



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30323

ENCLOSURE 1

REQUALIFICATION EXAMINATION REPORT - 50-280/91-300

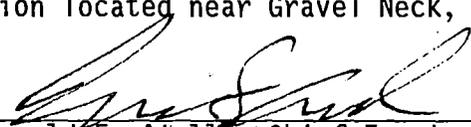
Facility Licensee: Virginia Electric and Power Company  
5000 Dominion Boulevard  
Glen Allen, VA 23060

Facility Name: Surry Nuclear Power Station

Facility Docket Nos.: 50-280 and 50-281

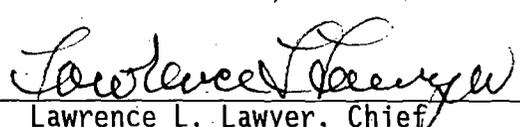
Written and Operating Requalification Examinations were conducted at the Surry Nuclear Power Station located near Gravel Neck, Virginia.

Chief Examiner:

  
Ronald F. Aiello, Chief Examiner

11/13/91  
Date Signed

Approved By:

  
Lawrence L. Lawyer, Chief  
Operator Licensing Section 1  
Division of Reactor Safety

11/13/91  
Date Signed

SUMMARY

SCOPE:

Requalification Examinations were conducted during the weeks of September 9 and 23, 1991. Written and operating examinations were administered to eight Reactor Operators and eight Senior Reactor Operators.

RESULTS:

Seven of the eight Reactor Operators passed the examination. Eight of the eight Senior Reactor Operators passed the examination. Four crew simulator examinations were administered. All crews were rated as satisfactory.

Based on these results, fifteen of sixteen licensed operators (93.8 percent) passed these examinations. The Surry Requalification Program has been determined to be satisfactory.

Strengths: Strengths in the Surry Requalification Program were noted in JPM format, construction and equipment simulation (Paragraph 3.C.1.a), simulator scenario critical task identification (Paragraph 3.C.2.a), written examination construction and comprehension (Paragraph 3.C.3.a), simulator infidelity resolution (Paragraph 3.G) and laboratories and mock-up use (Paragraph 3.H).

Weaknesses: Program weaknesses were identified in JPM administration (Paragraph 3.C.1.b), operator communications and acknowledgement of alarms (Paragraph 3.D.1) and equipment status verification (Paragraph 3.D.2.a).

One IFI (50-280,281/91-300-01) concerning a conflict between AP-20 and FCA-1.01 was identified (Paragraph 3.C.3.b.2).

## REPORT DETAILS

### 1. Facility Employees Attending Exit Interview:

J. McCarthy, Superintendent, Operations  
A. Friedman, Superintendent, Nuclear Training  
H. McCallum, Operations Coordinator - Training  
L. Gardner, Lead Simulator Instructor  
J. Spence, Senior Instructor  
A. Brown, Supervisor Nuclear Training  
T. Williams, Manager Nuclear Training  
D. Modlin, Check Operator  
A. Price, Assistant Station Manager  
R. Sanders, Assistant Vice President Nuclear Operations

### 2. NRC Personnel Attending Exit Interview:

\* R. Aiello, NRC, Region II  
G. Harris, NRC, Region II  
M. Parrish, EG&G  
M. Branch, SRI

\* Chief Examiner

### 3. Discussion

#### A. Program Evaluation:

Based on the examination results, the Surry Requalification Program meets the criterion established in NUREG-1021, ES-601.C.2.b (Revision 6). One unsatisfactory individual performance was subject to a re-evaluation as set forth in ES-601.D.1. An NRC retake requalification examination was administered to this operator during the second week. Following re-examination, this individual's performance was determined to be satisfactory.

#### B. Reference Material:

The examination team reviewed and found the reference material to be adequate to support the examination. The licensee supplied a sampling plan describing the requalification cycle and the selection process used for the topics included in the examinations.

A review was conducted of the facility's proposed written, walk-through and dynamic simulator examinations. It was determined that the validation times for questions on both the static simulator and open reference examinations reflected the time that a knowledgeable operator would require to answer the questions. The NRC substituted new material for about ten percent of each section of the examination. This was done in accordance with

NUREG-1021. The remainder of the examination was approved with minor changes.

C. Proposed Examination:

1. JPMs:

a. Strengths

1. Greater than ninety percent of the JPM questions were analytical in nature.
2. The JPMs were written to take advantage of training resources such as equipment simulators and mockups.
3. The JPMs were well structured and formatted.
4. The JPM bank covered many subject areas that were important to plant safety.

b. Weaknesses

1. Three JPMs contained only three to four steps to complete the task. Although these JPMs were safety significant and high in K/A value, they provided little discriminatory value.
2. Two JPMs over-prompted the operator by providing too much information. For example, one JPM step required the operator to cross-connect unit 1 and 2 charging pump service water systems by cuing him to "open 1-SW-269, Charging Pump (CP) Service Water Cross-connect". The beginning cue was changed to read "cross-connect units 1 & 2 CP service water systems." In addition, the team added a fault to this JPM. The fault was the failure of 1-SW-269 to function. This condition required the operator to use the other train. Similarly, another JPM instructed the operator "to perform the immediate operator actions of FR-S.1 for ATWT". The instructions now read "Your task is to perform the required actions."
3. The examination did not include any SRO specific JPMs. Therefore, the exam team wrote and administered one.

## 2. Simulator Scenarios:

### a. Strengths

Critical tasks were all important and safety significant.

### b. Weaknesses

1. Scenario 7 (FR-H.1 and FR-P.1) contained actions that required the operator to only verify indications.
2. Scenario 7 and scenario 20 failed to use Technical Specifications and Abnormal Operating Procedures as required by the examiners standard.

## 3. Written Examination:

About 40% of the examination questions require the examinee to calculate, analyze, or evaluate.

### a. Strengths

The written examination exceeded the guidelines as outlined in the Examiner Handbook and ES-602. Moreover, the questions were easy to read and comprehend.

### b. Weaknesses

1. The Part A examination contained some questions that could be used for Part B and vice-versa. In addition, contrary to the examiners standard, Part B contained six "direct look up" questions.
2. Question 19 on the second week part "B" exam contained more than one correct answer. This was due to the conflict between procedure AP-20 (Main Control Room inaccessibility) and FCA-1.01 (Limiting Main Control Room Fires). The RNO in AP-20 directed the operator to operate the steam dumps locally to maintain RCS temperature. FCA-1.01 directed the operator to isolate main steam lines by closing all MSTVs. This action would prevent local operation of the steam dumps. The answer key was also incorrect because the answer required a pressure band whereas the procedure (AP-20) required a temperature band. In addition, the answer did not refer to several parameters such as pressurizer level that would

have to be maintained in HSD conditions. The discrepancy between procedures AP-20 and FCA-1.01 will be identified as IFI 50-280,281/91-300-01.

#### D. Operator Performance

Operator performance was adequate; however, some weaknesses were identified.

##### 1. Simulator

- a. Frequently operators were slow to silence alarms. The failure to expeditiously silence alarms detracted from crew performance.
- b. Off normal trends were not recognized prior to the actuation of the annunciators.
- c. Communication during casualties was inadequate. For example, an announcement was not made to the crew to alert them to adverse containment conditions. Moreover, one crew continually disregarded the need for closed loop communications. This is contrary to procedure VPAP-1407 Section 6.4.1, Face-To-Face Communications Methods.

Crew performance in the simulator part of the examination was satisfactory.

##### 2. JPM Performance

- a. Indications were not being clearly verified by operators. The examiners had to counsel operators on the performance of indication verification. For example, Abnormal Procedure O-AP-5.20 (Radiation monitor System Ventilation Vent Hi Alarm) requires switch AOD-VS-109A/B to be placed in the filter position. This action caused AOD-VS-110 damper to change position. The indication for this damper was found on the Auxiliary Vent Panel VNTX-R on the opposite side of the simulator. One operator failed to verify that the damper had repositioned. The failure to perform verification of indications was a training weakness.
- b. JPM 41.01B (Initiate Emergency Boration locally) required an operator to open valve 2-CH-228 (Manual Emergency Boration Valve). This valve was on the East wall of the boric acid flats area. While performing this step of the JPM the operator broke the vertical

plane above the contamination area posting rope. This action was contrary to station radiological control and ALARA procedures. A special caution was added to the walkthrough briefing to prevent a repeat of this event.

E. Examination Administration:

1. JPM 99.04 (Perform FR-S.1, ATWS) required the operator to perform the immediate actions of FR-S.1. JPM 99.04 was also a time-critical JPM. This JPM allowed the operator 3.5 minutes to perform the task. This time did not compare favorably with the actual time needed to complete this task. Most of the operators finished this task in less than one minute.
2. The events in scenario #7 required operators to transition into FR H.1. Both facility evaluators and examiners were hampered from following these operator actions due lack of guidance in the scenario script.
3. The facility was directed to develop a malfunction in scenario 19 that would open the supply breaker to valve CH-MOV-1381 (RCP Seal Return Isolation Valve). It was intended that the supply breaker malfunction should occur when a containment isolation phase A signal was present. This malfunction should have failed the valve without control board position indication. However, the facility developed malfunction failed the valve open with its supply breaker remaining closed. This prevented the evaluation of crew response to a loss of position indication.

F. Facility Evaluators:

All facility evaluators were found to be satisfactory. However, the following deficiencies were identified:

1. Facility evaluators were not careful to have operators emphasize verification of indications during the performance of JPMs.
2. Facility evaluators sometimes gave improper cues to the candidates. For example, the evaluator gave an operator values for meter indications without having the operator show which meter he was reading.

These evaluator deficiencies had no impact on individual pass/fail decisions.

G. Simulator Fidelity:

The team reviewed the degree to which the simulator met the operational requirements of ANS 3.5. This review showed that the processing of Simulator Modification Reports (SMR) was adequate. However, no formal methods of communicating SMRs to the training staff existed. This was confirmed during subsequent interviews with instructors. Therefore, the team concluded that some instructors and operators might not be aware of some of the differences between the simulator and the plant. In addition, the facility responses to NRCs questions (NRC letter dated 8/23/89) concerning the simulator performance were not included in the simulator certification. Moreover, no formal method existed to ensure that these questions were addressed and that the subsequent simulator modifications would be incorporated into the next recertification.

Both of the above discrepancies were identified during the prep week. The facility had taken prompt action to correct both deficiencies prior to the team returning for the first week exam. SMRs are now a required reading for instructors. In addition, the NRC questions and facility responses were made an integral part of the simulator certification. This prompt corrective action was considered a training department strength.

Step 2 of JPM 65.03 (Recover a Dropped Control Rod) requires the operator to rotate the rod control mode select switch from manual to the CBA position. The operator should then verify a rod speed of 48 steps per minutes on SI-I-408. However, after performing these steps the rod speed indication read only 38 steps per minute.

#### H. Laboratories and mock-ups:

The facility has taken significant steps to ensure that station maintenance and operations personnel receive the most effective training possible. Surry Nuclear Power Station has developed laboratories and acquired equipment for hands-on training. The labs are equipped with both plant and laboratory equipment. The extensive use of these training aids is a training department strength.

#### I. General Observations:

The exam team observed that most of the labels on valves are "dog tags" that present a burn hazard. Moreover, these tags are difficult to read. The lack of adequate labelling was identified as a operations weakness during the requalification exam administered in September of 1990 (50-280/OL-90-02). The utility currently has a program in place to correct these labelling deficiencies.

During the in plant walkthroughs the examiners found that the AFW

booster pump control switches (FW-P-4 A & B) were not labeled.

JPM 58.01 (Place Hydrogen Analyzers in service following a LOCA) required an operator to place an affected unit's hydrogen analyzer in service. After containment conditions were verified and valve lineups were performed, the procedure instructed the operator to start the analyzer. Prior to this step, a note informed the operator that heat tracing circuitry must be energized for a minimum of twenty minutes, otherwise, analyzer readings would be inaccurate. This time requirement is critical to the proper operation of the analyzer and therefore, should have been a critical step. Additionally, the time requirement contains a warning but is not written as a CAUTION as required by plant procedure.

J. Security & HP Inprocessing:

No problems were encountered with either security or health physics processing.

4. Exit Interview

At the conclusion of the site visit, the examiners met with the representatives of the plant staff, indicated in paragraph 1, to discuss the results of the examinations and inspection findings. The licensee did not identify as proprietary any material provided to or reviewed by the examiners. The examiners further described the areas inspected and discussed in detail the inspection finding listed below. Dissenting comments were not received from the licensee.

<u>Item</u>	<u>Status</u>	<u>Description/Paragraph</u>
50-280/91-300-01	Open	IFI, Resolve conflict between AP-20 (Main Control Room inaccessibility) and FCA-1.01 (Limiting Main Control Room Fires)/Paragraph 3.B.3

## ENCLOSURE 2

### REQUALIFICATION PROGRAM EVALUATION REPORT

Based on the examination results, the Surry Requalification Program met the criteria established in NUREG-1021, ES-601.C.2.b (Revision 6), and has been determined to be satisfactory. One unsatisfactory individual performance was re-evaluated according to the requirements set forth in ES-601.D.1. On re-examination, this individual's performance was determined to be satisfactory.

#### 1. Reference Material and Proposed Examination:

The examination team reviewed the reference material supplied by the licensee and found it to be adequate to support the examination. The licensee supplied a sampling plan that described the requalification cycle and the process that was used to select examination topics.

Facility proposed written, walkthrough and dynamic simulator examinations derived from this sample plan were reviewed by the NRC examination team. The validation times for questions on both the static simulator and open reference exams were determined to reflect accurately the time which a competent operator would have needed to answer correctly the questions. The examination team substituted new material for about 10 percent of each section of the examination as required by NUREG 1021.

#### A. JPMs:

##### 1. Strengths

- a. Greater than 90% of the JPM questions were analytical in nature.
- b. Equipment mockups were used during JPM performance.
- c. The JPMs were well formatted and structured.
- d. The JPM bank contained a variety of operational tasks.

##### 2. Weaknesses

- a. Three JPMs contained only three to four steps. Although these JPMs were safety significant, they provided little discriminatory value.
- b. Two JPMs contained cues that provided too much information to the operator. For example, one cue provided instructions to the operator on how to cross-connect unit 1 and 2 charging pump service water systems. The cue instructed the operator to "open 1-

SW-269, Charging Pump Service Water Cross-connect". This cue was changed to read "cross-connect units 1 & 2 CP service water systems. In another JPM, an ATWT condition existed that required the operator to perform immediate actions from memory. The initiating cue of the JPM instructed the operator " to perform the immediate operator actions of FR-S.1 for a ATWT." This provided the operator with too much information. The cue was changed to read "You are tasked to perform the required actions". Moreover, the examination did not include any SRO specific JPMs. Therefore, the examination team wrote one and administered one.

- c. Two JPMs contained inadequate lead-in steps (i.e. focused directly on the task). This made these tasks less of a discriminator to judge operator performance. These JPMs were replaced by the examination team.

## B. WRITTEN EXAMS:

### 1. Strengths

- a. Approximately 40% of the examination questions required the examinee to either calculate, analyze, or evaluate.
- b. The written examinations exceeded the guidelines as required by the Examiner Handbook and ES-602. Most examination questions were easy to read and comprehend.

### 2. Weaknesses

- a. The Part A exams contained some questions that were more suited for the Part B and vice-versa. Part B contained six questions that were "direct look up". This is contrary to guidelines established in the examiner's standard.
- b. Question 19 on the second week part "B" exam contained more than one correct answer. This was due to the conflict between procedures AP-20 (Main Control Room Inaccessibility) and FCA-1.01 (Limiting Main Control Room Fires). The RNO in AP-20 directed the operator to locally manipulate the steam dump valves to maintain temperature. However, FCA-1.01 directed the operator to verify that main steam was isolated by closing all MSTVs. Closing the MSTVs prevented local operation of the steam dump valves. The answer key was also incorrect because it required a pressure band where as the procedure (AP-20) required a temperature band. Furthermore, the answer did not refer to

several other parameters such as pressurizer level that would have to be maintained in HSD conditions. The AP-20 and FCA-1.01 procedure conflict has been identified as IFI 50-280,281/91-300-01.

C. SCENARIOS:

Review of the simulator scenarios was simplified by the licensee's implementation of recommended changes during the 1991 NRC Requalification Examination review. The licensee's positive response to these recommendations has enhanced the simulator scenarios and the examination process.

1. Strengths

Critical tasks were clearly identified by the facility and were safety significant.

2. Weaknesses

- a. Simulator scenario 7 (FR-H.1 and FR-P.1) required no actions other than verification.
- b. Scenario 7 and scenario 20 failed to use Technical Specification and Abnormal Operating Procedures as required by the examiner's standard.

2. Operator Performance:

A. Operator weaknesses observed during the simulator portion of the examination:

1. The operators were slow to silence alarms. The failure to expeditiously silence alarms detracted from the crew's performance.
2. Operators failed to recognize off normal trends prior to the sounding of the alarms.
3. Communication during casualties was inadequate. For example, events such as adverse containment were not announced to the entire crew. Moreover, the lack of closed loop communications was observed throughout the scenario sets. This is contrary to station procedure VPAP-1407 Section 6.4.1, Face-To-Face Communications Methods.

B. Operator weaknesses observed during the walkthrough portion of the examination:

1. Operators were not verifying indications. The examiners had to counsel operators on how to perform verifications. For

example, Abnormal Procedure 0-AP-5.20 (Radiation Monitor System Ventilation Vent Hi Alarm) required switch AOD-VS-109A/B to be placed in the filter position. This switch is located on the vent panel. This action caused AOD-VS-110 damper to reposition. The indication for this damper was located on the Auxiliary Vent Panel VNTX-R on the opposite side of the simulator. One operator failed to verify that the damper had repositioned.

2. During the performance of JPM 41.01B (Initiate Emergency Boration locally), first exam week, an operator was required to manipulate valve 2-CH-228 (Manual Emergency Boration Valve) located on the East wall of the boric acid flats area. The operator failed to comply with local radiological procedures and ALARA criteria when he broke the vertical plane of the air space above the contamination area posting rope.

The licensee took prompt corrective action by adding the items listed below to the system walk-through briefing checklist.

- a. **OBSERVE & OBEY ALL STATION HP PRACTICES.** Observe and respect all posted areas. If a JPM should involve pointing to a valve/component on the controlled side of a posted area, use a flashlight and do not break the vertical plane of the air space above the posting rope.
- b. Ensure that you verbalize your actions during the performance of the JPM. This includes pointing out the appropriate meter/indication that you are looking at and vocalizing what you observe or expect to observe.
- c. If during the performance of a JPM, you feel it is necessary to contact the Shift Supervisor (just as you would if you were actually performing the task) point this out to the facility evaluator and he will provide the appropriate response that a Shift Supervisor would provide.
- d. If during the performance of a JPM, it becomes necessary to contact or direct an auxiliary operator to perform a local action:
  - In the simulator, contact them just as you would in the plant.
  - During the walkthrough, inform the evaluator and provide him the same directions you would give the auxiliary operator.

### 3. Examination Administration:

- A. JPM 99.04 (Perform FR-S.1, ATWS) required the operator to perform the immediate operator actions of FR-S.1. The JPM is also time critical in that it required the operator to finish the task within a specific amount of time (i.e. 3.5 minutes). However, many operators completed the task in less than one minute. The critical time was changed to reflect the actual time needed to perform the task.
- B. During scenario #7, operators were required to transition into FR H.1. Although this transition was a predictable success path it was not contained in the scenario script. Subsequently, the examiners had to either follow along in the procedures with the operators or rely on their personal knowledge of procedure 1-E-0.
- C. It was requested by the examination team to develop a malfunction in scenario 19 that would open the supply breaker to valve CH-MOV-1381, RCP Seal Return Isolation. It was intended that the supply breaker malfunction should occur when a containment isolation signal was present. This malfunction should have failed the valve without control board position indication. However, the malfunction as designed by the facility allowed the breaker to remain closed. This prevented the evaluation of the operator's response to a loss of position indication.

### 4. Evaluation of Facility evaluators:

All facility evaluators were rated satisfactory. However, the following deficiencies were noted.

- A. Facility evaluators had to be counseled regarding the need for operators to verbalize their verifications during the performance of JPMs.
- B. While conducting JPM 55.01 (Manually Start an EDG at the Local Panel), the evaluator gave the operator values for meter indications without having the operator indicate the meter he was reading.

These evaluator deficiencies, although significant, had no impact on the crew or individual pass/fail decisions.

ENCLOSURE 3

SIMULATOR FACILITY REPORT

Facility Licensee: Surry Nuclear Power Station

Facility Docket Nos.: 50-280 and 50-281

Operating Tests Administered During: The Weeks of September 9 and 23 1991

This form is used only to report observations. These observations do not constitute, in and of themselves, audit or inspection findings and are not, without further verification and review, indicative of noncompliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility other than to provide information which may be used in future evaluations. No licensee action is required solely in response to these observations.

During the conduct of the simulator portion of the operating test, the following items were observed:

The team reviewed the degree to which the simulator met the operational requirements of ANS 3.5. This review indicated that the processing of Simulator Modification Reports (SMR) is adequate. However, no formal method of communicating SRMs to the staff instructors exist. Several instructors were interviewed to confirm this concern. It is the NRC's perception that the instructors and operators are not aware of some of the differences between the simulator and the control room.

Facility's responses to the NRC's questions concerning simulator performance (NRC letter dated 8/23/89) are not included in the current simulator certification document. Furthermore, no method existed to ensure that these questions were addressed and that approved simulator modifications were incorporated into the existing certification document.

Both discrepancies were identified during the prep week. The facility had taken prompt action to correct both deficiencies prior to the team returning for the first week exam. This action included placing a required reading book containing the SMRs in the simulator and making the NRC questions and facility responses a part of the simulator certification.