consistent with "A" wording 3) remove "however" and "therefore" from Choices A, C and D. All Choices should consistently identify the effect in the first sentence and the second sentence should be either "Fuel Handling may continue" or "Fuel Handling must stop". Comments incorporated.
65	H	2											Y		M	E	Recommend change Choice B to "...spraying down the EDG or the room." (OR, vice AND). Change made.
66	H	2											Y		B	S	no comments
67	F	1.5?				X							Y		B	U	1) LOD= borderline. Answer is obvious, "A" distractor does not appear to be plausible. Would not just open valve. 2) Choice B not plausible as written. An independent verifier would not "direct" the actions of a peer. Stem and distractors rewritten to improve plausibility.
68	F	2													B	E	1) For Choice D justification, add reference to TS 3.7.1.2 Action 'e'. "D" appears to be non-conservative also given your explanation 2) Choice B arguably non-conservative if "early" interpreted to mean prior to the threat of loss of heat sink or prior to entry into loss heat sink functional HR-3 Modified Q stem to make "Conservative" and "D" tp address comment
69	F	2											Y		B	E	Question is very general, referring only to "a blue dot on one of the annunciator windows". Recommend enhance operational validity by changing stem to "A blue dot has been placed on Panel C-06/7 Annunciator Window D-17. RADWASTE AREA SUPPLY AIR TROUBLE. What is the significance of the blue dot on this window?" Stem modified to list specific alarm.
70	F	2				X							Y		B	E	1) "A" does not appear plausible removing tag? 2) Change Choice C wording from "remains..." to "must remain..." for consistency with other choice structure Changes made.

Q#	1. LOK (F/H)	2 LOD (1-5)	3 Psychometric Flaws					4 Job Content Flaws				Ref Req Y/N	5 Other		6 R/M/N NRC	7 U/E/S	8. Exolnation	
			Stern Focus	Cues	T/F	Cred Dist	Partial	Job-Link	Minutia	#/units	Back-ward		Q=K/A	SRO only				
71	H	2				X							Y	Y		B	U	1) Appears to be DLO with reference provided. Distractors do not appear to be plausible given the TS. 2) Choice C justification seems to indicate 303 entry acceptable. However condition is covered by 3131 Action A 1 which specifies MODE 3 in next 6 hours. Need to revise justification to also explain 303 entry not correct. Also, revise to indicate AOP-2556 (not TS 3131) prohibits affected rod repositioning if mispositioned > 2 hrs. Removed reference and revised "C"
72	F	2												Y		M	S	
73	F	2												Y		B	S	
74	H	3				X								Y		M	U	1) typo in Choice D justification. 1) "B" distractor not plausible for HPSI pump to start in PTL. 2) Choice D not plausible as HPSI pump in PTL. 3) Choices B and C not discriminating as they require applicant to think a SIAS signal will be automatically generated. Very basic information to know SIAS generated by either 2 of 4 pZR press <1714 psia OR 2 of 4 cntmt press >442 psig with ability to block on 3 of 4 pZR press <1850 psia. Stem states press at 375 psia and on event cntmt press steady, pZR press dropping. Applicant would have to forget the SIAS setpoints and the status of the SIAS block in order to justify either of these choices. Modified stem and all answer choices to address comments
75	F													Y		B	S	No comments

Total	75	20	9	0	1	2	3	1	0	0	0	0	3	3	0	71	75	Sum
F	38	50.7%	40-50%											B	Bank=	25	16	UNSAT
H	36	48.0%	50-60%											M	Modified=	23	42	Enhancement required
	74	98.7%												N	New =	23	17	SATISFACTORY
														NRC	Exams=	0	75	Total graded
																71	21.3%	% UNSAT

Q#	1 LOK (FIH)	2. (1-5)	3. Psychometric Flaws					4 Job Content Flaws				Ref Req	5. Other		6. B/M/N	7. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	# units	Back- ward		Q=K/A	SRO only			
76	H	1.8				N							Y	Y	N	U	LOD too low Distractors not distracting. This basic rule of usage should be well ingrained from simulator training and probably tested during op test dynamics. Could raise LOD by providing some parameter problem such that distractors more plausible. Revised stem to increase LOD and revised distractors to be more plausible
77												Y	N	N	N	U	1) Unnecessarily wordy stem. Delete reference to SM taking actions, 2) Stem details are window dressing in that all the choices direct restoring "the PORV to operable. No diagnosis required No expectation to identify which PORV is affected. Could just say "Unit is in MODE 3, PORV is stuck open with pressure below lift setpoint, what TS action is required", 3) Direct lookup with reference provided.. 4) NOT SRO only because operability call already made, RO should be able to identify straight-forward TS application calls with references provided. 5) NOT a KA match. Although stem provides conditions to support diagnosis, none of the answer choices require use of this information, Further, none of choices support demonstration of ability to "understand how operator actions and directives affect plant and system conditions" Replaced Q new Q acceptable.
78	H	3											Y	Y	N	S	Explain why "A" is incorrect again Justification further explained
79	H	3				N							Y	Y	B	E	1) How is 374F possible 9 hrs after LBLOCA?, EOP-2532 Step 17 would have cooldown at a minimum of 40F/hr, putting temp below 374 in under 5 hrs. The LBLOCA depressurization and injection by itself will significantly cooldown the plant. 2) Choice B not credible since LPSI pumps would have been stopped 7.5 hrs ago, recommend delete first part of choice ("stop the 'A' LPSI Pump") Comments resolved.
80	H	2					N						N	Y	N	E	1) "MINIMUM" in stem doesn't make much sense, does it mean soonest action, or least severe action, or fewest number of steps required. 3) Choice B is a second correct answer. Q revised to address comments
81					Y								N	Y	N	U	1) Unsat because this is a T/F list of choices. No stem is required Q and KA replaced

- SRO 401-9 Resolutions in "BOLD & Italics" print.

- Detailed Comment/Resolution - see ATTACHED NOTES

- 44% of SRO QUESTIONS UNSAT (11 QUESTIONS)

OVERALL EXAM 2/10 UNSAT 10/500 CORRECT (27 QUESTIONS)

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				Ref Req	5. Other		6. B/M/N	7. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Backward		Q=K/A	SRO only			
82	F	1.5				X							Y	N	N	U	1) Not discriminating. RO and SRO applicants alike will know that OP-2206 (not EOP) directs shutdown verifications. Would not enter an EOP for a leak that is not affecting plant stability ("p2r press and level are stable"). Further, cannot jump into middle of EOP network to utilize an EOP cooldown attachment. Could possibly raise the LOD to adequate level by building transient conditions into stem. For example, have tube leak come in at 50 gpm w/1 chg pump avail and letdown still in service. Then applicant would have to determine EOP entry not required because letdown isolation and additional charging pump start will stabilize plant, allowing mitigation with AOP-2569. New replacement Q using same K/A acceptable
83	F	1											N	Y		U	1) KA mismatch. Tests knowledge of discharge procedure requirements, not ability to apply system tech specs. 2) Not discriminating. Common sense dictates that radioactive fluid discharge to the environment would not proceed unless tank content and activity level is known. Replaced Q with new Q and drew a new K/A.
85	H	2				N						Y	Y	Y	M	E	Typo in Choice A ("due to the loss OF the ...").
85	H	3											Y	Y	N	S	No comments.
86	F	2				Y?							Y?	N	N	U	1) OP-2207 Steps 4.2.6 and 4.2.7 direct raising level to 65% and maintaining at 65% during cooldown. Key answer says 40, not 65. 2) For symmetry with other choices, key answer should be general, not specific, for example "during a plant cooldown when raising level above program setpoint". 3) Not SRO level really system level knowledge. 4) Syntax of Choice D inconsistent with other responses ("After", "Prior", "During", "PLACING"). 5) Choice D implausible because 2nd part action doesn't match first part. Possible 2nd part replacement: "Prior to drain down for head removal". "D" K/A topic was too basic for a license exam reselected new K/A and developed new SRO level Q.
87	F							Y						Y	N	E	1) Do you have a valid LO to know from memory. and 2) "C" second part doesn't appear to be plausible to just kill power to the pumps rather than responding to protect pumps? Asst Ops Mngr determined applicants should be able to answer based on knowledge of EOPs and bases also modified "C"

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				Ref Req	5. Other		6. B/M/N	7. U/E/S	7. Explanation	
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Backward		Q=K/A	SRO only				
88	F	2											Y	N			U	1) NOT SRO Only. Only requires basic RO system knowledge to answer. 2nd part of choices not required, they follow naturally from the chosen plant system response. 2) Recommend Choice D change "in 205 seconds" to "after time delay", to ensure this distractor does not assist applicant in answering any other question on exam. 3) Choice D implausible since high pressure AFAS actuation setpoint at 2400 psia. PT-103-1 has range of 0-1600 psia. Further, AFAS requires 2 of 4 high pressure channel coincidence logic for actuation, so single channel would not initiate. New replacement Q written to replace bank Q.
89							N						Y	Y	N		E	1) Choice D is not plausible. Procedure is ONLY applicable in MODES 5, 6, Defueled. Procedure is only entered for COMPLETE loss of ALL AC power. Flowrates (9000 gpm SW, 2000 gpm RBCCW) indicate motor-driven pumps running. Not complete loss of power. 2) Choice A has weak plausibility as "all indicating lights for Bus 24C breakers are out". Obvious indication of loss of DC power. Comments resolved for "A&D".
90	H	3				E						Y	Y	Y	B		E	1) Do not need references, applicant should be able to pick the correct answer by knowing what constitutes operability of containment integrity isolations vs. leak detection vs. airlock. With refs provided, becomes direct lookup. Revised to make closed reference also revised to make distractor more plausible.
91	F	2.5											Y	Y	N		S	No comments.
92	F													Y	N		E	1) Typo Choice A procedure should be 2516, not 2616 fixed
93	H	2				X							Y	Y	N		E	"A" not plausible as written recommend enhancing distractor Choice A by changing stem to have 14 rods not fully inserted, 'A' charging pump is running in emer boration lineup Revised Q ok
94	H	3											Y	Y	B		S	No comments.
95	F	1											Y		N		U	1) UNSAT. Question has operational validity and matches the KA. However, it has NO discriminatory value. LOD=1 Who else besides station security would control site access. 2) Acronyms in stem should be spelled out to eliminate unwanted questions by applicants during exam administration. K/A reselected and replaced with a modified bank Q
96	F	2											N	Y	N		U	UNSAT because KA mismatch. Question tests understanding of administrative command and control requirements, not ability to operate console controls to operate facility between shutdown and designated power levels. Good admin knowledge to test, but not under this KA. This K/A is extensively tested during the operating exam and is more appropriately examined in that manner. K/A reselected and new Q written.
97	F	2											Y	Y	N		S	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				Ref Req	5. Other		6. B/M/N	7. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# units	Back-ward		Q=K/A	SRO only			
98	F	2.5											Y		N	E	1) Capitalize "v" in "valves" in Choice B, 2) Choice C should be changed to 50 minutes since it takes 30 minutes to close the valve, 3) AOP-2577, Rev 007 had an NRC commitment item (#EU4500Q1.02, commitment record #6830) which req'd cntmt isolated w/in 10 min met by closing purge valves. Has this commitment been changed? 4) For psychometric balance, change Choice D to "One train of CRACS must be operating in the Recirculation Mode within 30 minutes after the event". Justification explains requirement has been changed from 10 to 50, so 30 is clearly incorrect and balances with Choice A 30 minutes. This provides two choices with 50 minutes and 2 choices with 30 minutes. 5) Again, for balance, change Choice C from "...after the Transfer..." to "...after the event." 6) to focus stem, change to "...personnel exposure, per AOP-2577, the SM must..." 7) What constitutes "isolation of containment"? Other choices refer to specific components where Choice A is general. Can we provide a specific action or set of actions in place of "isolation of containment"? Revise
99	F					N							Y		B	U	1) Lower Order memory level not high Order 2) What reasonable misconceptions could explain why an applicant would choose any of the distractors? How could securing CSS in less than 4 hours affect long term recirc heat removal, hydrogen concentration or result in a much harsher equipment environment? 2) EOP2532, Rev 023 had a 2 hr limit on securing CSS, vice current 4 hr limit. Reve 023 Basis stated 2 hr "ensures iodine concentration w/in acceptable limits". Question key answer says "would result in higher iodine...". This is not necessarily correct. If 4 hrs ensures level w/in limits, then less than 4 hrs does NOT necessarily mean "would result in higher concentrations". Full iodine scrubbing may have already occurred. Replaced with a bank Q tied to the same K/A.
100	F												N	N	N	U	1) Not SRO only, general knowledge for all ERO members. 2) KA match? Stem should indicate security" event, if that is the case. 2) Question reference incorrectly lists OP-2302A, CEDS interlocks. Reselected K/A and wrote new replacement Q.

Total	22	2.2	0	0	1	8	2	0	1	0	0	3	6	5	23	25	Sum
F	13	59.1%											B	Bank =	4	11	UNSAT
H	9	40.9%											M	Modified =	1	9	Enhancement required
		100.0%											N	New =	18	5	SATISFACTORY
													NRC	NRC =	0	25	Total Graded
														Total	23	0	Number not graded
															0	44.0%	% UNSAT

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

1	<p>GENERAL COMMENT: NEED TO KNOW THE HISTORY OF ALL WRITTEN EXAM Qs - any used on last 2 NRC exams?</p> <p>1) Choice C does not seem plausible. Is there any relationship between hotwell level and requirement to limit AFW flow to 300 gpm? 2) Choice D might be distracting if applicant didn't realize condensate pumps not running. However, Choices A and C both state effects based on loss of condensate flow. Therefore, A and C reduce plausibility of D. Need to remove words "loss of condensate flow" from Choices A and C 3) Typo in Choice C, "OP 2525", should be "EOP 2525".</p> <p><u>2/16/09:</u></p> <ol style="list-style-type: none"> 1) Justifications do not line up with choices. 2) Applicant has no basis for selecting actions from EOP-2526 (Choice B) or OP-2319B (Choice D), given that stem says you are performing EOP-2525. Recommend delete "During the performance of EOP 2525, Standard Post Trip Actions" from the stem. 3) Regarding Choice B, EOP-2526 is a short 9-step procedure which provides basic SF maintenance guidance. The only related reference to the GS system is through EOP-2541 Appendix 4, Step 9, which says "manually control steam seal pressure using MS-182A". There is no direction to "immediately open MS-182A". Recommend remove reference to EOP-2525 in the stem, change the "per" statement in Choice B to "per Appendix 4, Followup Actions" and change "immediately open" to "manually control steam seal pressure using". 4) Choice C comment #1 from previous review not adequately addressed. Justification for plausibility of choice not reasonable. Not plausible that applicant would choose to limit AFW flow based on rising hotwell level. No logical tie between rising hotwell level and AFW flow rate. Generally well understood that AFW flow is adjusted to control SG levels and is based on control of the heat sink. 5) Choice C still contains the "loss of condensate flow" statement, reducing plausibility of Choice D. See comment #2 from previous review. 6) Regarding Choice D, unlikely that applicant would respond to abnormal condition post-trip using an OP. Further, OP doesn't appear to provide any guidance for high level and/or overflow control. Recommend change choice to "...Per Alarm Response C-05, A-10, CONDENSER HOTWELL LEVEL HI, the BOP must take local control and close Hotwell Reject Valve 2-CN-219." The ARP does not direct this action (instead directing <u>opening</u> LCV) but still plausible to think that it would contain the guidance for an auto high hotwell level response which results in a chemical spill situation. <p><u>2/20/09:</u> Comments addressed.</p>
2	<p>1) Weak KA match because KA would have you test ability to determine position from the controller, when question key answer is can only do so locally at the valve. Possible better match would be to ask determine actual position and source of information from control room indications, give them red light lit and not closed alarm, with answers being, for example, "15% open by alarm", "as-indicated on C05 controller", "as-indicated on Foxboro IA system", "as-indicated on PPC".</p> <p><u>2/16/09:</u> Okay. One typo in stem – should be a space between "Facility" and "1".</p> <p><u>2/20/09:</u> Comments resolved.</p>

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

3	No comments.
4	<p>Should tighten stem confused over exactly what is required e.g. Are you asking what is required for safe s/d - one train of SIAS, CIAS, and EBFAS. Is power lost to all of this equipment and it all needs to be started or not?</p> <p>2/16/09:</p> <ol style="list-style-type: none">1) Reword choices for symmetry:<ol style="list-style-type: none">a. Service Water, RBCCW and HPSI pumps for core cooling. Service Water and RBCCW pumps and CAR fans for CTMT cooling.b. Service Water, RBCCW and LPSI pumps for core cooling. Service Water and RBCCW pumps and CAR fans for CTMT cooling.c. Service Water, RBCCW and HPSI pumps for core cooling. Service Water, RBCCW and CTMT Spray pumps for CTMT cooling.d. Service Water, RBCCW and LPSI pumps for core cooling. Service Water, RBCCW and CTMT Spray pumps for CTMT cooling. <p>2/20/09:</p> <ol style="list-style-type: none">1) Justifications were not updated when question was modified.2) Justifications updated.

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

CA-21 indicates trip the reactor and turbine and stop B RCP this seems like only a partially correct answer? Why is Choice A plausible? Stem states check valve for affected RCP closes. Why would an applicant reasonably think it would block flow from other RCPs? 2) Why is Choice C plausible? Again, why would remaining unaffected RCP bleedoff flow have to be redirected? We just stopped affected pump bleedoff. 3) Recommend change stem question to replace "undesirable effect" with "consequence". Could be argued that stopping B RCP is not undesirable in this circumstance, since it is required and will save the seal. ?

2/16/09:

- 1) Typo in stem – "temperatue".
- 2) Choice A not plausible. Stem states "...B RCP ... and its bleedoff flow check valve closes." Given reference to the check valve for a particular RCP, not plausible for applicant to conclude that other RCPs are impacted. Why then have separate check valves for each pump? Recommend change stem to "...B RCP suddenly rises to 10 gpm and the system responds per design." Applicants must now apply their system knowledge to determine the excess flow check valve has closed. They could conclude incorrectly, however, that other valves operate instead, resulting in the system response as described in the distractors.
- 3) Choice C not plausible for same reason as Choice A. Plausibility established with recommended change described in Item #2 above.
- 4) Choice D not plausible for same reason as Choice A. Plausibility established with recommended change described in Item #2 above.

5

2/20/09:

- 1) Change #2 above not implemented as recommended. Stem changed to say "immediately followed by **B RCP BLEEDOFF FLOW LO** annunciator". This has same effect as previous wording in that it clearly identifies only one pump affected. Choices were also changed to improve plausibility. With these changes, problems still exist with Choices A and D. Do not understand why plausible to assume in Choice A that increased flow, if it did occur due to lowered backpressure, would result in degraded seals. Choice D still based on believing all RCPs. Possible, however that applicant could select it if he/she thinks this is referring to RV specific to B RCP. Choice D might still be ruled out because of the use of the phrase "excessive leakage". Better to say "increased leakage". Obvious that BO relief will only pass what is coming thru the seals, increasing leakage.
- 2) Recommendations.
 - a) Modify Choice D wording.
 - b) Justify Choice A - why plausible that seals would degrade if slightly increased BO flow OR fix this distractor.
- 3) All comments resolved.

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

Add to stem, "assuming current power level is maintained", 2) question has too low a LOD. CVCS Lesson Obj RO-2 and RO-3 require an applicant to know the min, max and programmed level in the pressurizer. Applicant is expected to be able to determine pressurizer level setpoint at a given power level or Tavg value, knowing it is a directly proportional relationship with min level = 40% at 15% power, max level = 65% at 80% power. In this power range, level can be determined by: $(25/65)*(\%Pwr-15)+40$. Recommend modify start point to "The plant is at 41% power, steady state when ...", change question to complete the following statement "Assuming steady-state plant conditions are maintained, administrative requirements will necessitate a plant trip when pressurizer level lowers to a) 55%, b) 40%, c) 35%, d) 20%. Justification: Lvl SP at 41% power = 50%, admin reqm't is trip at 10% below SP = 40% level.

6 2/16/09: Better. Matches KA. LOD okay. No need to indicate in stem that 70% is above setpoint for this power level. Recommend modify stem by changing bottom two current (existing) conditions to "Pressurizer level is currently 70% and lowering at a steady rate of 5% per hour."

2/20/09:

- 1) Recommend change stem (as recommended earlier) to "Pressurizer level **is currently** at 70% and is lowering...", rather than present wording of "Pressurizer level **has peaked** at 70%, but is now...". The "**peaked**" wording is leading in that it highlights level is not on program. This question should require the applicant to use the unbiased parameter values as provide to independently determine what program level should be and then use knowledge of administrative requirement to determine time to reach that level. Should not indicate or stress that 70% is not the program value, that is for the applicant to identify.

Comments resolved.

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

Need to tighten stem regarding status of “B” LPSI pump.

2/16/09:

- 7
- 1) Status of B LPSI not clearly defined in stem. Says pump is available but not in service. In TS-speak, *available* means pump could run if needed but not *operable* to perform its TS function. Applicant could assume that pump is available but not in service with its handswitch in PTL. Better to state condition of pump and controls – as in "pump is not running, it is lined up for SDC operation with its handswitch in NORMAL AFTER STOP.
 - 2) None of the answers work with the question asked. Stem wants LPSI pump auto response after sequencer completes load sequencing. Answers are: a) you must restart (not an auto response), b) will auto start before the sequencer fires (not an auto response after sequencing), c) starts on sequencer step (not an auto response after sequencer is completed), d) must manually start (not an auto response). Recommend question change to “Regarding B LPSI, which of the following is correct after the opening of the RSST supply breaker to Bus 24D.”
 - 3) Recommend changing Choice B to read the same as the tail-end of Choice C. Recommended new wording:

b) Because the B LPSI pump handswitch is in the “Neutral” position, it will automatically start on the applicable sequencer step.

2/20/09:

- 1) Comments resolved.

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

1) Stem focus problem. Not clear what is being asked. "Additional" indicates something more than conditions given in each choice, yet the choices have imbedded notifications imbedded in the 2) Choice D tense - "continued" should be "continue", 3) Justification for Choice D appears to address conditions other than in the choice, 4) Choices B, C, and D are true/false statements. The stem condition (trip of Pump 'A') can be inferred from each of these choices, 5) References should not be provided. Required actions for loss of running RBCCW should be expected RO knowledge, 6) Weak KA link, in that applicant may get the question right or wrong based on understanding of plant operation rather than knowledge of status that must be reported. 7) K/A is really intended to test SRO reportability SRO 4.1 and RO 2.7. Question is really just collection of T/F.

2/16/09:

8

Replaced Q and K/A

- 1) Recommend adding to stem, "Regarding operation in MODE 2 or MODE 1, which...". Eliminates any possibility of confusion over whether reactor is already shutdown.
- 2) Choice D is a second correct answer. Tavg varies linearly from 0 to 100% power. Per OP-2204, Rev 19, Attachment 6, no-load Tavg=532 and full-load Tavg=572.9 for a range of 47.2°F, or 0.472°F/% power. At 3% power, program Tavg will be $532 + (3 * 0.472) = 533.4^\circ\text{F}$. If Tavg drops to 523°F, temperature will be -10.4°F from program. OP-2203 precaution states: *"If at any time during power change, RCS temperature is not within 10°F (plus or minus) of temperature program for given power level and efforts to regain control of temperature are unsuccessful, the reactor must be tripped."* Recommend change Choice D to "...lowers to 525°F, making this choice indisputably wrong.

2/20/09: Comments resolved on replacement Q.

9

Stem states fault is loss of VR-21. ALL choices indicate heaters deenergized. Only logical conclusion is that VR21 supplies a level channel associated with control. If not selected, nothing would happen. If selected, a low level due to loss of channel power should turn off all heaters to prevent heater damage. With forcing sprays on, pressure will obviously lower until HPSI injection turns the trend. Better to state steady-state 100% (leave out forcing sprays), with Ch Y the controlling channel. Make two choices assoc with a response that does not include low level htr cutout. Make the other two related to htr cutout - key answer and the other w/all BU htrs off, pressure will control at ... on proportional heaters.

2/16/09: Revised stem and distractors to improve LOD. Okay.

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

10

1) "D" is not plausible to have NI greater than 20% as an indicator that the reactor is s/d. 2) with page 36 of the proc provided DLO. 3) KA should be stated as "...between the ATWS and the following: Breakers, relays, and disconnects". This is typo in KA catalog. Section EK in each of the EPE sections are intended to be the same structure. Refer to EPE 009 for an example. 4) Agree w/John's comment on Choice D. Recommend reword question from "...reactor was shutdown by..." to "...reactor trip was initiated by..." 5) VERY low LOD. The DSS is simple enough that it doesn't even warrant its own lesson plan. The 1984 addition of 10CFR50.62 mandated a DSS for CE plants as follows: "2) Each pressurized water reactor manufactured by Combustion Engineering or by Babcock and Wilcox must have a diverse scram system from the sensor output to interruption of power to the control rods. This scram system must be designed to perform its function in a reliable manner and be independent from the existing reactor trip system (from sensor output to interruption of power to the control rods)." At Millstone Unit 2, this consists of a 2 of 4 coincidence on pressurizer pressure >2400 psia tripping both MG set generator output contactors. So, in order to answer this question, the applicant must know the function of the DSS, namely, to open the MG Set Output Contactors. Sort of like asking the purpose of RPS, looking for an answer of opening trip circuit breakers. Important knowledge, but a given that any applicant will know this piece of information, therefore not able to discriminate at the 80% threshold.

2/16/09:

- 1) Question modification history does not identify the latest change to Choice D (from "NI > 20%" to "MG set supply bkrs").
- 2) Recommend add to stem that normal in-house electrical buses remain energized. NRC concern is that an applicant could otherwise argue there are no correct answers since the output contactors will also trip on loss of power > 2 seconds or low frequency < 55 Hz?
- 3) Cannot find the alarm to which Choice C refers. Is this correct window wording?

2/20/09: Comments resolved – modified distractors to increase plausibility- see Q comments and Q Modification History.

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

<p>11</p>	<p>1) "C" distractor doesn't appear to make sense - the cooldown is always to 515F stem says to less than 515F also "with the same amt of decay heat" what does that mean? Recommend "SG pressure should be the same with or without RSST". 2) Change stem "...to less than 515..." to "...to 515..." to align with Choice C. 3) Symmetry is off with only 3 ans stating basis of nat circulation. Recommend rewording choices. Truncate Choices A and C after "... RCS Delta-T". Remove "regardless of the type of RCS flow" from Choice C. Remove "after the MSIVs are closed" from Choice B. These changes ensure applicant must evaluate pertinent equipment impact without the choices leading him analyze nat circ vs forced circ.</p> <p><u>2/16/09:</u> 1) Question asks differences, where Choice C says "the same". Recommend change stem question to:</p> <p style="padding-left: 40px;">How will SG pressures respond if the cooldown to 515°F had been accomplished with a loss of the RSST at the time of the trip?</p> <p><u>2/20/09:</u> Comments resolved minor rewording of the stem and distractors.</p>
<p>12</p>	<p>1) Do you have an RO learning objective to know this from memory? Why did you not include LOs for any of the Qs as per the NRC template? 2) Why is SG level given in inches AND in percent? Should you specify instruments used or is this normal convention, to infer based on units? 3) This is LCO basis question. Is it required RO knowledge from memory?</p> <p><u>2/16/09:</u> Okay. Question re-written to ensure at RO level. 1) Recommend change "below" in Choice B to "less than". This establishes different adjectives in each choice: "greater than", "less than", "more positive", and "below".</p> <p><u>2/20/09:</u> Comments resolved.</p>
<p>13</p>	<p>This is an SRO topic. Do you have an RO LO for this topic 55.43a.5?</p> <p><u>2/20/09:</u> Comments resolved minor revisions to stem and explained why RO knowledge being tested..</p>

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14	<p>1) UNSAT because LOD1 or non-credible distractors. Choices too generic, can be answered without site-specific knowledge, one of major concerns associated with PWR station blackout anywhere is maintenance of batteries. All PWRs will shutdown on station blackout. All PWRs have CSTs and AFW/EFW to maintain core cooling for extended periods, No PWR should lose DC Control power within 60 minutes. Answer is obvious. Recommend Choices center on plausible specific power supply actions, only one of which is an action directed by EOP2541 App 28 for maintenance of vital batteries. Distractor Choices B and C not plausible.</p> <p><u>2/17/09:</u></p> <p>1) Recommend rewording Choices A and D as shown below to format of all choices with general noun component description followed by alphanumeric component identifiers as shown below:</p> <ul style="list-style-type: none">a. Distribution Panels D-11, 12, 21 and 22b. Inverters 5 and 6c. Inverters 1, 2, 3 and 4d. ESAS Actuation Cabinets 5 and 6 <p>2) Recommend change question in stem to delete phrase “specific loads” to match the possible choices. 2/20/09: Comments resolved.</p>
15	<p>Revise B&D to make more plausible .</p> <p><u>2/17/09:</u></p> <p>1) Stem statement, “NO components start on Sequence 3” is too leading. Recommend change the stem completely to read only:</p> <p>“Why is Start Sequence 3 different for a Loss of Normal Power (LNP) concurrent with a Safety Injection Actuation Signal (SIAS) and an LNP without a SIAS.”</p> <p>2) B & D revised</p> <p>3) Choice B distractor justification needs updating to reflect modifications to the choice.</p> <p>2/20/09: Comments resolved.</p>

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<p>16</p>	<p>1) Choice B (do nothing) not plausible as written since question asks what action is req'd, recommend change to wording in comment #3 below, 2) Choices A and C are not mutually exclusive, add 'ONLY' to Choice A, 3) Better question if indications of loss VA-30 provided rather than stating ("crew observes INVERTER INV 3 TROUBLE, SGFP A TROUBLE, multiple C Channel indicators downscale, based on these indications, which of the following BOP actions are required, a) manually raise ONLY SGFP A speed b) verify SGFP A controlling properly in AUTO c) manually raise speed on BOTH SGFP d) start AFW pumps after performing SPTAs"</p> <p><u>2/17/09:</u></p> <ol style="list-style-type: none"> 1) Typo in stem – "...safety related <u>indications</u> .. 2) Revised stem and distractors to resolve comments above. 3) How can the applicant determine that VR-11 remains energized from the information given in the stem? Per distractor justification, A and D would be correct for a loss of VR-11. Could the applicant reasonably assume VR-11 deenergized based on trouble alarm in stem? <p>2/18/09: Comments resolved.</p>
<p>17</p>	<p>1) The question does not provide a time frame, so applicant can correctly identify battery design for 8 hours and eventual degradation of bkr control power and inverter output (unless inverters auto swap to backup AC sources), 2) Choice A wording "decalibrate" should be modified to enhance distraction, degraded voltage won't decalibrate but will affect accuracy of instrumentation, 3) Choice C as written is obviously correct, low LOD, better to ask impact at 2 hours after the event if charger not restored to service, then choices would be a) accuracy of related AC instrumentation is degraded, b) facility 2 AC breakers can no longer be tripped remotely, c) DC bus voltage lower than normal but still adequate for DC system loads, d) letdown isolates, 4) delete 'due to lowering voltage from stem', it is unnecessary and having it there reduces evaluation value of the given indications.</p> <p>2/17/09: Okay. Revised stem and distractors to address comments</p>
<p>18</p>	
<p>19</p>	
<p>20</p>	<p>1) capitalize 'b' in 'bypass' in Choice A, 2) Choice A justification refers to a reactor startup and does not apply to conditions in the stem, 3) for Choice B, lesson matl does not refer to 'arming' PTTI, only states 'initiates', 4) for symmetry, recommend Choice C change from 'now bypassed' to 'will bypass'"</p> <p>2/17/09: Comments resolved.</p>

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<p align="center">21</p>	<p>1) 'but' identifies situation as unexpected, rephrase to provide indications without value judgement, 2) 'handswitch for both disch valves' is ambiguous, could be read as one switch for both or two separate switches, 3) distractor 'd' not plausible because loss of control power to valves should always close valves, okay if 'd' combines both 'c' and 'd', <u>2/17/09:</u> 1) Typo in stem. Question asks "which ...describes how the ... RM <u>be</u> affected". Should either ask "... how the ...<u>will be</u>" or else ask "how the ... <u>is</u> affected". 2) Punctuation in Choice D. Choice should end with a period, for consistent format with other choices. 3) Choices C and D do not answer the question asked. Rephrase the question to encompass all choice responses.</p> <p>2/18/09: Comments resolved.</p>
<p align="center">22</p>	<p>1) Choice D non-credible, 508/509 are in parallel, one from each tank, also flow rate obviously determined by positive displacement pump design, 2) Capitalize 'shutdown' in Choice B 'Hot shutdown Panel', 3) in Choice C, meaning of 'locally' appears ambiguous, could mean local at C-21 or local at valve. Note that 'locally' in stem used to mean at the valve, not at C-21, where use in Choice C intended to mean at C-21, not at valve, 4) Not a KA match.</p> <p>2/17/09: Q rewritten to match K/A.</p>
<p align="center">23</p>	
<p align="center">24</p>	<p>1) in stem, remove 'but' in statement regarding leak degradation. CVCS isolation not related to leak degradation, 2) change stem 'all other valves' to 'leak isolated from CVCS by closing 429', 3) delete 'safety' from stem question, charging isn't safety injection, ...', 3) provide units in stem for '1400'</p> <p>2/17/09: Changes made</p>

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<p>25</p>	<p>1) This is simple memory not High Cog 2) LOD is borderline low and 3) distractor plausibility debatable. 4) Is this a KA match? Reasons for hi FP activity corrective actions, Call HP why? Ans: because of changing dose rates. Call HP is not really a corrective action. It doesn't in any way correct the hi FP activity. 5) the correct answer is so obviously correct that it is difficult to even consider the distractors.</p> <p><u>2/17/09:</u></p> <p>1) Typos in Choice D – “mircon” vs “micron”, “particules” vs “particles”, “avtivity” vs “activity”.</p> <p>2) Punctuation in Choice A – add a period at the end of the second statement.</p> <p>3) Recommend change second part of Choice B to reduce the emphasis on cleanup flow by rewording as follows:</p> <p>“b) Start an additional Charging Pump and adjust the Letdown Flow Controller bias to raise Letdown flow. The additional flow with provide a higher rate of removal of activity from the RCS.”</p> <p>2/18/09: Comments resolved.</p>
<p>26</p>	<p>1) Think Q fundamental not higher order</p> <p>2/17/09: Memory level</p>
<p>27</p>	<p>No comments.</p>
<p>28</p>	<p>Borderline low LOD need to increase LOD too simplistic. 2/20/09: Comments resolved.</p> <p>2/17/09: Okay. Question replaced with different bank question testing same K/A.</p>
<p>29</p>	<p>1) Why are "A&B" plausible? - pegged high pressure indicator at 600 psig when stem says failed to 200 psig.</p> <p><u>2/19/09:</u> Revised distractors to improve plausibility</p>
<p>30</p>	<p>No comments.</p>
<p>31</p>	<p>1) LOD low borderline 2) Distractors don't appear plausible A&C lowest setting on controller 1500 psia and "D" switch only controls power supplies and nothing in stem indicates problem with circuit?</p> <p>2/17/09: The stem and distractors were modified to improve LOD and distractor plausibility.</p>

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32	<p>1) "B" not plausible to have all LPCI valves powered from one power source - violates single failure criteria 2) Choice D not plausible. No action in choice, therefore will do nothing to ensure max flow is established. 3) Obvious from choices that B51 must supply LPSI injection valves. Therefore, Choice C non-discriminating. Why would any applicant think he/she could open a de-energized MOV from the control boards?</p> <p>2/17/09: Question modified to address earlier comments.</p>
33	<p>1) Borderline low LOD need to increase LOD too simplistic. 2) why is "C" plausible? 3) Possible fix for too low LOD: Change Q to "which of following is procedurally directed to control tank temperature?". Change choices to a) feed from PMW and bleed tank to PDT to maintain temperature <120F b) feed from... <150F c) recirculate tank to maintain temperature <120F d) recirculate tank... <150F. These changes require applicant to demonstrate understanding that feed and bleed, while possible, is not the procedural method for cooling the tank. Requires applicant to know the procedurally maintained temperature (120F vs 150F). Requires applicant to know that recirculation alignment is the same alignment used to cool the tank.</p> <p>2/17/09: Okay. Comments incorporated.</p> <p>1) Typo in stem – "temperture" 2) Typos in Choices C and D – "temperaure"</p>
34	<p>1) Q helps to answer #8 2/17/09: Comment addressed by deleting Q#8.</p>
35	<p>For B and D nothing in stem to support the assumption that only A and C TCV's would get open signal. 2/18/09: Revised distractors</p>
36	<p>1) Very low LOD - should increase LOD; 2) Why are "A&D" plausible? 2) K/A mismatch. Question does not test knowledge of power supplies to code safety position indicators. Given in stem that tailpipe acoustic monitors (used for indirect position indication) are de-energized.</p> <p>Q and K/A replaced with a bank Q.</p>
37	<p>No comments.</p>

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<p>38</p>	<p>seems like simple memory</p> <p>2/17/09: Okay. Re-categorized as lower order.</p>
<p>39</p>	<p>1) Seems like fundamental just need to remember bases why these valves need to close during SRAS. 2) "C&D" don't appear to be plausible - if the applicants know basic SRAS actuation scheme answers easy boderline LOD. 3) K/A not too tight since stem already indicates failure vice having to monitor and identify failure? 4) Choices B, C and D not plausible because stem indicates valves should have auto-closed. Since they are expected to auto close by design, should not have to take any preliminary actions prior to manually closing the valves. Basic concept is to immediately actuate manually if auto fails. May be able to fix by changing question from "WHEN and why" to "HOW and why", with choices to match.</p> <p><u>2/17/09:</u> Question replaced with new question on same KA.</p> <ol style="list-style-type: none"> 1) Typo in stem – "actuted". 2) Typo in Choice C – "override" should be "override". 3) Choice D implausible. If the concern is pumps operating without flow, why would operators want to align in precip control configuration? If this align would re-establish flow through the LPSI pumps, then recommend explaining this plausibility rationale in the justification section. 4) Recommend delete "immediately" from Choice D. None of the other choices provide time-frame or urgency. 5) Recommend change Choice C from "if any SI pump..." to "if any LPSI pump...". 6) This question is lower order. No analysis required. Stem indicates LPSI pumps should be off and asks what action is required. Correct choice is the action directed by procedure. Direct memorization. <p>2/19/09: Resolved comments with new Q.</p>

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1) Choice B non-credible because nothing in stem to indicate CAR fans unavailable, if unavail by design then, by design, cntmt should not exceed design. Choice C non-credible because nothing in stem to indicate RBCCW flow to SDC affected, 3) in stem, why does SW to RBCCW HX remain throttled?, stem should specifically identify which SW valves are throttled (3.1 inlet, manual inlet), 4) stem states all 'three' TCVs where Print 25203-26009-7 shows six TCVs affected, 5) recommend stem state that air leak isolated by closing 2-IA-255, Air Supply to TCVs, this would eliminate possibility of other unintended affects of air line rupture

2/17/09: Question revised to address earlier comments.

- 1) Typo in stem – "hydrolayzing" should be "hydrolazing".
- 2) Recommend delete form stem the statement, "ALL plant equipment functions as designed, but Service Water flow to the RBCCW heat exchangers remains throttled at pre-event values". Statement is not required, given addition of information regarding prior manual throttling of SW-9A and C.
- 3) Choice D in not credible. Why would an operator choose to go "outside the EOPs" to combine facilities when, by design, a single facility should mitigate an accident. SW-9A and C are not broken. Why wouldn't an operator instead increase SW flow by opening SW-9A and C?
- 4) Choice D format differs from other choices in that it identifies actions required. In contrast, Choices A and B describe consequences and Choice C says if problem not corrected here is consequence.
- 5) In Choice D, change "...exceeding system..." to "...exceeding RBCCW system..."
- 6) In Choice B, change "exceed" with "approach".

40

2/20/09:

- 1) Recommend change new Choice D to " ...lower Service Water flow will cause Spent Fuel Pool temperature to rise". Implausible that the SFP will exceed design limit temp. Also, temperature will rise on SIAS but not because of elevated RBCCW system temps. Recommended change makes for better distractor.

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<p>41</p>	<p>1) Stem enhancements: 1a) Delete "only Fac 1..." 1b) Change Fac 2 elect problem statement to a specific event such as "A small break LOCA caused a Rx trip from 100% pwr 6 hrs ago, Bus ... fault concurrent with the Rx trip results in Lockout" 1c) change "at that very moment" to "subsequently", 2) Choice B non-credible, quest asks actions req'd, choice is stand back and watch, 3) Choice A non-credible because auto response is for fans to shift to slow speed on break in containment, 4) Appendix 25, Att C allows CSAS reset without stopping pump, EOP-2532 Step 58 allows ESAS reset before Step 59 which directs pump shutdown. EOPs do not need to be entirely committed to memory. 5) regardless of distraction value of Choice D, the key answer would always be a method of addressing the rise in pressure. If kept, the key answer choice needs to be mutually exclusive of the others, as, for example, 'CSAS will not start the pump, must manually restart ...'</p> <p><u>2/18/09:</u> Question revised to address earlier comments.</p> <ol style="list-style-type: none"> 1) Recommend delete statement from stem, "the fault cannot be repaired". Not needed. 2) Recommend change stem statement, "five minutes after...causing..." to "Subsequently, the break size increases. Containment pressure rises rapidly above 10 psig." 3) Choices A and B not discriminating distractors. Question stem states actuation signal are not reset. Applicant would therefore not select a choice where realignment is assumed based on signal actuation. Recommend making signals not reset less blatant. Provide alarm indications, lights rather than words "signals not reset". <p>2/19/09: All comments resolved.</p>
<p>42</p>	<p>1) Why are "A&C plausible? 2) K/A match what reference material used? What trend is being recognized? 3) Need to add to justification for Choice C. Why is loss of inventory thru ISLOCA not possible cause of vortexing?</p> <p><u>2/18/09:</u> Reselected KA, wrote new question.</p> <ol style="list-style-type: none"> 1) "<u>Initial</u> action" is not clear in stem. Does the mean first action? Recommend change to "Per EOP-2532, which of the following actions must be taken in response to the HPSI current/flow fluctuations?" 2) Recommend remove second part of each choice. Not needed. Further, for Choice C, the second part is correct. Because of sump clogging, suction pressure at the HPSI pumps is reduced to point that the hot water from the sump is flashing to steam at the pump suction. 3) Use the word "only" in Choice A, since this choice is a subset of Choice D. <p>2/19/09: All comments resolved</p>

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<p>43</p>	<p>1) Loss of extraction results in slightly less MS flow to turbine, resulting initially in rise in Tc. Tc subsequently will lower as the colder feedwater flow reaches the SGs. Recommend modifying question to ask which correctly describes plant parameter response 5 minutes after HV-4494 closes, as compared to initial steady-state conditions (with answers in format of "... is lower".</p> <p><u>2/18/09</u>: Okay. Reworded to address earlier comments. 1) Recommend reword stem as follows:</p> <p><i>The plant is ... 2A Feed Water Heater closes.</i></p> <p><i>Which one of the following describes plant condition approximately 5 minutes after the valve closes, as compared to steady state conditions prior to the valve closing. Assume NO operator action.</i></p> <p><u>2/20/09</u>: 1) Stem should say "assume NO operator action", not "Assuming NO operator action".</p> <p><u>2/20/09</u>: All comments resolved</p>
<p>44</p>	<p>1) Unnecessary stem info: 1a) "within seconds", 1b) "components unaffected are unchanged", 2) Key choice would be a viable option, even if other choices possible, a loss of control power would not prevent local-manual operation, therefore obvious answer, 2) Choices A and B non-credible since no MFRV controls at C-21 and C-10, 3) Questionable KA match, answering quest neither demonstrates ability to locate or to operate controls 4) LOD < 2 replace</p> <p><u>2/18/09</u>: Replaced with different modified bank question to same KA. 1) Change Choice D to refer to #1 MFRV, instead of to #2 MFRV. 2) Recommend change Choice D from "isolate all backup air..." to "isolate air", similar to Choice B.</p> <p><u>2/19/09</u>: All comments resolved</p>

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1) "B" how plausible if flow path does not exist? 2) Choice D implausible. On what basis would an applicant be expected to select this answer, given stem info of "5 minutes into cooldown" and "BOP reports lowering consistent with AFW usage"? Stem will be read as "doing an EOP cooldown on the safety system (AFW) designed for such an emergency, with AFW responding as designed". Under these conditions, applicant would not have any plausible basis for selecting Choice D. 3) Choice C would be a obviously prudent choice anytime CST level is low. Hard to see why this wouldn't always be the safe answer since it is just a verification of capability and requires no realignment. Looks like this answer would be selected even if applicant could not rule out others, making it LOD=1.

2/18/09: Revised to address earlier comments.

1) Very simple as written. Also Choice D is not a method for lowering oxygen concentration. Recommend reword as shown:

"The plant...lines. The Chemist reports CST has a nitrogen blanket, however oxygen concentration in the CST water sample is 260 ppb. CST level is being maintained...per Steam Generator.

45

What action must be taken for this condition?

- a) Maximize CST makeup flow and drain to the hotwell.
- b) Transfer CST to the hotwell and hotwell to the surge tank.
- c) Place the CST nitrogen sparger in service.
- d) Start the CST recirc pumps. [IS THIS A PLAUSIBLE CHOICE]

2/20/09:

1) Earlier rewording recommendation to make the obvious correct answer not quite so obvious by indicating the CST did have nitrogen blanket. Also the recommendation didn't include any indication from chemistry as to what action to take (i.e. lower oxygen concentration). The thought was that applicant may think no need to nitrogen sparge if CST already blanketed, which is not true. As modified by the licensee, this question is too simple. Per the modified stem, Chemistry says oxygen in the tank must be lowered. And the obvious, most immediate way to do that is to bubble nitrogen through the water.

46

No comments.

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<p align="center">47</p>	<p>1) Per OP-2351, CONVEX 345 KV Switchgear, the normal backfeed alignment is 15G-2X1-4 closed, 15G-8T-2 closed, 15G-9T-2 closed. Based on lack of details in stem, wouldn't this make Choice C another possible correct answer? Possible fix, add following to stem: "Main Generator links are installed". Eliminates possibility of backfeed. Could not be in backfeed alignment with links installed. 2) Choice D implausible based on DGs powering buses. Why would applicant choose this answer? Recommend change choices as follows: a) "Verify MO Disc open and gen outputs closed. Verify all ... energized from RSST", b) " Verify MO Disc closed and gen outputs open. Verify all ... energized from RSST", c) "Verify MO Disc closed and gen outputs closed. Verify all ... energized from NSST", d) Verify MO Disc open and gen outputs closed. "Verify all ... energized from NSST".</p> <p><u>2/18/09:</u> Reworded stem and choices to address earlier comments.</p>
<p align="center">48</p>	<p>1) Recommend editorial change to Choice D to say "with NO cooling water flow:" This change ensures the negative is not missed by an applicant. 2) Do we need first bullet since last bullet states 24A and C are deenergized?</p> <p><u>2/18/09:</u> Reworded Choice D to address earlier comments.</p>
<p align="center">49</p>	<p>1) Borderline LOD. Stem Indications: component overheating and high indicated supply flow. Obvious Cause: flow is bypassing the component. 2) Choice A is not a generically correct statement. There is no relief valve in the system at that location. 3) Possible alternative. Change stem to high coolant temp and LOW (vice high) flow and change choices to: a) DG SW strainer d/p is 4 psid, b) DG Air Cooling HX SW Inlet is plugged, c) DG SW bypass valve is full open, d) DG SW is cross-tied between DGs. Simple question, but now applicant has to apply plant-specific knowledge. Must know 4 psid is normal to eliminate Choice A. Must know SW flow is in series (from air cooling hx to lube oil hx to jacket cooling hx) in order to recognize Choice B as correct answer due to blockage of air cooling SW inlet limiting flow through downstream heat exchangers. Must know location of SW flow element as upstream of bypass to eliminate Choice C. Must know cross-tie will leave flow unchanged (if both headers at same pressure) to eliminate Choice D.</p> <p><u>2/18/09:</u> Okay. Modified to address earlier comments.</p> <p>1) Typo – extra space in Choice A – "...Jacket Cooler has a [extra space here] tube rupture."</p> <p><u>2/19/09:</u> ok</p>

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<p>50</p>	<p>1) Is "4.5 X 10 +5" normal MS2 way of indicating "4.5 times 10 to the power of 5"? More used to seeing "4.5 E+5". 2) Choices A and B not highly plausible because both allow continued discharge even while taking plausible actions to determine validity of rad monitor indications. If reading is suspect, logical choice is to stop and regroup. Recommend alternate choice wording as follows: a) Stop the discharge, restart on same permit after chem sample confirms activity comparable to ..., b) Continue the discharge, periodically confirm rad monitor peak readings remain approximately at current value, c) Stop the discharge, discharge not allowed to continue under existing permit, d) Continue the discharge, lower discharge flowrate to reduce rad monitor fluctuations.</p> <p><u>2/18/09:</u> Modified to address earlier comments.</p> <p>1) Overlaps with new SRO replacement question #83. Tests same area (two independent samples and a new permit). More appropriate on SRO exam. Recommend re-work RO question #50 and re-sample KA for Q#50 if needed. Replaced Q using same K/A.</p>
<p>51</p>	<p>No comments.</p>
<p>52</p>	<p>1) In stem, what injection temp 73F? 2) Choice A implausible. Typical redundant system tech specs permit short term OOS of single train. There are many examples, including ECCS subsystems, cntmt spray trains, cntmt clg trains, RBCCW, service water, CR Emer Vent, AC power sources, on-site pwr distribution, aux feedwater. In all example cases, the spec provides actions for restoration w/in a given time, often 72 hours. This should be common knowledge and therefore, Choice A unlikely choice, low discriminatory value. 3) What is meant by "minimum procedurally required" in stem. Could make argument that no correct answers since there are other required actions such as stop RCPs. Recommend change wording to something like "which choice identifies procedurally directed actions that must be performed to mitigate". 4) Choice B wording of "continue operation" reduces discriminatory value. Applicant may think cross-tie appropriate but would not buy into "continue operation". Recommend change Choice B to "Open both service water cross tie valves and commence a normal plant shutdown". 5) Choice D stands out from rest in number of details. This is only choice that identifies procedures. To balance with other choices, recommend reword Choice D to "Stop the running Facility 1 RBCCW pump and trip the reactor."</p> <p><u>2/18/09:</u> Reworded choices to address comments.</p>
<p>53</p>	<p>Loss of grid should have resulted in automatic rx trip, recommend change stem from manual to auto trip.</p> <p><u>2/18/09:</u> Modified to address comment.</p>

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54	<p>1) Use consistent SG naming, either A/B or 1/2, 2) Correct ans stands out clearly from the distractors ("what action is req'd when integrity lost during refueling?"). Recommend remove "immediately" from A and B, remove "all" from A, change C and D to actions such as "confirm RCS temp < 110F", "ensure contingency plans established to close the B MSL opening if req'd"</p> <p><u>2/18/09:</u> Okay. Modified to address earlier comments.</p>
55	<p>1) Explain why "C" plausible closing Enclosure Bldg doors for Cntmt Integrity. 2) Enhance terminology in Choices A and B. "Radiation" does not leak. "Radioactive gas" and "contamination" can leak. 3) Recommend adding to justifications to explain why the distractors are plausible and, for Choice D, why an applicant would potentially choose this answer. 4) Choice B is obviously correct regardless where any of the others may also be correct. Recommend making this choice mutually exclusive of the others such that applicant must think about the distractors. As currently written, applicant can easily lock in on B as it does not preclude other actions. Might also trip the plant or maintain doors closed or realign main exhaust, but will definitely have leakage and will definitely want to filter this leakage. Will increase LOD if Choice B precludes others by addition of a statement like "no plant trip required" or "no other ventilation realignment required".</p> <p><u>2/18/09:</u> Okay. Modified to address earlier comments. 1) Typo in Choice B – "Initiating" should be "Initiate".</p>
56	<p>1) Typo in Choice D. "where" instead of "were".</p> <p><u>2/18/09:</u> Okay.</p>
57	<p>Words common to every answer ("Manual Group rod motion will stop when"). Move these words to the stem and change question to a "complete the following statement" form.</p> <p><u>2/18/09:</u> Okay. Modified for earlier comment. 1) Recommend remove acronyms in choices (UEL, UCS). These acronyms are not used by themselves anywhere else in the Q.</p>

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

58	<p>Very easy to "nuc" this one out. Would be a non-sensical coincidence design to have a single failure of a four channel system cause an unwarranted action (Choice C) or prevent system actuation on a warranted condition (Choice A). And Choice B does not seem to make sense for the modified question. In the original question, Choice B was a potential cause for the failure condition. However, the modified question does not ask what caused the failure that is described in the stem. Recommend replacing Choice B with a plausible distractor and consider ways to improve Choices A and C.</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
59	<p>1) Tighten stem "Which of the following actions must be verified or taken...think I like original Q better, 2) Typo in stem. "...Loop 1Thot input..." needs space between "Loop 1" and "Thot".</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
60	<p>1) Knowing corrective actions from memory is this covered by a valid RO LO? 2) Add to justifications to explain why reducing RCS pressure to raise LPSI flow (assuming it could be accomplished) is NOT a valid mitigation strategy. 3) Choice A justification mentions >200F above sat temp of 511F. Sat temp for 250 psia is approx 400F. What is meant by justification statement? This may be justification from original (pre-modified) question. 4) Recommend justifications explain difference between CET Max and CET High and why CET Max > saturation temp okay. 5) Why is delta-T between HJTC and un-HJTC greater in Choice A than in correct Choice C? Is the delta T an indicator of voiding? 6) Why is cntmt pressure provided in stem? Does not appear to be needed to support applicant evaluation of conditions.</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
61	<p>1) Per lesson material, CIAS signal closes dampers to maintain cntmt integrity, where stem says protect ducting from overpressure, 2) Choices C and D mention Cntmt Purge vice Cntmt Hydrogen Purge, 3) Q asks how protected, making either Choice A or B arguably correct, does not ask the PREFERRED method.</p> <p><u>2/18/09</u>: Modified to address earlier comments.</p> <p>1) Typos in Choices C and D – "Dampser" should be Dampers".</p> <p>2) Choice D implausible. Only reason to pick this answer is if you did not notice that stem only said CSAS was reset. Could possibly fix by having SIAS also reset in the stem. Would then change Choice D to "...re-actuation of a SIAS". Applicant could choose distractor if he/she thinks SIAS closes purge dampers.</p> <p><u>2/19/09</u>: Okay. Modified to address comments.</p>

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

62	No Comments
63	Minor comments
64	<p>1) In stem add What affect "if any"...2) "D" change the word "has" to "will" to be consistent with "A" wording 3) remove "however" and "therefore" from Choices A, C and D. All Choices should consistently identify the effect in the first sentence and the second sentence should be either "Fuel Handling may continue" or "Fuel Handling must stop".</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
65	<p>Recommend change Choice B to "...spraying down the EDG or the room." (OR, vice AND)</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
66	No comments.
67	<p>1) LOD=1-2 borderline. Answer is obvious, "A" distractor does not appear to be plausible. Would not just open valve. 2) Choice B not plausible as written. An independent verifier would not "direct" the actions of a peer. Recommend change Choice B to "Stop independent verification.</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
68	<p>1) For Choice D justification, add reference to TS 3.7.1.2 Action 'e', "D" appears to be non-conservative also given your explanation 2) Choice B arguably non-conservative if "early" interpreted to mean prior to the threat of loss of heat sink or prior to entry into loss heat sink functional HR-3</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

<p>69</p>	<p>Question is very general, referring only to "a blue dot on one of the annunciator windows". Recommend enhance operational validity by changing stem to "A blue dot has been placed on Panel C-06/7 Annunciator Window D-17, RADWASTE AREA SUPPLY AIR TROUBLE. What is the significance of the blue dot on this window?"</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
<p>70</p>	<p>1) "A" not appear to be plausible clearing tag ? 2) Change Choice C wording from "remains..." to "must remain...", for consistency with other choice structure</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
<p>71</p>	<p>1) Appears to be DLO with reference provided. Distactors do not appear to be plausible given the TS. 2) Choice C justification seems to indicate 3.0.3 entry acceptable. However, condition is covered by 3.1.3.1 Action A.1, which specifies MODE 3 in next 6 hours. Need to revise justification to also explain 3.0.3 entry not correct. Also, revise to indicate AOP-2556 (not TS 3.1.3.1) prohibits affected rod repositioning if mispositioned > 2 hrs.</p> <p><u>2/18/09</u>: Okay. Modified to address earlier comments.</p>
<p>72</p>	<p>No comments.</p>
<p>73</p>	<p>1) typo in Choice D justification</p> <p><u>2/18/09</u>: Okay.</p>

RO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

74	<p>1) "B" distractor not plausible for HPSI pump to start in PTL, 2) Choice D not plausible as HPSI pump in PTL, 3) Choices B and C not discriminating as they require applicant to think a SIAS signal will be automatically generated. Very basic information to know SIAS generated by either 2 of 4 pZR press <1714 psia OR 2 of 4 cntmt press >4.42 psig, with ability to block on 3 of 4 pZR press <1850 psia. Stem states press at 375 psia and, on event cntmt press steady, pZR press dropping. Applicant would have to forget the SIAS setpoints and the status of the SIAS block in order to justify either of these choices.</p> <p><u>2/18/09:</u> Modified to address earlier comments.</p> <ol style="list-style-type: none">1) Based on justifications, doesn't appear any of the answers are correct. If HPSI is in PTL and SIAS is blocked, will need to take out of PTL and manually initiate SIAS, or manually start pumps and align valves. What is the correct answer?2) Justification for Choice A does not align with the choice. Choice as HPSI auto start, justification says HPSI in PTL.3) Other justification alignments need work also.4) In Choice C, change capital 'V' in 'verify' to lower case.5) Should update modification history to reflect changes from earlier comments. <p>2/19/09: Resolved above comments.</p>
75	No comments.

SRO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

<p>76 1</p>	<p>LOD too low. Distractors not distracting. This basic rule of usage should be well ingrained from simulator training and probably tested during op test dynamics. Could raise LOD by providing some parameter problem such that distractors more plausible.</p> <p>2/4/09: Revised Q is okay. Recommend delete hyphen in "re-perform" or add hyphen to "redialognose" for consistent punctuation in choices.</p>
<p>77 2</p>	<p>1) Unnecessarily wordy stem. Delete reference to SM taking actions, 2) Stem details are window dressing in that all the choices direct restoring "the PORV" to operable. No diagnosis required. No expectation to identify which PORV is affected. Could just say "Unit is in MODE 3, PORV is stuck open with pressure below lift setpoint, what TS action is required", 3) Direct lookup with reference provided., 4) NOT SRO only because operability call already made, RO should be able to identify straight-forward TS application calls with references provided, 5) NOT a KA match. Although stem provides conditions to support diagnosis, none of the answer choices require use of this information. Further, none of choices support demonstration of ability to "understand how operator actions and directives affect plant and system conditions"</p> <p>2/4/09: Replacement question okay. 1) Will RC-403 close with LTOP switch in high or would you also have to take 403 HS to CLOSE? Choice A only mentions the LTOP switch.</p> <p>2/14/09: Revised Q ok.</p>
<p>78 3</p>	<p>Explain why "A" is incorrect again</p> <p>2/4/09: Comment addressed in justification. Q is okay.</p>
<p>79 4</p>	<p>1)_How is 374F possible 9 hrs after LBLOCA?. EOP-2532 Step 17 would have cooldown at a minimum of 40F/hr, putting temp below 374 in under 5 hrs. The LBLOCA depressurization and injection by itself will significantly cooldown the plant. 2) Choice B not credible since LPSI pumps would have been stopped 7.5 hrs ago, recommend delete first part of choice ("stop the 'A' LPSI Pump")</p> <p>2/4/09: Stem has been changed to "only Fac 1 avail", but justification for correct answer is based on both facilities available. Designated correct choice does not appear to meet procedural requirements with only Fac 2 go to Attachment 18 A?</p> <p>2/14/09: Revised Q ok.</p>
<p>80 5</p>	<p>1) "MINIMUM" in stem doesn't make much sense, does it mean soonest action, or least severe action, or fewest number of steps required, 2) Choice B is a second correct answer.</p> <p>2/9/09: Discussed further with site closed reference accepted new replacement Q.</p>

SRO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

<p>81 6</p>	<p>1) Unsat because this is a T/F list of choices. No stem is required. 2) KA match, how does this test the purpose and function of major system components? 2/9/09 discussed further with site closed reference accepted new replacement Q.</p>
<p>82 7</p>	<p>1) Not discriminating. RO and SRO applicants alike will know that OP-2206 (not EOP) directs shutdown verifications. Would not enter an EOP for a leak that is not affecting plant stability ("pZR press and level are stable"). Further, cannot jump into middle of EOP network to utilize an EOP cooldown attachment. Could possibly raise the LOD to adequate level by building transient conditions into stem. For example, have tube leak come in at 50 gpm w/1 chg pump avail and letdown still in service. Then applicant would have to determine EOP entry not required because letdown isolation and additional charging pump start will stabilize plant, allowing mitigation with AOP-2569. 2/5/09: Replacement question acceptable..</p>
<p>83 8</p>	<p>1) KA mismatch. Tests knowledge of discharge procedure requirements, not ability to apply system tech specs. 2) Not discriminating. Common sense dictates that radioactive fluid discharge to the environment would not proceed unless tank content and activity level is known. 2/9/09 discussed further with site will re-sample and draw a new K/A. 2/15/09 – replacement Q acceptable.</p>
<p>84 9</p>	<p>1) Typo in Choice A ("due to the loss OF the ..."), 2/5/09: Revised Q with no reference provided okay.</p>
<p>85 10</p>	<p>No comments.</p>
<p>86 11</p>	<p>1) OP-2207 Steps 4.2.6 and 4.2.7 direct raising level to 65% and maintaining at 65% during cooldown. Key answer says 40, not 65. 2) For symmetry with other choices, key answer should be general, not specific, for example "during a plant cooldown when raising level above program setpoint". 3) Not SRO level testing system level knowledge and KA topic too basic for license exam 4) Syntax of Choice D inconsistent with other responses ("After", "Prior", "During", "PLACING"). 5) Choice D low plausibility because 2nd part action doesn't match first part. Possible 2nd part replacement: "Prior to drain down for head removal". 2/15/09 - K/A topic was too basic for a license exam reselected new K/A and developed new SRO level Q.</p>

SRO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

<p>87 12</p>	<p>1) Do you have a valid LO to know from memory? and 2) "C" second part doesn't appear to be plausible to just kill power to the pumps rather than responding to protect pumps?</p> <p>2/9/09: 1) Discussed further with site and Asst Ops Mngr indicated the applicants should be able to answer this Q based on EOP baseline and bases baseline knowledge. 2) "C" modified. Q determined to be acceptable.</p>
<p>88 13</p>	<p>1) NOT SRO Only. Only requires basic RO system knowledge to answer. 2nd part of choices not required, they follow naturally from the chosen plant system response. 2) Recommend Choice D change "in 205 seconds" to "after time delay", to ensure this distractor does not assist applicant in answering any other question on exam. 3) Choice D implausible since high pressure AFAS actuation setpoint at 2400 psia. PT-103-1 has range of 0-1600 psia. Further, AFAS requires 2 of 4 high pressure channel coincidence logic for actuation, so single channel would not initiate.</p> <p>2/5/09: New question written to replace previous bank question. 1) Distractor Choice D not plausible because stem states controller output at 0%. Cannot lower the output further. 2) Use different terminology in Choice D for condition of pressurizer pressure control. "Inoperable" has a defined TS meaning. 3) Distractor Choice C not plausible based on stem information regarding controller output. From stem, appears that lowered output causes proportional heaters to turn on. Therefore would not select a choice which says <u>raise</u> output to turn heaters on. 4) Are you in TS LCO action below 2225? If not, then statement in Choice C regarding 2225 psia and validity of accident analyses doesn't appear to be plausible. Can you be in TS compliance and outside of analyses assumptions? Also affects statement in Choice A that 2225 means centerline melt if DBA from this pressure – hardly believable given only 25 psi off normal setpoint. 5) Correct Choice B states "below limit needed to ensure..." where the TS Basis says heaters "enhance capability" for natural circ. Are they equivalent statements?</p> <p>2/15/09 – comments on new Q addressed.</p>
<p>89 14</p>	<p>1) Choice D is not plausible. Procedure is ONLY applicable in MODES 5, 6, Defueled. Procedure is only entered for COMPLETE loss of ALL AC power. Flowrates (9000 gpm SW, 2000 gpm RBCCW) indicate motor-driven pumps running. Not complete loss of power. 2) Choice A is implausible as "all indicating lights for Bus 24C breakers are out". Obvious indication of loss of DC power. Question does meet min intent for SRO level Q.</p> <p>2/5/09: Revised Q ok</p>

SRO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

<p>90 15</p>	<p>1) Do not need references, applicant should be able to pick the correct answer by knowing what constitutes operability of containment integrity isolations vs. leak detection vs. airlock. With refs provided, becomes direct lookup.</p> <p>2/5/09: "B&C" don't appear to be plausible since there is nothing in the stem alluding to the rad monitors being inop also don't like the way the answers are phrased relative to the question asked. Q: What must be directed, A: If something is not operable, then take some action. As phrased, all choices are arguably correct. The answers are not so much what must be directed, rather what actions would be taken if, and, in that sense, all are correct statements. For the Q asked, should answer with something like "Restore the inoperable valve or else shut the plant down". Then we can defend as incorrect since referenced valve is not inoperable.</p> <p>2/15/09: distractors revised - ok</p>
<p>91 16</p>	<p>No comments.</p>
<p>92 17</p>	<p>1) Choice A procedure should be 2516, not 2616</p> <p>2/5/09: Reference corrected.</p>
<p>93 18</p>	<p>"A" not plausible as written recommend enhancing distractor Choice A by changing stem to have 14 rods not fully inserted, 'A' charging pump is running in emer boration lineup.</p> <p>2/5/09: Revised question okay.</p>
<p>94 19</p>	<p>No comments.</p>
<p>95 20</p>	<p>1) Question has operational validity and matches the KA. However, it has NO discriminatory value. LOD=1. Who else besides station security would control site access. 2) Acronyms in stem should be spelled out to eliminate unwanted questions by applicants during exam administration.</p> <p>2/5/09: KA reselected and Q replaced with bank question. 1) Is there written support for Distractor Choice C justification regarding unsafe to <u>not</u> fully insert? Unless procedurally <u>required</u> for FH SRO to finish inserting assembly, I can't see NRC or facility management having problem with FH team just stopping movement and remaining on station while problem is corrected. 2) For symmetry, recommend format B like D (for "insert, then halt") and format A like B to include all the same post-halt activities.</p> <p>2/25/09: comments on replacement Q resolved.</p>

SRO WRITTEN EXAM COMMENTS – MILLSTONE UNIT 2

<p>96 21</p>	<p>1) UNSAT because KA mismatch. Question tests understanding of administrative command and control requirements, not ability to operate console controls to operate facility between shutdown and designated power levels. Good admin knowledge to test, but not under this KA. This K/A is extensively tested during the operating exam and is more appropriately examined in that manner.</p> <p>2/6/09: KA reselected and new Q developed. 1) Per basis, TS 4.0.3 allows delay up to the limit of the specified time interval and applies from time of discovery, not from time specified interval was not met. It is a quarterly surveillance so looks like could delay up to 3 months from time of discovery. Recommend change Correct Choice C to say "...provided the missed surveillance is performed within the next three months".</p> <p>2/15/09: Change made - comment resolved.</p>
<p>97 22</p>	<p>No comments</p>
<p>98 23</p>	<p>1) Capitalize "v" in "valves" in Choice B, 2) Choice C should be changed to 50 minutes since it takes 30 minutes to close the valve, 3) AOP-2577, Rev 007 had an NRC commitment item (#EU4500Q1.02, commitment record #6830) which req'd cntmt isolated w/in 10 min met by closing purge valves. Has this commitment been changed? 4) For psychometric balance, change Choice D to "One train of CRACS must be operating in the Recirculation Mode within 30 minutes after the event". Justification explains requirement has been changed from 10 to 50, so 30 is clearly incorrect and balances with Choice A 30 minutes. This provides two choices with 50 minutes and 2 choices with 30 minutes. 5) Again, for balance, change Choice C from "...after the Transfer..." to "...after the event." 6) to focus stem, change to "...personnel exposure, per AOP-2577, the SM must..." 7) What constitutes "isolation of containment"? Other choices refer to specific components where Choice A is general. Can we provide a specific action or set of actions in place of "isolation of containment"?</p> <p>2/6/09: Revised Q okay. All earlier comments addressed.</p>
<p>99 24</p>	<p>1) Lower Order memory level not high Order 2) What reasonable misconceptions could explain why an applicant would choose any of the distractors? How could securing CSS in less than 4 hours affect long term recirc heat removal, hydrogen concentration or result in a much harsher equipment environment? 2) EOP2532, Rev 023 had a 2 hr limit on securing CSS, vice current 4 hr limit. Reve 023 Basis stated 2 hr "ensures iodine concentration w/in acceptable limits". Question key answer says "would result in higher iodine...". This is not necessarily correct. If 4 hrs ensures level w/in limits, then less than 4 hrs does NOT necessarily mean "would result in higher concentrations". Full iodine scrubbing may have already occurred.</p> <p>2/6/09: Replaced with another bank Q tied to the same KA. 1) typo in stem, "...100% power due to lowering ...". Recommend Distractor Choices A and C each begin with "Minimize", not "Minimizes".</p> <p>2/15/09: Comments resolved for replacement Q.</p>

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1) Not SRO only, general knowledge for all ERO members. 2) KA match? Stem should indicate security" event, if that is the case. 2) Question reference incorrectly lists OP-2302A, CEDS Interlocks.

2/6/09: Reselected KA and replaced with a new Q. 1) In stem and in choices A and C, change "Unit Three" to "Unit 3". In stem and Choice C, change "Unit Two" to "Unit 2". 2) Typo in Choice D, "...call **all in** a fire brigade qualified person..."? 3) Typos in justification: "fie", "bigade". 4) Request some add'l clarification added to Choice D justification. Statement related to 3 PEOs qualified but only 2 available is confusing. Are these Unit 2 PEOs? Unit 3 is already supplying 3 PEOs. 5) "Within 2 hours" is in every choice. Recommend moving time frame from choices into the stem – "which of the following actions must be taken within 2 hours to meet the minimum ...". 6) Choice D justification refers to TRM 6.6.2. Should be TRM 6.2.2. 7) TRM refers to a single site fire brigade. What is meant in Choice C by having someone man the Unit 2 fire brigade? Not distracting to refer to a specific unit's fire brigade. All applicants will know there is only 1 fire brigade. 8) What unit is meant in Choice B? Recommend stating the intended unit. 9) Choice A also implies unit specific fire brigade leaders required. Not distracting if there is only one fire brigade. 10) Stem states fire brigade leader goes home. Which unit was supplying the assigned fire brigade leader? Recommend clarify.

2/9/09 discussed further with site clarified justifications and will revise distractor "C" to have off-site fire dept EMT respond it is addressed in EP plan that if site needs off site EMT will respond and formerly EMT was designated part of the fire brigade.

2/15/09: Comments resolved for replacement Q.

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MILLSTONE UNIT 2 OPERATING TEST REVIEW COMMENTS

Control Room / In-Plant JPMs

1. General Notes: 1) Are the JPM banks open to the students and in their training have they been exposed to these Alt path JPMs? **NO** 2) What is the history of these JPMs any used on the last 2 NRC exams? **NO**
2. JPM a (JPM-014), **Restore Letdown to Service** a) Steps 33, 38 are not critical, b) In Step 39, recommend change cue from "US directs NA" to "Examiner cue: for purposes of this JPM, assume pwr level is 68%". Better to simulate req'd conditions, instead of NA of a step that should not be NA'd, c) Step 43 action to close CH-515 is not critical. No consequence to leaving valve open as no flow through regen hx, since CH-341 is closed. d) Is there position indication for 110P? CH-341 meant to simulate fail closed 110P. If position indication available, need to ensure Valve 110P indicates closed. **Replaced JPM found to be redundant to scenario actions taken.**
3. JPM b (JPM-051), **Swap 24C From "A" EDG to RSST**, a) step 14 not critical? b) Steps 17-19 EDG load decrease should be critical? c) Consider modifying JPM (straight from bank) after step 11 bus powered from Transformer e.g. low lube oil alarm on EDG trip early. alt path, as written, is inconsequential since machine unloaded, output bkr open and no fault on machine, better alternate path if changed as suggested. d) Step 5 not critical, no UV present, e) Step 10 only critical if adjustment required. Recommend initial sim setup to require some adjustment. f) Step 14 not critical, no observable plant equipment operation required, no SIAS present, g) Recommend examiner cue in Step 21 to inform applicant that 3 minutes have elapsed since the DG Fdr Bkr was opened. h) should initial conditions state no fault indicated on RSST? **JPM truncated to eliminate some steps to shorten JPM to a reasonable run time.**
4. JPM c (JPM-250), **EOP-2541, App. 4, Start "A" Main Feed Pump** – a) new alt path JPM. Not really alt path in true sense have to cue to start other FW pump. **Replaced**
5. JPM d (JPM-223), **Force Pressurizer Sprays**, a) skills tested by this JPM are already tested on dynamic portion of exam. Scenario #4 fails pressure transmitter, operator must recognize and swap to Ch X – same as in alt path JPM. Also, Scn #3 initialized w/forcing sprays and Scn #1, 2 and 4 have operators initiate forcing sprays. Recommend replace this JPM. **Replaced JPM found to be redundant to scenario.**
6. JPM e (JPM-251), **S/G Safety Channel Level Instrument Failure (Low)** – a) there does not appear to be any substance to this JPM, does not appear to test understanding in any substantial way, cue informs of alarm (SG LO LEVEL TRIP CH B) and directs alarm response, applicant expected to obtain keys and bypass bistables on RPS, C-517 and C-518. Appears only knowledge tested is ability to find the keys and the panels. Questionable safety consequence to this task as plant is stable and condition of trip system is as desired by TS Table 3.3-1 Action 2 in that trip unit is tripped and plant is 'safe', in a 1 of 3 remaining coincidence situation. b) only critical step is to turn the keys as the step for not tripping the reactor is not critical because no positive action is observed, rather looking for the lack of improper action. Need to select a JPM that requires operator intervention on the malfunction to stabilize conditions. **Replaced JPM for above reasons**

MILLSTONE UNIT 2 OPERATING TEST REVIEW COMMENTS

7. JPM f (JPM-224), **Start "B" Circulating Water Pump** – a) Bank alternate path JPM is low LOD since just go back to restoring line-up pre-pump trip consider modification. b) Step 21 is N/A marked critical is just a verify N/A step. ***Retained JPM based replacement of other JPMs.***
8. JPM g (JPM-010), **RCP Seal Degradation and Failure** – a) Steps 1 and 7 are not critical, no action taken, b) Steps 18 and 19 do not appear to be critical as observable actions not taken, c) JPM not acceptable. Applicant in cue told to make recommendation about continued operation of the pump. Pass/fail judgement based solely on whether applicant recommends a plant shutdown for degrading seals (no physical board action required of the applicant). Appears only other outcome of JPM would be for applicant to say "all is well, let's continue operating the pump", which would be incredible given the cue guidance. Further, the JPM indicates applicant will arrive at the correct conclusion by multiple paths – rate of change if he/she is quick and at greater than 1500 psid if he/she is very slow, therefore not even testing timeliness of applicant response. This "make a recommendation" type of JPM might fit as an admin JPM, but not as a control room JPM. Possible alternatives include having the applicants follow through with observable physical actions to respond to a degrading pump. An example would be a degrading seal that results in a vapor seal failure, requiring rx and turbine trip and RCP shutdown. Would need examiner (as US) cue to take OP actions for the condition. ***Replaced JPM for above reasons.***
9. JPM h (JPM-221), **Shift CAR Coolers** – Bank alternate path JPM is very low LOD since just go back to restoring "B" after "D" trips upon starting - restores pre-fan trip line-up - consider modification and or replacing. These four alt path JPMs collectively (JPM-051, 250, 221, 224) very weak set of alt path JPM set. ***Replaced JPM for above reasons - JPM determined not to test operator understanding.***
10. JPM i (JPM-142 – SPARE), **Adjust Radioactive Waste Gas Radiation Monitor Setpoint**, Initiating Cue doesn't seem clear why not just state Perform Waste Gas RM Adjustment for Discharge IAW steps 4.1.9 to 4.1.12...
11. JPM j (JPM-085), **Local Manual Start of the Turbine Driven Auxiliary Feedwater Pump**, appears too easy LOD=1, opens one steam supply valve. ***Replaced JPM for above reason.***
12. JPM k (JPM-225), **Shift Radioactive Waste Gas Decay Tanks**, step #7 why not critical - rotate the "A" Decay Tank Inlet Stop, 2-GR-6A to clockwise to stop. Note: Step #8 equivalent step is marked critical.
13. JPM l (JPM-252), **Place CEA on the Hold Bus** – a) Step #2 Cabinet designations Name plate data not listed - not clear which breakers are being operated? Check other cabinet designations in JPM to make sure they represent plant designations. b) Is task intended to be time critical? Cover sheet says YES but cue does not indicate task is time critical. Alarm procedure step says request PEO perform within 15 minutes. However, nothing in ARP to indicate this action is time-critical. What is consequence of exceeding 15 minutes? Is the time a valid basis for denying a license? c) This is improperly categorized on ES-301-2 as an "Emergency or Abnormal in plant". This evolution, directed by alarm response is more of a normal evolution. d) Step 1 should not be critical, no action required, we are cueing that they have the key. e) We'll need some

MILLSTONE UNIT 2 OPERATING TEST REVIEW COMMENTS

way to evaluate applicant ability in Step 11 since not actually allowing applicant to open access door. Either open the door or provide a photo of the interior. f) steps to check voltage and meter deflection are not critical, assuming correct switch manipulations and the existence of power, task could be completed successfully without checking voltages, etc.

Admin JPMs

1. General Notes:
2. JPM-A1.1R, **RO Shift Turnover**, a) Outline ES-301-1 on CD does not match submitted JPMs. Submitted JPM is **Perform a Calculation for Boration to RCS**. However, hard copy sent with the disk does match the JPMs b) Calculate Boration appears borderline low LOD just plugging numbers into formula and doing math. c) Crews performs power reductions in Scenarios #1, 2 and 4. Looks like we should expect boration calculations performed during these scenarios. ***Replaced JPM for above reasons***
3. JPM-A1.2R, **RO Determine Shutdown Margin**, a) Recommend add to initial conditions a single rod stuck at 20 steps, changes JPM from bank and adds an additional factor to consider in the calculation, also makes end result actual SDM unsat which adds consequence to performing JPM correctly.
4. JPM-A.1.3R (SPARE), **RO Maximum RCS Venting Time Determination**, a) spare JPM is not discriminating with graph provided equivalent to a DLO Q not really a valid task – does not test operator understanding as required by 10CFR 55.
5. JPM-A2R, **Calculate Time to Boil**, a) recommend modify initial conditions from “been returned to MODE 5” to “transitioned from MODE 6 to MODE 5” for clarity, b) recommend add to initial conditions status of SDC, c) need to determine and establish acceptable ranges for calculated values based on reasonable accuracy in reading graphs and tables.
6. JPM-A3R, **Review RWP and Survey Map for Entry into Tech Spec Locked High Rad Area and Contaminated Area**
7. JPM-SRO-SPARE, **SRO Shift Staffing Requirements**,
8. JPM-A1.2S, **SRO Perform a Shutdown Safety Assessment**,
9. JPM-A1.1S, **SRO Shift Turnover**,
10. JPM-A2S, **SRO Approve A Clearance Boundary**, a) obvious errors LOD=1.5 borderline, suggest that you leave off 2-SW-2A, Service Water Pump Discharge Stop valve so that they need to identify this also.
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Note: The Operating test draft submittal was overall weak and required a lot of rework to meet NRC standards. However, the Operating test was determined to meet the metric of not more than 20% of the exam submittal was unsat when averaging in the scenario events/malfunions as described in the example in ES-501, E.3. a. , pg 9. For example, the six SROU applicants were administered 10 JPMs and 2 scenarios each with an average of 6 events/malfunions per scenario (12). 3 of their 10 proposed JPMs were unsat, therefore, $3/22=13.6\%$ unsat. For the two SROI applicants, 6 of the 15 JPMs administered were unsat plus each was administered 3 scenarios each for a total of 33 on test exam items, therefore, for the two SROI applicants $6/33=18.2\%$ unsat.

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General Notes

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9. D-1 events should be listed chronological order as they occur in scenario.

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Scenario #1 (ES08LI1) (SBLOCA/LOOP)

1. MT really includes: a) Turbine Load Shed; b) LOOP; and c) Can't double count PORV open as malfunction and MT. **PORV is a set-up for the scenario – no success path to close it, therefore, considered part of the MT.**
2. Will need to add at least one and should add 2 malfunctions prior to MT to this scenario since really only have 4 malfunctions. **Added "RCP Bleed-off Transmitter Failure"**
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4. CT #3, how fast does SG level degrade if second AFW pump not started in 10 minutes? Need to better understand this CT. **Determined not to be a critical task 2 new critical tasks added.**
5. TS should be evaluated before the MT which TS are being tested on this scenario – need at least 2/scenario for SROs? **Done for final.**
6. Classify the scenario at the end this will be a follow-up for SRO applicants. **Done**
7. The scenario D-1 form states that the 24D bus is aligned to the 24C bus. The scenario guide says that the 24D bus is aligned to the 24E bus. **corrected**
8. The scenario narrative states that the first event is swapping service water pumps. This event is listed out of order on the D-1 form. Is this event 9? If so, why is the event listed after the major plant transient on the D-1 form? **Moved to event #1.**

Scenario #2 (ES08LI2) (SGTR)

1. Event 2 does not count as an instrument malfunction TS only call – no required operator actions.
2. Can't double count SGTR as a MT and a malfunction. **Corrected.**
3. You only have a total of 5 malfunctions need 5 minimum should add 2 malfunctions one before and one after MT. **Added a component malfunctions - Loss of "B" CRAC Filter Fan**
4. Classify the scenario at the end this will be a follow-up for SRO applicants. **Done**
5. Event 7 (spray valve stuck open) is listed in the D-1 form but not listed on the D-2 form scenario narrative. **Corrected**
6. Revised scenario to address general note #1 above to provide more diversity. **Crew directed to perform a power increase from 90% power as part of their turnover.**

Scenario #3 (ES08LI4) (Heat Sink)

1. Classify the scenario at the end this will be a follow-up for SRO applicants. **Done**
2. The turnover on the D-1 form states that the 24E bus is aligned to the 24C bus. This condition is not listed on the D-2 scenario narrative or on the turnover sheet. **Corrected**
3. Event 6 (RSST fault) The loss of the RSST (loss of offsite power) occurs coincident with the reactor trip and should not be considered a separate component failure. **Corrected**
4. RD0328 on D-1, but RD0326 on D-2.- **Typo corrected.**
5. Don't have required minimum number of malfunctions – **added 2 malfunctions: 1) #2 S/G level control failure and 2) "A" CAR fan trip**

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Scenario #4 (ES08LI3) Spare Scenario Note: Not included in Master file since not used during exam and licensee would like to use on future exam. Comments below do not include detailed information for that reason.

1. Event 1 – replace event since no point in the normal evolution to swap pumps when third event trips the “A” pump this pre-conditions the applicants and should be avoided.
2. Event 2 - transmitter failure only counts for SRO TS call – not a malfunction since there are no required operator actions.
3. Event 4, oil leak, cannot be counted as a malfunction because no substantial operator action taken.
4. Event 5, 6 and 8 are all part of a single major event and should not be listed separately on the D-1, nor counted more than once as a MT.
5. Event 7 may also be part of the major plant transient –
6. What is the second TS call before the MT?
7. Highlight required steps to satisfy each CT in the script.
8. Where is scripting for isolating ?
9. Classify the scenario at the end this will be a follow-up for SRO applicants.
10. Turnover instructions on the D-1 form do not match the D-2 form.
11. CT3 – what is the task standard?
12. CT2 - What is the task standard?
13. Typo in the shift turnover report (page 31) states that the unit is at 100% power rather than 1.5%

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Control Room / In-Plant JPMs

1. General Notes: 1) Are the JPM banks open to the students and in their training have they been exposed to these Alt path JPMs? **NO** 2) What is the history of these JPMs any used on the last 2 NRC exams? **NO**
2. JPM a (JPM-014), **Restore Letdown to Service** a) Steps 33, 38 are not critical, b) In Step 39, recommend change cue from "US directs NA" to "Examiner cue: for purposes of this JPM, assume pwr level is 68%". Better to simulate req'd conditions, instead of NA of a step that should not be NA'd, c) Step 43 action to close CH-515 is not critical. No consequence to leaving valve open as no flow through regen hx, since CH-341 is closed. d) Is there position indication for 110P? CH-341 meant to simulate fail closed 110P. If position indication available, need to ensure Valve 110P indicates closed. ***Replaced JPM found to be redundant to scenario actions taken.***
3. JPM b (JPM-051), **Swap 24C From "A" EDG to RSST**, a) step 14 not critical? b) Steps 17-19 EDG load decrease should be critical? c) Consider modifying JPM (straight from bank) after step 11 bus powered from Transformer e.g. low lube oil alarm on EDG trip early. alt path, as written, is inconsequential since machine unloaded, output bkr open and no fault on machine, better alternate path if changed as suggested. d) Step 5 not critical, no UV present, e) Step 10 only critical if adjustment required. Recommend initial sim setup to require some adjustment. f) Step 14 not critical, no observable plant equipment operation required, no SIAS present, g) Recommend examiner cue in Step 21 to inform applicant that 3 minutes have elapsed since the DG Fdr Bkr was opened. h) should initial conditions state no fault indicated on RSST? ***JPM truncated to eliminate some steps to shorten JPM to a reasonable run time.***
4. JPM c (JPM-250), **EOP-2541, App. 4, Start "A" Main Feed Pump** – a) new alt path JPM. Not really alt path in true sense have to cue to start other FW pump. ***Replaced***
5. JPM d (JPM-223), **Force Pressurizer Sprays**, a) skills tested by this JPM are already tested on dynamic portion of exam. Scenario #4 fails pressure transmitter, operator must recognize and swap to Ch X – same as in alt path JPM. Also, Scn #3 initialized w/forcing sprays and Scn #1, 2 and 4 have operators initiate forcing sprays. Recommend replace this JPM. ***Replaced JPM found to be redundant to scenario.***
6. JPM e (JPM-251), **S/G Safety Channel Level Instrument Failure (Low)** – a) there does not appear to be any substance to this JPM, does not appear to test understanding in any substantial way, cue informs of alarm (SG LO LEVEL TRIP CH B) and directs alarm response, applicant expected to obtain keys and bypass bistables on RPS, C-517 and C-518. Appears only knowledge tested is ability to find the keys and the panels. Questionable safety consequence to this task as plant is stable and condition of trip system is as desired by TS Table 3.3-1 Action 2 in that trip unit is tripped and plant is 'safe', in a 1 of 3 remaining coincidence situation. b) only critical step is to turn the keys as the step for not tripping the reactor is not critical because no positive action is observed, rather looking for the lack of improper action. Need to select a JPM that requires operator intervention on the malfunction to stabilize conditions. ***Replaced JPM for above reasons***

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7. JPM f (JPM-224), **Start "B" Circulating Water Pump** – a) Bank alternate path JPM is low LOD since just go back to restoring line-up pre-pump trip consider modification. b) Step 21 is N/A marked critical is just a verify N/A step. ***Retained JPM based replacement of other JPMs.***
8. JPM g (JPM-010), **RCP Seal Degradation and Failure** – a) Steps 1 and 7 are not critical, no action taken, b) Steps 18 and 19 do not appear to be critical as observable actions not taken, c) JPM not acceptable. Applicant in cue told to make recommendation about continued operation of the pump. Pass/fail judgement based solely on whether applicant recommends a plant shutdown for degrading seals (no physical board action required of the applicant). Appears only other outcome of JPM would be for applicant to say "all is well, let's continue operating the pump", which would be incredible given the cue guidance. Further, the JPM indicates applicant will arrive at the correct conclusion by multiple paths – rate of change if he/she is quick and at greater than 1500 psid if he/she is very slow, therefore not even testing timeliness of applicant response. This "make a recommendation" type of JPM might fit as an admin JPM, but not as a control room JPM. Possible alternatives include having the applicants follow through with observable physical actions to respond to a degrading pump. An example would be a degrading seal that results in a vapor seal failure, requiring rx and turbine trip and RCP shutdown. Would need examiner (as US) cue to take OP actions for the condition. ***Replaced JPM for above reasons.***
9. JPM h (JPM-221), **Shift CAR Coolers** – Bank alternate path JPM is very low LOD since just go back to restoring "B" after "D" trips upon starting - restores pre-fan trip line-up - consider modification and or replacing. These four alt path JPMs collectively (JPM-051, 250, 221, 224) very weak set of alt path JPM set. ***Replaced JPM for above reasons - JPM determined not to test operator understanding.***
10. JPM i (JPM-142 – SPARE), **Adjust Radioactive Waste Gas Radiation Monitor Setpoint**, Initiating Cue doesn't seem clear why not just state Perform Waste Gas RM Adjustment for Discharge IAW steps 4.1.9 to 4.1.12...
11. JPM j (JPM-085), **Local Manual Start of the Turbine Driven Auxiliary Feedwater Pump**, appears too easy LOD=1, opens one steam supply valve. ***Replaced JPM for above reason.***
12. JPM k (JPM-225), **Shift Radioactive Waste Gas Decay Tanks**, step #7 why not critical - rotate the "A" Decay Tank Inlet Stop, 2-GR-6A to clockwise to stop. Note: Step #8 equivalent step is marked critical.
13. JPM l (JPM-252), **Place CEA on the Hold Bus** – a) Step #2 Cabinet designations Name plate data not listed - not clear which breakers are being operated? Check other cabinet designations in JPM to make sure they represent plant designations. b) Is task intended to be time critical? Cover sheet says YES but cue does not indicate task is time critical. Alarm procedure step says request PEO perform within 15 minutes. However, nothing in ARP to indicate this action is time-critical. What is consequence of exceeding 15 minutes? Is the time a valid basis for denying a license? c) This is improperly categorized on ES-301-2 as an "Emergency or Abnormal in plant". This evolution, directed by alarm response is more of a normal evolution. d) Step 1 should not be critical, no action required, we are cueing that they have the key. e) We'll need some

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way to evaluate applicant ability in Step 11 since not actually allowing applicant to open access door. Either open the door or provide a photo of the interior. f) steps to check voltage and meter deflection are not critical, assuming correct switch manipulations and the existence of power, task could be completed successfully without checking voltages, etc.

Admin JPMs

1. General Notes:
2. JPM-A1.1R, **RO Shift Turnover**, a) Outline ES-301-1 on CD does not match submitted JPMs. Submitted JPM is **Perform a Calculation for Boration to RCS**. However, hard copy sent with the disk does match the JPMs b) Calculate Boration appears borderline low LOD just plugging numbers into formula and doing math. c) Crews performs power reductions in Scenarios #1, 2 and 4. Looks like we should expect boration calculations performed during these scenarios. ***Replaced JPM for above reasons***
3. JPM-A1.2R, **RO Determine Shutdown Margin**, a) Recommend add to initial conditions a single rod stuck at 20 steps, changes JPM from bank and adds an additional factor to consider in the calculation, also makes end result actual SDM unsat which adds consequence to performing JPM correctly.
4. JPM-A.1.3R (SPARE), **RO Maximum RCS Venting Time Determination**, a) spare JPM is not discriminating with graph provided equivalent to a DLO Q not really a valid task – does not test operator understanding as required by 10CFR 55.
5. JPM-A2R, **Calculate Time to Boil**, a) recommend modify initial conditions from “been returned to MODE 5” to “transitioned from MODE 6 to MODE 5” for clarity, b) recommend add to initial conditions status of SDC, c) need to determine and establish acceptable ranges for calculated values based on reasonable accuracy in reading graphs and tables.
6. JPM-A3R, **Review RWP and Survey Map for Entry into Tech Spec Locked High Rad Area and Contaminated Area**
7. JPM-SRO-SPARE, **SRO Shift Staffing Requirements**,
8. JPM-A1.2S, **SRO Perform a Shutdown Safety Assessment**,
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