In accordance with examination security guidance contained in NUREG 1021, Revision 12, APS requests that the material contained in the enclosures be withheld from public disclosure until after the examinations are complete.

NUREG 1021/10 CFR 55

Palo Verde
Nuclear Generating Station
P.O. Box 52034
Phoenix, AZ 85072
Mail Station 7636
Tel 623 393 5753

102-08722-MSC/JR
May 14, 2024

J. Monninger, Regional Administrator
U.S. Nuclear Regulatory Commission, Region IV
1600 E. Lamar Blvd.
Arlington, TX 76011-4511

Reference: Nuclear Regulatory Commission (NRC) letter, "Palo Verde Nuclear Generating Station, Units 1, 2, and 3 – Notification of NRC Initial Operator Licensing Examination, dated September 6, 2023" [Agencywide Documents Access and Management System (ADAMS) Accession No. ML23249A257]

Subject: **Palo Verde Nuclear Generating Station (PVNGS)**
Units 1, 2, and 3 Docket Nos. STN 50-528, 50-529, 50-530
2024 Post-Examination Comments and Analysis Submittal

Arizona Public Service Company (APS) management has completed its review of the initial operator licensing examination conducted May 9, 2024. Per NUREG 1021, Revision 12, Section ES-4.4, this letter provides the required post examination documents. There were no substantive comments made by the applicants following the written examination.

As discussed with the Chief Examiner, APS will obtain post-examination signatures from individuals who had detailed knowledge of any part of the operating tests or written examination and electronically forward completed Form(s) 1-3.1, "Examination Security Agreement," with the appropriate pre- and post-examination signatures.

In accordance with examination security guidance contained in NUREG 1021, Revision 12, APS requests that the NRC Region IV office delay public release of the proposed and final operating test, written examination and answer keys for a period of 2 years from the date of the examination completion.

No new commitments are being made to the NRC by this letter.

If you have any questions or require additional information, please contact Jarred J. Shaver, Section Leader, Nuclear Training, at (623) 393-4519.

Sincerely,

Cox, Matthew S(Z05628) Digitally signed by Cox, Matthew S(Z05628)
Date: 2024.05.14 08:03:00 -07'00'

Matthew S. Cox
Department Leader, Nuclear Regulatory Affairs

MSC/JR

Withhold from Public Disclosure
Per NUREG 1021, Revision 12

Enclosure:

1. Signed Facility Cover Letter
2. Written Examination Cover Sheets – UNGRADED
3. Written Examination Cover Sheets – GRADED
4. Written Examination Answer Sheets – UNGRADED
5. Written Examination Answer Sheets – GRADED
6. As-Given RO and SRO Written Examinations with Provided Examination References
7. As-Given RO and SRO Written Examination Worksheet
8. RO and SRO Written Examination Answer Keys
9. Questions Asked and Responses Given During Written Examination Administration
10. Post-Examination Applicant and Licensee Comments
11. Written Examination Seating Chart
12. Written Examination Performance Analysis
13. Form 1-3.1 Examination Security Agreement
14. Condition Reports Generated from Exam Validation and/or Administration

cc: (w/o enclosure)

H. J. Gepford	NRC Region IV, Chief, Operations Branch
N. Salazar	NRC Region IV, Licensing Assistant, Operations Branch
D. You	NRC Region IV, Operations Engineer
L. N. Merker	NRC Senior Resident Inspector for PVNGS

(w enclosure)

T. J. Farina	NRC Region IV, Chief Examiner

Withhold from Public Disclosure
Per NUREG 1021, Revision 12

Enclosure

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In accordance with examination security guidance contained in NUREG 1021, Revision 12, material contained in the enclosure shall be withheld from public disclosure until after the examinations are complete. APS requests withholding of this material for 2 years from the completion of examinations to align with the completion of the two-year training cycle.

2024 PVNGS NRC Initial Written Exam Performance Analysis (< 70% Pass Rate Questions)

Question 5		Given the following conditions: • Unit 3 is operating at 30% power • Pressurizer Level Control, RCN-LIC-110, is in LOCAL/AUTO with a setpoint of 40% Subsequently: • The always running and normally running Charging Pumps both tripped due to gas binding • The standby Charging Pump was placed in PULL TO LOCK • The CRS has just entered 40AO-9ZZ05, Loss of Charging or Letdown Assuming charging cannot be restored, approximately how long will it take Pressurizer level to reach Reactor trip criteria in 40AO-9ZZ05?
63%	**A.**	**38.5 minutes**
21%	B.	71.5 minutes
13%	C.	82.5 minutes
4%	D.	165 minutes
Analysis:		The Loss of Charging or Letdown lesson plan clearly covers the trip criteria during a loss of Charging. If pressurizer level lowers to 33% and restoration of charging is not impending, the reactor trip criteria is met. The other piece of knowledge needed to answer this question is the rate at which pressurizer level lowers with all charging pumps secured and letdown isolated. This is also clearly annotated in the Loss of Charging or Letdown lesson plan. Pressurizer level will lower 10% in 55 minutes due to RCP controlled bleedoff. Following exam review with the class, the students indicated that they knew the rate at which pressurizer level will lower, however several were unsure what level at which a reactor trip would be procedurally directed.
Conclusion:		The question was determined to be technically adequate and training on this topic is also adequate. No action required, however generation or and use of questions covering this concept should be incorporated (if not already done) on periodic exams during the program to ensure this concept is understood by LOIT students.

2024 PVNGS NRC Initial Written Exam Performance Analysis (< 70% Pass Rate Questions)

<table>
<tr><td colspan="2">Question 21</td><td>Given the following conditions:

• Unit 1 is performing a Reactor startup following a refueling outage
• The Reactor is at the ECP -1000 position

Subsequently:

• Startup Channel NI #1 failed low

Which of the following LCOs require action to be taken (within one hour) in response to this failure?

1. LCO 3.3.2, RPS Instrumentation – Shutdown

2. LCO 3.3.12, Boron Dilution Alarm System

3. LCO 3.9.2, Nuclear Instrumentation</td></tr>
<tr><td>8%</td><td>A.</td><td>1 ONLY</td></tr>
<tr><td>54%</td><td>B.</td><td>2 ONLY</td></tr>
<tr><td>0%</td><td>C.</td><td>1 and 3</td></tr>
<tr><td>38%</td><td>D.</td><td>2 and 3</td></tr>
<tr><td colspan="2">Analysis:</td><td>Of the 11 applicants who missed this question, 9 picked D. While 2 is correct, 3 (LCO 3.9.2) is only applicable in MODE 6 and would therefore not require any action to be taken within one hour. Mode of applicability is RO level knowledge. Additionally, which NIs are used for which LCOs is system level knowledge. This information is covered in both TS lesson plans as well as the Excore Instrumentation lesson plan. Following exam review, the class indicated that they just didn’t study mode of applicability as well as they probably should have.</td></tr>
<tr><td colspan="2">Conclusion:</td><td>Question is technically accurate, training on this information is adequate, and question is appropriate for the RO exam. Recommendation to evaluate LOIT training program exams to ensure ROs and SROs are being adequately tested on mode of applicability during the training program, specifically on programmatic written examinations.</td></tr>
</table>

2024 PVNGS NRC Initial Written Exam Performance Analysis (< 70% Pass Rate Questions)

Question 58		Given the following conditions: • Unit 2 is operating at 100% power • A loss of Class 120 VAC Instrument Bus, PND-D28, has just occurred Prior to any operator action, which of the following describe the impacts the loss of PND-D28 will have on Rod Position Indication? 1. The Plant Computer will lose position indication for CPC D target rods 2. Upper Electrical Limit Lights will be illuminated for all CPC D target rods 3. The Rod Bottom Lights will be illuminated for all CPC B and D target rods
63%	**A.**	**1 and 2 ONLY**
33%	B.	1 and 3 ONLY
0%	C.	2 and 3 ONLY
4%	D.	1, 2, and 3
Analysis:		Of the 9 students who missed this question, 8 of them picked B. Following exam review, they indicated that they knew the plant computer would lose position indication for CPC D rods, however they weren't sure about the other two choices. This information is adequately trained in the CPC lesson plan as well as the loss of class instrument power AOP lesson plan.
Conclusion:		Question is technically accurate and within the scope of RO knowledge. No action needed.

<table>
<tr><td colspan="2">Question 80</td><td>Given the following conditions:

• Unit 2 is operating at 100% power
• The ‘B’ EDG is paralleled with offsite power for a EDG load run

Subsequently:

• Train ‘B’ 125 VDC Control Power Bus, PKB-M42, loses power due to a short on the bus
• The CRS has entered 40AO-9ZZ13, Loss of Class Instrument or Control Power

(1) Per 40AO-9ZZ13, the CRS should direct the crew to have an AO…

(2) If PKB-M42 cannot be restored, Unit 2 must be in MODE 3 within a MAXIMUM of…</td></tr>
<tr><td>0%</td><td>A.</td><td>(1) immediately open the ‘B’ EDG Output Breaker locally
(2) 7 hours</td></tr>
<tr><td>100%</td><td>B.</td><td>(1) immediately open the ‘B’ EDG Output Breaker locally
(2) 8 hours</td></tr>
<tr><td>0%</td><td>C.</td><td>(1) emergency stop the ‘B’ EDG, THEN open the ‘B’ EDG Output Breaker locally
(2) 7 hours</td></tr>
<tr><td>0%</td><td>D.</td><td>(1) emergency stop the ‘B’ EDG, THEN open the ‘B’ EDG Output Breaker locally
(2) 8 hours</td></tr>
<tr><td colspan="2">Analysis:</td><td>The Loss of Class Instrument Power lesson plan discusses the required entry into LCO 3.0.3 for a loss of PKB due to losing all RCS Leakage Detection. This concept is adequately trained, however all students jumped on the 8 hours to be in MODE 3 based on 2 hours to restore PKB per LCO 3.8.4, DC Sources – Operating, then 6 hours to be in MODE 3 if the bus is not restored. Following the exam review, the students indicated that given the conditions in the stem (EDG paralleled with offsite, loss of power to an electrical bus, entry into the loss of control power AOP), their focus was solely on electrical LCOs and therefore didn’t consider the other LCOs impacted by the loss of PKB. They thought the question was fair, but unintentionally led them to focusing on LCO 3.8 impacts.</td></tr>
<tr><td colspan="2">Conclusion:</td><td>Question is technically accurate, appropriate for the SRO level, and is adequately covered in the training materials. However, a failure rate of 100% warrants a closer look at how this information is conveyed to the operators as well as whether or not this concept is evaluated during the training program. Additionally, recommend evaluating extent of condition as it applies to training on other conditions or equipment failures which require direct entry into LCO 3.0.3. Recommend a TNA to evaluate the adequacy of training and evaluation of these concepts in the LOIT training program.</td></tr>
</table>

2024 PVNGS NRC Initial Written Exam Performance Analysis (< 70% Pass Rate Questions)

Question 81		Given the following conditions: • Unit 3 is operating at 100% power • Outside Containment Isolation Valve, IAA-UV-2, has just failed closed and could not be re-opened • The CRS has entered 40AO-9ZZ06, Loss of Instrument Air (1) Per 40AO-9ZZ06, the CRS should INITIALLY direct the crew to perform… (2) If the appendix entered in Part 1 is not successful in restoring air header pressure inside Containment and Reactor Drain Tank pressure reaches 5 psig, the CRS should direct the crew to…
0%	A.	(1) Appendix J, Aligning N2 to the CTMT Instrument Air Header (2) commence a downpower per 40OP-9ZZ05, Power Operations
30%	B.	(1) Appendix J, Aligning N2 to the CTMT Instrument Air Header (2) immediately trip the Reactor per 40AO-9ZZ06, Loss of Instrument Air
10%	C.	(1) Appendix K, Placing the Instrument Air/Service Air Cross-Tie In Service (2) commence a downpower per 40OP-9ZZ05, Power Operations
60%	**D.**	**(1) Appendix K, Placing the Instrument Air/Service Air Cross-Tie In Service** **(2) immediately trip the Reactor per 40AO-9ZZ06, Loss of Instrument Air**
Analysis:		40AO-9ZZ06, Loss of Instrument Air, provides clear direction on this situation. However, during exam review, the class pointed out that this AOP was revised in October 2023, which changed how this situation is handled, specifically whether the reactor is tripped or not when RDT pressure reaches 5 psig. This AOP was trained (in the classroom) prior to this AOP revision and some members of the class were unaware of the procedure change.
Conclusion:		Question is technically accurate and appropriate for the SRO section of the exam. Recommendation was made the LOIT section leader to implement a tracking mechanism to identify AOPs or EOPs which are revised after being trained to ensure all students are aware of these changes prior to their Audit and/or NRC exams.

2024 PVNGS NRC Initial Written Exam Performance Analysis (< 70% Pass Rate Questions)

Question 92		Given the following conditions: • All 3 Units were operating at 100% power when an Operating Basis Earthquake (OBE) occurred • Unit 2 automatically tripped on the OBE • Following SPTAs, the Unit 2 CRS transitioned to 40EP-9EO09, Functional Recovery, due to an RCS leak in the Aux Building and a SGTR on SG #1 Per 40EP-9EO09, Functional Recovery, in order to minimize the spread of contamination outside of Containment, the Unit 2 CRS should direct AOs to…
70%	A.	align Aux Building Sumps and Turbine Building Sumps to the Liquid Radwaste System
30%	**B.**	**open the feeder breakers for all of the Aux Building Sump Pumps and align Turbine Building Sumps to the Liquid Radwaste System**
0%	C.	align Aux Building Sumps to the Liquid Radwaste System and open the feeder breakers for all of the Turbine Building Sump Pumps
0%	D.	open the feeder breakers for all of the Aux Building Sump Pumps and all of the Turbine Building Sump Pumps
Analysis:		All 10 applicants correctly determined that the Turbine Building Sumps should be aligned to the LRS system, however 7 of 10 incorrectly determined that the Aux Building Sumps should be aligned to the LRS System.
Conclusion:		Question is technically accurate, and the concept of isolating Aux Building Sumps from the LRS is discussed in the Loss of Coolant Accident lesson plan, however Appendix 99, Aux Building Sump Pump Breaker List, the appendix performed in order to isolate Aux Building Sumps, is not discussed in the lesson plan. Recommend evaluating the LOCA lesson plan for incorporation of this Appendix, evaluating if this concept is tested during the program, and consider an extend of condition for other EOPs which direct the performance of Standard Appendices to identify other potential gaps regarding EOP mitigation training. Given that one of the primary SRO level test items for NRC initial written exams is the knowledge of implementation of EOP sub-procedures, this concept should be heavily emphasized and evaluated during the LOIT training program to prepare SRO applicants for their NRC written exams.

2024 PVNGS NRC Initial Written Exam Performance Analysis (< 70% Pass Rate Questions)

Question 93		Given the following conditions: • Unit 1 is performing a core offload • An irradiated fuel assembly has just been loaded into the upender and the upender is in the vertical position • A check of the camera screen shows a small stream of bubbles coming from the area of the upender • A determination has been made to place the fuel assembly into a safe location Per 72IC-9RX03, Core Reloading, the recommended action for the assembly is to ___(1)___ , and this placement will be done at the discretion of the ___(2)___ .
0%	A.	(1) reinstall the assembly in its original location in the core (2) Shift Manager
0%	B.	(1) reinstall the assembly in its original location in the core (2) Refueling SRO
40%	C.	(1) lower the upender to the horizontal position (2) Shift Manager
60%	**D.**	**(1) lower the upender to the horizontal position** **(2) Refueling SRO**
Analysis:		72IC-9RX03 is clear on who has ultimate decision making authority for placement of fuel assemblies. However, during the exam review, a student brought up that the procedure does state that “the RSRO and the SM/CRS may determine a safe intermediate storage location”. This information is what led some of the students to be unsure as to whose discretion is the ultimate authority.
Conclusion:		Question is technically accurate and this concept is well trained and evaluated during the training program. No action needed.

Questions Asked During 2024 NRC Written Exam

Q#	Applicant	Question and Answer
5		Q: What is the status of letdown?
		A: Answer the question as written
11		Q: D says “Am RCS leak…” It should say “An RCS leak…”
		A: Correct. (provided clarification to class)
11		Q: Since the stem doesn’t mention radioactivity levels in containment, can I assume there isn’t any?
		A: You can’t assume either way. Answer the question given the information provided in the stem.
21		Q: Am I supposed to consider mode of applicability?
		A: Answer the question as written
22		Q: Was Appendix D already performed?
		A: Answer the question as written
22		Q: Can I assume Channel #1 was reading the same as Channel #2 when Channel #1 failed?
		A: You can assume all systems and equipment function properly unless or until told otherwise given the conditions in the stem
26		Q: Since water loss the RDT isn’t leakage as defined by TS, can I assume that the LCO is met?
		A: Answer the question as written
30		Q: How much time has elapsed since the RAS?
		A: Answer the question as written
36		Q: Did an MSIS occur?
		A: Answer the question as written

51		Q: I think the correct answer here is 1 and 2, unless you are asking about which RM will DIRECTLY cause an auto start of a spray pond pump.
		A: (after discussion with CE – clarification provided to the class) "disregard any potential cross-trip actuations" was added in parenthesis at the end of the question.
64		Q: Is this asking how long each operator has to perform a board walkdown or how long until either of the board operators has to do a board walkdown?
		A: It's asking how long for an individual operator to perform a board walkdown.
76		Q: I believe that EOP Operations Expectations says not to go to Rx Trip even if the ESD is isolated by MSIS but 3 only is not an option
		A: Answer the question as written
82		Q: B2 and D2 say "BRINING the unit…", I think it should say "BRINGING the unit…"
		A: Correct. (provided clarification to class)
93		Q: Fuel moves are at the direction of the RSRO but temporary storage is a joint decision by the SM an RSRO.
		A: Answer the question as written

2024 PVNGS NRC Post Exam Applicant Comments

Comments on Examiners:

- The class all thought the examiners were very personable and put them ease, however they specifically called out Kelly by name as being friendly and disarming
- They also comments about how the SBCS Valve plant JPM was administered differently by different examiners. Those who did the JPM in the morning in Unit 1 all had to go up on the valve platform and yell down to the examiner what they saw and simulate what they were doing, while all others were able to just use the provided pictures to describe and simulate operation of the valve.

Operating Test Comments:

- There were no comments on the operating test

Written Exam Comments:

- **Q5 (high miss question) –** Class all said they knew how to calculate the rate at which pressurizer level would lower, however several were unsure of the level at which a reactor trip was required
- **Q21 (high miss question) –** Class said they knew that LCO 3.9 items are primary for refueling, however they didn't know that the mode of applicability was MODE 6 for all 3.9 LCOs. LOIT section leader was at the exam review and took an action to evaluate whether or not coverage of LCO mode of applicability is sufficient in the program
- **Q58 (high miss question) –** Students who missed the question said they just couldn't remember what the UEL response is for a loss of a class instrument but and guessed wrong. They agreed that the concept is adequately trained and tested on though.
- **Q80 (high miss question) –** All SROs said that they remember that a loss of PKB will result in a direct entry to LCO 3.0.3, however the stem had led them to only consider the electrical LCOs and not consider the impact to RCS leakage detection. They all felt the question was fair and the concept is adequately trained, but they let the stem lead them down a narrow path instead of consider all equipment impacted by the loss of the bus.
- **Q81 (high miss question) –** One of the operators pointed out that the Loss of IA AOP was revised in October 2023, which was after this AOP was taught (in the classroom), and the revision added the criteria to trip the reactor if RDT pressure exceeds 5 psig. Recommendation from the student to the LOIT section leader to implement some sort of tracking mechanism to identify AOPs or EOPs which are

modified during class to ensure that those changes are conveyed to the class so they are all studying the procedure revisions which will be tested on.

- **Q92 (high miss question) –** Several students indicated that they were unfamiliar with (or never heard of) Appendix 99, which is an appendix initiated during a LOCA in the Aux Building and directs opening the breakers for the Aux Building Sump Pumps. Recommendation was provided to the LOIT section leader to ensure all appendices initiated from AOPs or EOPs are discussed in the program, and ideally, a study guide of sorts is generated which lists all appendices which are generated from each AOP or EOP and a brief description as to when and why each are initiated.
- **Q93 (high miss question) –** The students who missed this question said they knew that the RSRO was in charge of fuel move decisions but weren't quite sure who had ultimate authority for temporary storage of assemblies.