UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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December 9, 2004

J. V. Parrish (Mail Drop 1023)
Chief Executive Officer
Energy Northwest
P.O. Box 968
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SUBJECT: COLUMBIA GENERATING STATION - NRC EXAMINATION REPORT - 05000397/2004-301

Dear Mr. Parrish:

On October 26, 2004, the NRC completed an initial examination at your Columbia Generating Station. The enclosed report documents the examination findings, which were discussed on October 27,2004, with you and other members of your staff.

The examination included an evaluation of 14 applicants for reactor and senior operator licenses. The written and operating examinations were developed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Draft Revision 9. We determined that 5 applicants satisfied the requirements of 10 CFR Part 55, and the appropriate licenses have been issued.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Anthony T. Gody
Operations Branch
Division of Reactor Safety

Docket: 50-397
License: NPF-21

Enclosure:
NRC Examination Report 05000397/2004-301

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	50-397
License:	NPF-21
Report No.:	05000397/2004-301
Licensee:	Energy Northwest
Facility:	Columbia Generating Station
Location:	Richland, Washington
Dates:	September 20 to October 27, 2004
Examiner:	T. O. McKernon, Senior Operations Engineer, Operations Branch P. C. Gage, Senior Operations Engineer, Operations Branch G. E. Werner, Senior Operations Engineer, Operations Branch S. Garchow, Operations Engineer, Operations Branch
Approved By:	Anthony T. Gody, Chief Operations Branch Division of Reactor Safety

SUMMARY OF FINDINGS

ER 05000397/2004-301; 9/20-10/27/2004; Columbia Generating Station; Initial Operator Licensing Examination.

NRC examiners evaluated the competency of 14 applicants; 3 for reactor operator licenses, and 11 for senior operator licenses. The written examination and the operating test were developed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Draft Revision 9. The NRC examiners administered the written examination to the applicants on September 20, 2004. The NRC examiners administered the operating test on September 21-28, 2004

Cornerstone: Human Performance

Of the 14 applicants, 7 passed the written examination and 9 passed the operating portion of the examination; 5 applicants passed the examination overall. Observations of weak operator performance were noted in the areas of technical specification knowledge and application, control board equipment operation and systems knowledge of feedwater control, electrical plant power bus alignment, and implementation of immediate actions (Section 40A4.1).

Report Details

4. OTHER ACTIVITIES (OA)

4OA4 Initial Operator License Examination

.1 Operator Knowledge and Performance

a. Scope

On September 20, 2004, the NRC examiners administered the written examination to the applicants. The NRC graded the examination, analyzed the results, and reviewed post-examination recommendations from the licensee, which were submitted on October 6, 2004.

The NRC examiners administered the operating test portion of the examination between September 21-28, 2004. The eleven applicants for senior operator licenses and the three applicants for reactor operator licenses participated in two or three dynamic simulator scenarios depending upon the crew mix. The eight applicants for instant senior operator participated in a control room and facilities walkthrough test consisting of 10 system tasks, and an administrative test consisting of 5 administrative tasks. The three applicants for upgrade to senior operator participated in a control room and facilities walkthrough test consisting of 5 system tasks, and an administrative test consisting of 5 administrative tasks. The three applicants for reactor operator participated in a control room and facilities walkthrough test consisting of 11 system tasks, and an administrative test consisting of four administrative tasks.

b. Findings

Seven applicants passed the written examination, three reactor operators, three upgrades to senior operators and one instant senior operator applicant. The examination grades ranged from 68.4 to 87.8. For the reactor operator applicants, each scored 85.1 percent on the written examination. The examination grades for the senior operator applicants ranged from 68.4 to 87.8 and averaged 79 percent.

The licensee conducted a performance analysis for the written examination to determine if there were any knowledge weakness commonalities or training issues associated with the questions missed by the applicants and submitted this analysis to the chief examiner for review on October 6, 2004. During this analysis, the licensee identified three questions for review and consideration by the NRC for a change to the examination's answer key. The chief examiner reviewed the facility's recommendations.

Reactor Operator Examination Question 15 - This question asked the applicant to identify one of the bases for an emergency operating procedure caution that establishes 2100 rpm as the minimum speed for the Reactor Core Isolation Cooling (RCIC) turbine. The correct answer (choice C) for this question as presented in the reactor operator examination was "the potential exists for water in the turbine exhaust line damaging the exhaust line check valves." The challenge to this question was centered around the use

of the word “water” rather than the use of “water hammer.” The licensee argued that there is always water present when the system is operating and the RCIC system is designed to operate under these conditions. It is only when the RCIC turbine operates at low speeds that there is the potential for enough water to accumulate in the turbine exhaust line to damage the exhaust line check valves. The licensee recommended the question be deleted because there was no correct answer.

NRC Response - The physical phenomena that can damage the exhaust steam line is water hammer. As stated in the challenge to the question, “It is only when the RCIC turbine operates at low speeds that there is the potential for enough water to accumulate . . . to damage the exhaust line check valves.” If water does not accumulate in the steam line then there is no potential for water hammer induced damage. Based on this, the presence of higher amounts of water at low speeds leads to the bases of the caution. Therefore, the answer provided on the examination was correct as stated. The NRC denied the licensee’s recommendation to delete the question.

Reactor Operator Examination Question 22 - The intent of this question was to test the applicants’ knowledge of certain automatic functions associated with the off-gas system. The question asked what process radiation signal, and associated logic, will result in an automatic shift in the off-gas system. The correct answer (choice A) per the answer key was “one OG Post Treatment Process Radiation Monitor reaches the HI RADIATION setpoint.” The challenge to this question states that all four answers were correct and, therefore, the question should be deleted. This was based on the argument that any of the possible answers provided would result in an automatic shift.

NRC Response - If one process radiation monitor (PRM) reaching the high radiation setpoint causes an automatic shift, then it would be logical that a second PRM monitoring the same process flow that reaches the high radiation setpoint (Answer B) would also cause an automatic shift. It also seems reasonable that if a PRM at the high radiation setpoint causes an automatic response, then if one or both PRMs reach the high-high setpoint (Answers C and D) then this condition would also cause an automatic response. The NRC accepted the licensee’s recommendation to delete the question.

Senior Operator Question 7 - This question required the applicant to recognize from information provided in the question stem that a reactor scram should have occurred but did not. (The source of the scram would be a flow biased APRM power-to-flow scram signal.) Given the set of plant conditions, the applicant was asked to identify which of four procedures would take precedence in this situation. The challenge to the question stated that none of the answers provided are correct. The bases of the challenge was that the correct response to the given scenario would be to immediately enter Emergency Operating Procedure 5.1.1. The first action in Procedure 5.1.1 was to place the mode switch in shutdown and then the senior operator was required to evaluate whether Anticipated Transient Without a Scram Procedure 5.1.2 should be entered. The challenge argued that without knowing the position of the mode switch, the determination on whether to enter the anticipated transient without a scram procedure cannot be made in accordance with Emergency Operating Procedure 5.1.1.

NRC Response - The question stated, “. . . which of the following procedures take precedence?” After a review of the challenge, it is agreed that without knowing the

position of the mode switch, the procedure that would take precedence is emergency operating procedure Entry Procedure 5.1.1. Emergency Operating Procedure Anticipated Transient Without a Scram Procedure 5.1.2, cannot be entered directly from the scenario as described in the question stem and, therefore, cannot not take precedence. The other three distractors cannot, by definition, take precedence because these were abnormal procedures and this scenario required entering the emergency operating procedures. The NRC accepted the licensee's recommendation to delete the question.

In addition to the three questions identified by the licensee for review, the NRC reviewed all questions with a higher than 50 percent failure rate. Of those questions reviewed, the NRC determined that reactor operator examination Question 20 required a change. The question was discussed with the licensee and it was determined that Answers A and C were both correct. The question asked how a leak in the drywell would be limited to the reactor building. Answer C was correct, in that, there are two isolation valves that close and isolate the leak to the drywell and the drywell was inside the reactor building. Therefore, this answer was correct in addition to the reactor building isolation valves that also automatically close, answer choice A. It should be noted that the process flowpath for this leak passes through the valves identified in Answers A and C. The other answers were incorrect for the reasons stated in the answer key.

Conclusion: Answer choices A and C were accepted.

As a result of the written post-examination analysis, the licensee identified general weaknesses amongst the applicants concerning interlocks and system arrangements. The chief examiner reviewed the examinations and determined that, in addition, there appeared to be weaknesses in the areas of technical specification application and their basis, basic radiation worker knowledge, and understanding the operation of the main turbine control system. These generic weakness areas carried over to the applicants' performances during the operating test portion of the examination.

The final written examinations and answer keys as well as the licensee's post examination analysis can be viewed in the NRC's document management system (ADAMS) under the accession numbers referenced in the attachment to this report.

During the dynamic scenarios, the examiners observed generic weaknesses in operator knowledge related to technical specifications and their applications, knowledge and operation of the feedwater control system, nuclear instrumentation, control rod operation, and knowledge and operation of the electrical plant, particularly electrical breaker interlocks when aligning alternate power supply buses. Other weaknesses were observed in isolated instances. For example, one operating crew unnecessarily emergency depressurized when the condensate system was readily available as an injection source. As a result, the crew lowered reactor pressure vessel water level to -300 inches, approximately 1 foot above the bottom of active fuel. Had the crew responded in this manner in the real plant, this condition could have had a high likelihood of damaging fuel. In another example, an operating crew failed to implement immediate actions correctly in response to a tripped digital electro-hydraulic oil pump. As a result, the crew mistakenly scrammed the reactor early in the scenario when the

correct response was to manually start the backup digital electro-hydraulic oil pump and restore hydraulic pressure.

Nine of the14 applicants passed the operating test portion of the examination.

As a result of post-examination discussions, the licensee agreed to conduct remediation training with those applicants that passed the examination in the areas of technical specifications and their application, the electrical plant breaker alignments, and feedwater-reactor water level controllers. The licensee committed to complete this remediation training with the applicants prior to their assuming licensed operator duties.

Initial Licensing Examination Development

a. Scope

The NRC developed the written examination in accordance with NUREG-1021, Draft Revision 9, using facility training and operations staff on the security agreement to validate the examination. The facility's training staff assisted in developing a portion of the operating examination and validating the examination during the week of August 23, 2004.

b. Findings

The examiners and the facility coordinated review of the written examination and resolved any comments prior to August 27, 2004. Comments and changes to the operating examination identified during the validation week were incorporated into the operating examination during the week of September 13, 2004.

No findings of significance were identified.

4OA5 Simulator Fidelity

a. Scope

During the operating examination, the examiners observed the functioning of the simulator to maintain fidelity with the validated operating examination and the real plant.

b. Findings

During the operating examination, while implementing a dynamic job performance measure on the simulator, the simulator failed to actuate a planned malfunction. The applicant continued to perform the job performance measure as though it was not an alternate path test. The examiners reviewed the applicant's planned alternative path job performance measure test items and found that the applicant still had the minimum required number of alternate path tasks. The simulator was reset and the job performance measure was administered to the remaining applicants without incident.

Additionally, during one dynamic scenario the simulator introduced several unplanned malfunctions, which the crew had to respond to and which were not part of the validated

scenario. These malfunctions included, “Evaporator B Low Level Alarm,” “Gland Seal Steam Pressure Low,” and “Offgas Trouble Alarm.”

After completing the scenario and prior to running the scenario for a different crew, the simulator operators reset the simulator. The same scenario was repeated twice without incident.

During another scenario, the simulator’s rod worth minimizer malfunctioned and became inoperable at the beginning of the scenario. The scenario was halted, the simulator was reset, and the scenario continued without incident.

None of the simulator “glitches” presented a simulator problem with regard to energy/mass flow or thermodynamic modeling.

No findings of significance were identified.

4OA6 Examination Security

a. Scope

During the validation week and the examination week, the examiners observed the licensee in maintaining examination security.

b. Findings

While no examination compromises occurred, one instance was observed in which the licensee did not maintain proper control over applicants. An applicant was observed wandering the halls of the training facility without an escort.

No findings of significance were identified.

4OA7 Management Meeting

Exit Meeting Summary

The chief examiner conducted a debrief of examination issues with the Mr. R. Webring, Vice President Nuclear Operations, and other members of his staff on September 28, 2004. A final examination exit was conducted on October 27, 2004. Examination results were presented to Mr. V. Parrish, Chief Executive Officer, and other members of his staff. The facility acknowledged the findings presented.

Additionally, during the exit meeting the NRC requested the licensee to commit to remediating the applicants that successfully passed the examination in the areas of: feedwater control, electrical plant alignments, and technical specifications and their application. The licensee agreed to this commitment and stated that the applicants would receive remediation prior to assuming licensed duties.

The facility did not identify as proprietary any information or materials examined during the examination.

ATTACHMENT 1

KEY POINTS OF CONTACT

Licensee

D. Atkinson, Vice President Technical Services
J. Bekhazi, Maintenance Manager, Acting Plant General Manager
D. Coleman, Regulatory Programs Manager
G. Cullen, Licensing Supervisor
D. Dinger, Acting Radiation Protection Manager
R. Guthrie, Operations Training Supervisor
J. Hanson, Training Manager
R. Hayden, Training Specialist IV
M. Humphreys, Engineering General Manager
S. Hutchison, Senior Training Specialist
S. Jerrow, Assistant Operations Manager
T. Lynch, Operations Manager
S. Oxenford, Vice President Nuclear Generation
B. Sherman, Nuclear Engineer, Bonneville Power Authority
M. Westergren, Operations Training Instructor

ADAMS DOCUMENTS REFERENCED

Accession No. ML043130174: Final RO Writtem Examination and Answer Key
Accession No. ML043130180: Final SRO Written Examination and Answer Key
Accession No. ML042810417: Post Examination Analysis & Justification for Key Change

ATTACHMENT 2

ES-501 Simulator Fidelity Report

Facility Licensee: Columbia Generating Station
Facility Docket No.: 50-397
Operating Tests Administered on: 9/21-28/2004

This form is to be used only to report observations. These observations do not constitute audit or inspection findings and, without further verification and review in accordance with IP 71111.11, are not indicative of noncompliance with 10 CFR 55.46. No licensee action is required in response to these observations.
While conducting the simulator portion of the operating tests, examiners observed the following items:

Item Description

During one scenario the Control Rod Worth Display froze up and would not respond. Once the simulator was reset, the error did not recur.

During another dynamic scenario the simulator introduced several unplanned malfunctions which the crew had to respond to and which were not part of the validated scenario. These malfunctions included: “Evaporator B Low Level Alarm”; “Gland Seal Steam Pressure Low”; and “Offgas Trouble Alarm”.

During a dynamic JPM involving control of the Reactor Recirc system the planned malfunction did not occur. The simulator was reset and the error did not recur.