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ACCESSION NBR: 8704220311 DOC. DATE: 87/04/16 NOTARIZED: NO DOCKET #  
 FACIL: STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528  
 STN-50-529 Palo Verde Nuclear Station, Unit 2, Arizona Publi 05000529  
 STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530  
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SUBJECT: Forwards comments on reactor operator & senior reactor  
 operator exams administered on 870410.

DISTRIBUTION CODE: M003D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 8.  
 TITLE: Operator Requalification Program

NOTES: Standardized plant. M. Davis, NRR: 1Cy. 05000528  
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## Arizona Nuclear Power Project

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April 16, 1987

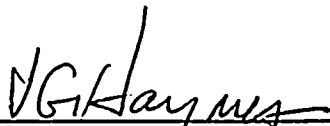
U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
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Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2, and 3  
Docket Numbers: STN 50-528 (License NPF-41)  
STN 50-529 (License NPF-51)  
STN 50-530 (License NPF-65)  
Comments on Reactor Operator and Senior Reactor  
Operator Exams Administered on April 10, 1987.  
File: 87-001-762; 87-A-056-026

Dear Sir:

ANPP has reviewed the Reactor Operator and Senior Reactor Operator exams administered on April 10, 1987. In accordance with ES 201 in NUREG 1020, we are providing you with our comments in the attachment to this letter.

Very truly yours,

  
\_\_\_\_\_  
J. G. Haynes  
Vice President  
Nuclear Production

JGH/RAB/pls  
Attachment

cc: O. M. DeMichele (with attachments)  
E. E. Van Brunt, Jr.  
A. C. Gehr  
R. P. Zimmerman  
R. J. Pate  
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ATTACHMENT I



Question 1.02 of the Reactor Operator License Examination states,

"A motor driven centrifugal pump is used in a closed cooling system. The pump has two speeds, 1200 RPM and 1800 RPM.

(a) How does each of the following parameters vary when the pump is switched from fast to slow speed?

(1) Pump differential pressure?

(2) Pump power?

Answer Key:

a.

1. Differential pressure is proportional to speed squared, therefore, pump differential pressure will go down by a factor of 0.44.
2. Pumping power is proportional to speed to the third power, therefore, power will go down by a factor of .030.

Facility Comment:

Part a asks how each of 2 parameters will vary but does not specify that a quantitative response is required. The key includes both a qualitative and quantitative response. (The quantitative response should not be required.) The relationship between speed and head and speed and power should be enough for full credit.





Question 2.13 of the Reactor Operator License Examination states,

"What are the normal and alternate power supplies (busses and voltages) to charging pump number three?"

Answer Key:

480 VAC PGB-L36 (normal) and PGA-L35 (alternate)

Facility Comment:

The number three charging pump is setup with two power supplies PGA-L35 and PGB-L36, the use of the term "normal" and "alternate" are just a matter of convenience used in the electrical line-up verification check list of the procedure. It doesn't signify that the charging pump will be powered preferentially from L36. It will be powered from the bus that allows the greatest flexibility of operation. We don't require the operator to memorize electrical power supplies when the information is easily obtained from the control board labels for the equipment. An acceptable answer would be:

480VAC load centers from either Train "A" or Train "B" essential busses.



Question 2.14 of the Reactor Operator License Examination states,

"The Chemical and Volume Control System controls RCS chemistry and inventory.

(a) ok

(b) Which two systems are needed to operate the gas stripper?

Answer Key:

b.

1. The Auxiliary Steam and Nuclear Cooling water systems are needed.

Facility Comments:

The referenced material used for the above answer is not all inclusive and a copy of Procedure 410P-1CH04 (Gas Stripper) has been supplied to the examiner. The procedure in steps 5.2.6 states that the following systems are capable of supplying the requirements of the GS:

1. Nuclear Cooling Water
2. Auxiliary Steam
3. Instrument and Service Air
4. Gaseous Radwaste
5. 480V Non Class IE Power

An appropriate answer should be any two of the five support systems for full credit.



Question 4.03 of the Reactor Operator License Examination states,

"The control room is being evacuated due to a bomb threat."

- (a) What are the five immediate actions to be taken while evacuating the control room?
- (b) OK

Answer Key:

1. Manually trip the reactor.
2. Trip two reactor coolant pumps.
3. Manually trip the turbine.
4. Place the letdown control valve select switch to the "Both" position.
5. Place the backpressure control valve select switch to the "Both" position.

Facility Comment:

The answer above is appropriate if the operator used 41A0-1ZZ27, Shutdown Outside Control Room. However, if the operator took a more conservative approach and used 41A0-1ZZ44, assuming that the bomb threat was real and could result in fire and or smoke in the control room, would take a different set of immediate actions. These actions are:

1. Manually trip the reactor.
2. If conditions permit; Manually trip all reactor coolant pumps.
3. If conditions permit; Manually trip the turbine.
4. If conditions permit; Trip the main feedwater pumps and the "A" essential auxiliary feedwater pump.
5. If conditions permit; Manually initiate a MSIS.

The above set of actions should also be an acceptable answer.

This question is valid and within the scope of Training Department objectives. Deletion of this question may impact this section of the test such that a candidate may not receive an adequate score, although he knew information pertinent the subject matter. In other words based on Training Department priorities, this question requires knowledge that is as important as other questions in this section.



Questions 5.03 of the Senior Reactor Operator License Examination states,

"The two most significant fission products which insert negative reactivity into a core are samarium and xenon. To answer the following question please refer to attached Figures 5.1 and 5.2 Samarium Concentration and Figure 5.2 Xenon Concentration.

- (a) OK
- (b) OK
- (c) OK
- (d) OK
- (e) OK
- (f) What does the term "xenon precluded" mean?

Answer Key:

- f. The negative reactivity associated with xenon exceeds the available excess reactivity.

Facility Comment:

5.03(F). In regards to the term "Xenon Precluded" the keyed answer assumes that the only precluded condition is a reactor restart during "Peak Xenon" conditions. To solicit this response the question should have used the term "Xenon Precluded Startup". Other transients may result in the Xenon Response "Precluding" normal control of the reactor. For example, recent communication between ANPP Reactor Engineering and Operations has identified the following:

Near the end of corelife a power reduction to 20% will create a xenon transient of sufficient rate that the ability of CVCS to adjust RCS Boron concentration will be exceeded. Thus, desired RCS temperatures will not be maintainable.

The grader should accept any answer which identifies a condition where the xenon transient exceeds the ability of the control system to compensate for rate or magnitude of xenon insertion.





Question 8.08 of the Senior Reactor Operator License Examination states,

"You have entered a Site Area Emergency, with minimum Technical Specifications Shift manning."

(a) -

(b) Who is the person responsible for making notifications over the unit page and the satellite technical support center (STSC) or control room radio circuit of transients and ESFAS actuations.

Exam Key Answer:

b. The Operation Technician (OPS. TECH)

Facility Comment:

The procedure reference used by the examiner does state their answer on page 20a PCN05, however, the questions stated that the shift was at minimum levels of staffing, by the Technical Specifications. There is no mention of the OPS. TECH position in Table 6.2-1 of Tech. Specs. Due to the way the question was asked an acceptable answer could be any of the following: Shift Supervisor, Control Room Supervisor/ASS, Reactor Operator, Nuclear Operator or STA.

