

**THE ENCLOSED EXAMINATION MATERIALS SHALL BE WITHHELD FROM PUBLIC  
DISCLOSURE UNTIL AFTER THE EXAMINATIONS ARE COMPLETE.**



Michael W. Davis  
Columbia Generating Station  
P.O. Box 968, MD 1028  
Richland, WA 99352-0968  
Ph. 509.377.4281 | F. 509.377.8662  
mwdavis@energy-northwest.com

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Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region IV  
1600 East Lamar Boulevard  
Arlington, TX 76011-4511

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397  
SUBMITTAL OF WRITTEN EXAMINATION RESULTS**

Dear Sir or Madam:

Enclosed are the exam cover sheets, answer sheets, and exam evaluation data for the Reactor Operator (RO) and Senior Reactor Operator (SRO) license written examinations given on March 4, 2021, at Columbia Generating Station. Specifically, the following materials are enclosed:

1. Graded written examination answer sheet for each applicant
2. Clean written examination answer sheet for each applicant
3. Completed written examination cover sheet for each applicant
4. Master answer key annotated to indicate any changes made while administering and grading the written examination
5. Questions asked by applicants and the answers given to the applicants during the written examination
6. The results of performance analysis that was performed for the written examination
7. The written examination seating chart
8. Completed Form ES-403-1, Written Examination Grading Quality Checklist
9. Original Forms ES-201-3, Examination Security Agreement, with a pre- and post-examination signature for every individual who had detailed knowledge of any part of the operating test or written examination

No new regulatory commitments are made in this letter.

If you require additional information, please contact CJ Prost, Manager, Operations Training, at (509) 377-4487.

Respectfully,

Michael W. Davis  
Manager, Training

Enclosures as stated

cc: w/o enclosures  
NRC Branch Chief, Operations Branch  
NRC Senior Resident Inspector – 988C

## **Evaluation of Questions With a Pass Rate < 50%**

**Question:** RO-19

**Pass Rate:** 9.1%

**Evaluation:** Applicants did not understand that FP-P-1 will automatically start on a loss of control power when SH-5 is deenergized. Some candidates did not realize that FP-P-2A loses power and will not start.

**Action:** This is a weak area that will be covered in gap training.

**Question:** RO-41

**Pass Rate:** 45.5%

**Evaluation:** Applicants did not know that Narrow Range RPV level is not density compensated.

**Action:** This is a weak area that will be covered in gap training.

**Question:** SRO-89

**Pass Rate:** 42.9%

**Evaluation:** Some applicants did not understand that, for the temperature given, electrolyte level is not the parameter of concern. Additionally, some applicants did not know the reason for restoring battery room temperature above the limit.

**Action:** This is a weak area that will be covered in gap training.

**Question:** RO-92

**Pass Rate:** 42.9%

**Evaluation:** Some candidates did not know that the given wetwell level was above the SRVTPLL for any given RPV pressure.

**Action:** This is a weak area that will be covered in gap training.

## **2021 CGS NRC Written Exam Facility/Applicant Comments**

If the question is answered using the valve noun names only, then B is correct. If the question is answered using the valve numbers only, then C is the correct answer. However, since there is no correct answer for the valve number and nomenclature together, as listed in the question stem, the facility recommends deleting the question from the exam.

## 2021 CGS NRC Written Exam Facility/Applicant Comments

**Applicant Comment (55-75376):** ROA-V-2 listed in the system description as closing on an inboard isolation signal.

**Applicant Comment (55-42919):** Valve noun names not correct for the valve numbers given.

**Facility Evaluation/Response:** The facility concurs that the valve noun names do not match the valve numbers as listed in the question stem. System Description SD000183, RB HVAC, lists ROA-V-1 as the REACTOR BLDG EXHAUST OUTBOARD ISOLATION and ROA-V-2 as the REACTOR BLDG EXHAUST INBOARD ISOLATION.

COLUMBIA SYSTEMS  
RBHVAC

January 2020  
SD000183, r12 mr2

- f) RRA-FN-15 ANALYZER ROOM A EMERG COOLING FAN  
with SUPPLY DAMPER ROA-AD-15
  - g) RRA-FN-17 ANALYZER ROOM B EMERG COOLING FAN  
with SUPPLY DAMPER ROA-AD-17
2. RRA-FN-19 and 20 FPC EQUIP ROOM EMERG COOLING FANS three  
position control switch, OFF/AUTO/ON, spring return to AUTO
- OFF - De-energizes fan
  - AUTO - Fan auto starts on:
    - F, A, or Z signal or
    - Loss of Normal and Startup power(for FN-20 as sensed by bkrs S1-1 and N1-1 open,  
and DG1-7 or B7 closed, FN-19 is similar)
  - ON - Fan starts
3. FPC EQUIP ROOM SUPPLY/EXH DAMPERS ROA-AD-19/REA-AD-8  
three position switch CLOSE/AUTO/OPEN, spring return to AUTO
- CLOSE - Closes damper
  - AUTO - Damper auto closes on F, A, or Z signal.
  - OPEN - Damper opens if no F, A, or Z signal
4. ROA-V-1 (2) REACTOR BLDG SUPPLY OUTBOARD (INBOARD)  
ISOLATION three position switch CLOSE/AUTO/OPEN, spring return to  
AUTO

## 2021 CGS NRC Written Exam Facility/Applicant Comments

### Questions/Comments During Exam Review

#### Question: RO-18

CGS is in Mode 1.

An event causes the following readings on the Reactor Building Exhaust Plenum Radiation Monitors:

- REA-RIS-609A: 11 mr/hr, steady
- REA-RIS-609B: 11 mr/hr, steady
- REA-RIS-609C: 14 mr/hr, steady
- REA-RIS 609D: Downscale

The CRS enters PPM 5.3.1, Secondary Containment Control.

With respect to Reactor Building Ventilation, what should the operator verify?

In accordance with PPM 5.3.1, verify ROA-V-1, Reactor Building Supply Inboard Isolation, is (1), and ROA-V-2, Reactor Building Supply Outboard Isolation, is (2).

- A. (1) closed  
(2) closed
- B. (1) closed  
(2) open
- C. (1) open  
(2) closed
- D. (1) open  
(2) open

Answer: B

## 2021 CGS NRC Written Exam Facility/Applicant Comments

### Explanation:

- A. Incorrect. Plausible since ROA-V-1 will be closed. However, ROA-V-2 will remain open
- B. Correct. REA-RIS-609C & D will provide a close signal to the RB HVAC inboard isolation valves when both monitors are > Hi-Hi level (13 mR/hr), Downscale, or a combination of either condition.
- C. Incorrect. Plausible if it is believed that REA-RIS-609C & D operate the outboard valves. However, these monitors provide input to the inboard valves.
- D. Incorrect. Plausible since ROA-V-2 will be open. Plausibility is enhanced if it is believed that a monitor downscale will not provide a close signal. However, for the conditions given, ROA-V-1 will close.

Tier 1 Discussion: This question requires knowledge of the expected system response while performing step SC-1 of EOP PPM 5.2.1, Secondary Containment Control.

Technical Reference(s)	Attached w/ Revision # See Comments / Reference
SD000147, Process Radiation Monitoring	
PPM 5.3.1, Secondary Containment Control	



## 2021 CGS NRC Written Exam Facility/Applicant Comments

Comments / Reference: SD000147	Rev: Major: 15	Minor: 001
<p>2. Reactor Building Exhaust Plenum RMS (Figure 2)(REA-RIS-609A/B/C/D)</p> <p>a) The range of this RMS is .01 - 10<sup>2</sup> mR/hr.</p> <p>b) This radiation monitor has two local alarms as follows:</p> <ul style="list-style-type: none"> <li>• LOW (white) Instrument INOP indication that activates due to any of: <ul style="list-style-type: none"> <li>- Indication LT .01 mR/hr.</li> <li>- Loss of power to the RMS.</li> <li>- Control Switch "OUT-OF-OPERATE".</li> </ul> </li> <li>• HIGH (red) If sensed on both REA-RIS-609A &amp; B, or C &amp; D causes alarm on H13-P602 AND a "Z" signal trip.</li> </ul> <p>c) RESET Pushbutton Depress to reset alarms.</p> <p>d) Monitor Function Switch 3-position switch, TRIP TEST/ZERO/OPERATE</p> <ul style="list-style-type: none"> <li>• OPERATE - Monitor operates normally (other positions are for testing; ZERO position generates a trip signal that can be used to trip the channel when required by Technical Specifications).</li> </ul> <p>e) A HI-Hi trip for channels A &amp; B initiates an alarm on H13-P602 and a Group III containment isolation signal [i.e., closure of the Reactor Building, Containment and Radwaste Building ventilation outboard isolation valves, and initiates startup of Standby Gas Treatment (SGT) Train A Lead Fan and Train B Lag Fan]. Logic is "TWO-OUT-OF-TWO" (trip of both channels in either division are required to cause the isolation.)</p> <p>f) A downscale condition (LE 0.01 mR/hr) sensed on both channels A &amp; B, causes alarm on H13-P602 AND a "Z" signal trip as described in "e" above.</p> <p>g) The same condition for Channels C &amp; D initiates closure of the corresponding inboard valves and initiates startup of SGT Train B Lead Fan and Train A Lag Fan (see NS<sup>4</sup> text for details).</p> <p>h) An additional trip signal for high radiation alarm is provided by Recorder REA-RR-603 (on H13-P600) and actuates a control room annunciator.</p>		

LO-5647g

## 2021 CGS NRC Written Exam Facility/Applicant Comments

Comments / Reference: PPM 5.3.1

Rev: Major: 21

Minor: N/A

# 5.3.1

**Second**

Revision 21

**CONTROL**

- RB differential pressure at or above 0 in. of water
- RB area differential temp above alarm level, **Table 22**
- RB area temp above alarm level, **Table 23**
- **RB exhaust plenum radiation level above 13 mR/hr**
- RB area radiation level above alarm level, **Table 24**
- RB area water level above alarm level, **Table 25**
- SFP temp above **124°F**
- SFP level below **22 ft 4 in.**

SC-1

**IF** FAZ signal exists

**THEN** ensure RB HVAC isolation and SGT initiation

**IF** SGT cannot restore and maintain RB differential pressure below 0 in. of water  
AND  
radioactivity release from RB hinders operation of systems required for damage control or systems required to be operated by EOPs

**THEN** restart RB HVAC



**IF** RB HVAC is shutdown

**THEN** reset RB HVAC isolation logic  
AND  
operate available RB HVAC