

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report Nos: 50-454/98024(DRS); 50-455/98024(DRS)

Licensee: Commonwealth Edison Company (ComEd)

Facility: Byron Generating Station, Units 1 & 2

Location: 4450 North German Church Road
Byron, IL 61010

Dates: November 30 - December 4, 1998

Inspectors: D. McNeil, Reactor Engineer
T. Jones, Reactor Engineer

Approved by: Melvyn Leach, Chief, Operator Licensing Branch
Division of Reactor Safety

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EXECUTIVE SUMMARY

Byron Generating Station, Units 1 & 2
NRC Inspection Reports 50-454/98024; 50-455/98024

This inspection report contains the findings and conclusions from the inspection of the licensed reactor operator (RO) and senior reactor operator (SRO) requalification training programs. The inspection included: (1) a review of training administrative procedures and written and operating examination material, (2) an observation and evaluation of operator performance and licensee evaluators during a requalification operating examination, (3) an assessment of simulator fidelity, (4) an evaluation of program controls to assure a systems approach to training, and (5) a review of requalification training records. Additionally, the inspectors observed a period of control room operations. The inspectors used the guidance in Inspection Procedures 71001 and 71707.

Operations

The control room had a quiet, business like environment in which operators could conduct control room operations. The control room operators were professional and maintained an appropriate focus on plant evolutions in progress. Licensed operators performed appropriate panel walkdowns and shift turnovers. (Section O1.1)

The Training Department's instructors have been generally successful in providing operators with the skills necessary to operate the facility. One crew's performance was determined to be unsatisfactory during the inspection week. Operator skills demonstrated during the operating tests were good with the exception of the significant command and control weaknesses displayed by the failing crew. The NRC inspectors agreed with the facility's evaluator assigned grades in all areas of the examination. (Section O4.1)

Operator error related events reviewed by the inspectors were not directly attributable to inadequate or ineffective training, but appeared to be due to a lack of application of the provided training and poor self-checking by operators. (Section O5.1)

The written examination questions were of high quality; however, there was sufficient time for each operator to look up the answer to every question, which made it difficult to detect a marginally performing operator. The dynamic simulator scenarios and job performance measures were acceptable as evaluation tools for determining operator mastery of required skills. Although the requalification program was being adequately controlled by the training department's supervision, the sample plan was poorly implemented. (Section O5.2)

The training program policies and practices regarding requalification examination administration and security were being implemented correctly, and in accordance with 10 CFR 55. The simulator operated correctly during the examination and was a valuable tool for the evaluation of the operator skills and competency. (Section O5.3)

The remedial training program was properly implemented and provided operators with the correct focus to enhance their individual knowledge or operating skills. (Section O5.4)

Adequate procedures existed to prevent an inactive or disqualified licensee from assuming a control room watch. A communications shortcoming between the operations and training departments was detected when it was determined that three licensees were reactivating licenses without informing training department personnel. (Section O5.5)

The licensee met the initial goals and objectives of the NGG Strategic Reform Initiatives associated with reinforcing the training programs. (Section O8.1)

Report Details

I. Operations

01 Conduct of Operations

01.1 Control Room Observation

a. Inspection Scope (IP 71001)

The inspectors observed routine control room activities during full power operation, performed a panel walk-down, reviewed control room logs, observed shift turnover, and questioned operators about plant and equipment status.

b. Observations and Findings

Control room operators performed routine reviews of plant indications per management expectations. Operating logs were maintained by the unit Reactor Operator (RO). The logs were complete and generally contained an adequate description of the shift's activities. The off-going and oncoming Senior Reactor Operators (SROs) conducted their turnover in part by performing a control room panel walk-down. This type of turnover was also conducted by the off-going and oncoming ROs. During the shift turnover, which included non-licensed personnel, one SRO and one RO per unit stayed in the main control room. The other members of the oncoming crew went to the briefing room for shift turnover. The crew members that stayed in the control room listened to the briefing via an intercom system. The Shift Manager conducted a concise shift briefing on plant equipment status and planned work activities and addressed Limiting Condition for Operations concerns. Licensed operators demonstrated appropriate knowledge of equipment and plant status.

c. Conclusions

The control room had a quiet, business like environment in which operators could conduct control room operations. The control room operators were professional and maintained an appropriate focus on plant evolutions in progress. Licensed operators performed appropriate panel walkdowns and shift turnovers.

04 Operator Knowledge and Performance

04.1 Examination Observations

a. Scope

Licensed operators were observed during the Job Performance Measures (JPMs) and the dynamic simulator scenario sections of the examination. Examiners used the guidance contained in NUREG 1021, Operator Licensing Examination Standards for Power Reactors, Interim Rev. 8, January 1997, when performing evaluations of the operators and examiners.

b. Observations and Findings

During performance of the JPM portion of the examination the operators generally observed the facility's three-way communications requirements and correctly executed the assigned JPMs. The operators appeared to be knowledgeable concerning equipment locations, procedure utilization, and annunciator causes and responses. During the inspection week, only one operator's performance was judged unsatisfactory on one JPM, and that unsatisfactory score was based on a personnel safety issue (climbing over safety-related equipment), not on a failure to complete a critical task.

All sixteen operators were observed as three separate simulator crews during the dynamic simulator scenarios. Ten of the operators were assigned to a control room shift crew. For purposes of examination, the control room crew was divided into two simulator crews. The six remaining operators occupied various positions in the facility's staff organization and formed a staff crew. One of the operating crews performed well. The crew members were observed following procedures correctly, responding to annunciators, and communicating with each other effectively. The SROs displayed proper command and control techniques while directing operator responses to various equipment and instrument failures, and during the execution of emergency operating procedures (EOPs).

The other operating crew's performance was judged to be unsatisfactory by the facility evaluators. During the first of the two evaluated scenarios, none of the crew's assigned SROs exhibited strong command and control characteristics and, ultimately, relinquished control of the crew and the scenario to the ROs assigned to the crew. Since the ROs were not in an oversight position, incorrect recommendations and decisions were made and the crew's performance suffered. Although all the scenario's critical tasks were completed by the crew, the crew's performance was judged as unsatisfactory by facility evaluators based on individual and crew competency issues. None of the SROs participating on this simulator crew was the regularly assigned Shift Manager. The crew's assigned Shift Manager was evaluated with the first operating crew. No other crews were determined to be unsatisfactory during the annual examinations administered through the inspection week.

The crew that received an unsatisfactory performance grade was disqualified from watch standing duties and assigned a remedial training program. The program was designed to address the weaknesses displayed individually and collectively as a crew during the examination.

The staff crew's performance was comparable to the first operating crew's performance. The staff crew's communications, response to annunciators, and execution of procedures was excellent. The Unit Supervisor's command and control skills while directing crew actions during the first of two scenarios was commendable.

The inspectors agreed with the individual and crew grades assigned by the facility's evaluators in all cases.

c. Conclusions

The Training Department's instructors have been generally successful in providing operators with the skills necessary to operate the facility. One crew's performance was determined to be unsatisfactory during the inspection week. Operator skills demonstrated during the operating tests were good with the exception of the significant command and control weaknesses displayed by the failing crew. The NRC inspectors agreed with the facility's evaluator assigned grades in all areas of the examination.

O5.1 Operating History

a. Inspection Scope (71001)

The inspectors reviewed the plant's operating history from January 1997 to March 1998 to determine if any operator errors occurred that could be attributed to ineffective or inadequate training. The following were reviewed:

NRC inspection reports

Most recent Systematic Assessment of Licensee Performance (SALP-14) report

b. Observations and Findings

The inspectors noted several events related to personnel error, especially in the area of out-of-service tagging. Additional events represented a lack of questioning attitude on the part of the operators.

The inspectors reviewed the facility's training program and determined that training designed to prevent the identified operator errors and deficiencies had been presented to the operators prior to the events. Additional training was provided on an on-going basis to address the operator knowledge weaknesses and performance deficiencies after the events occurred at the facility.

c. Conclusions

Operator error related events reviewed by the inspectors were not directly attributable to inadequate or ineffective training, but appeared to be due to a lack of application of the provided training and poor self-checking by operators.

O5.2 Requalification Examinations

a. Inspection Scope (71001)

The inspectors reviewed the following to assess the licensee's examination material quality and content:

Comprehensive written exams (Category A and B for 6 of 6 weeks).

Annual operating tests (JPMs and scenarios for 5 of 6 weeks).

Sample Plan

b. Observations and Findings

The written examinations (Category A and B) administered to the licensed operators appeared to be well constructed and addressed training provided during the training program. The average score on all examinations was approximately 94.5%. One static simulator scenario examination had only one operator miss one question in the entire examination. The high scores indicated that the examinations were either too easy or too short, and did not discriminate against the marginally performing operator. A marginal performer would have sufficient time to find a correct answer in the available reference material. Since the questions on the examination appeared to be written at the correct difficulty level, it suggests that there may have been an insufficient number of questions on the examination to challenge a marginally performing operator.

The dynamic simulator scenarios contained a sufficient number of events, before and after the start of the major transient, to provide adequate feedback to the facility evaluators of operator competence. All of the elements of a well constructed scenario, outlined in NUREG 1021, were incorporated in the scenario outlines.

The JPMs contained the necessary instructions for proper simulator set up, or, if in the plant, the correct cues to direct the operators in accomplishing the assigned task. Cues and feedback items for the operators were immediately available in the JPM package. A valid grading standard was included in each JPM.

The inspectors asked to see the facility's sample plan and were provided with a copy of the requalification training program schedule for the next cycle (two years) and an explanation that the schedule was the facility's sample plan. A Systematic Approach to Training (SAT) program has five elements: (1) job analysis, (2) learning objectives, (3) training, (4) examination, and (5) feedback. The facility's sample plan should coordinate each of these elements into an effective program that controls operator training. The inspectors found: (1) that the job analysis was complete, (2) the learning objectives were available in individual lesson plans, (3) training was taking place on a scheduled basis, (4) the operators were receiving high quality examinations and that (5) the feedback process was implemented. The weak element in this training program was a sample plan that provided a cohesive training guide that related the tasks with the training and the examination items.

c. Conclusions

The written examination questions were of high quality; however, there was sufficient time for each operator to look up the answer to every question, which made it difficult to detect a marginally performing operator. The dynamic simulator scenarios and job performance measures were acceptable as evaluation tools for determining operator mastery of required skills. Although the requalification program was being adequately controlled by the training department's supervision, the sample plan was poorly implemented.

O5.3 Requalification Examination Administration Practices

a. Inspection Scope (71001)

The inspectors performed the following to assess the licensee's policies and practices regarding requalification examination administration, simulator fidelity, and examination security:

Observed requalification examination administration (operating test)

Observed simulator performance.

Reviewed administrative procedures regarding examination security (BTP-400-12, Examination Construction, Control, and Administration, Rev. 11.)

b. Observations and Findings

The inspectors observed two trainers administering in-plant JPMs to the operating crew. The trainers provided the initiating cue and subsequent required cues in a professional manner and correctly assessed each operator's performance. During one JPM operators needed to crawl on the floor under some piping to get behind an auxiliary feedwater pump diesel engine to reach a switch to start the diesel engine. The evaluator identified a bad practice in that the operators he examined attempted to climb over the top of the diesel engine. This was correctly identified as an unsafe practice and corrected by the trainer. The second trainer accepted the operator pointing at the switch as sufficient knowledge to complete the task.

The inspectors observed three trainers administering the simulator (control room) JPMs to several operators. The trainers provided the correct initiating cues to the operators in a professional manner and correctly assessed each operator's performance. The trainers had been trained to maintain a "straight face" attitude during the examination to prevent giving an unintended prompt to an operator during an examination. NRC inspectors noted one instance when an operator noted a failed light indication on a control room panel and asked the trainer if the light bulb should be replaced. The trainer maintained the "straight face" and did not provide a cue to the operator on the proper course of action. While this practice is good for preventing an operator from obtaining an unintended prompt, in some cases, this practice may increase operator stress.

During the administration of the dynamic simulator scenarios, evaluators were noted to be standing away from the operators, yet were always close enough, or were in the right position, to observe all critical items that occurred during the scenarios. The post-scenario follow up discussions were conducted correctly and efficiently. Each of the operator's and crew's actions was characterized in the correct competency area of the grading form.

The simulator operated correctly during the entire examination without any errors (See Enclosure 2). Facility trainers operating the simulator and providing communications functions for the crews being examined were professional and provided the correct information when necessary to each crew.

The examination security procedure was found to be acceptable. No instances of examination security violations were noted during the examination process. Individuals were designated as operator escorts prior to the start of the examination and were ready at assigned times to provide security escort duties. Operators were told where to meet and where to wait between examination sessions. The examination security procedures were correctly implemented during the examination process.

c. Conclusions

The training program policies and practices regarding requalification examination administration and security were being implemented correctly, and in accordance with 10 CFR 55. The simulator operated correctly during the examination and was a valuable tool for the evaluation of the operator skills and competency.

O5.4 Remedial Training Program

a. Inspection Scope (71001)

The inspectors reviewed individual operator and crew performance evaluations and any associated remedial training plans.

b. Observations and Findings

Individual operator and crew performance evaluations were properly documented by training personnel. Weaknesses were correctly characterized in the documentation. Remedial training programs were initiated in cases where poor performance was observed. A remedial training program was initiated for the crew that failed the annual evaluation during the inspection week. The remedial training programs that were inspected contained all the elements necessary to address individual and crew weaknesses.

c. Conclusions

The remedial training program was properly implemented and provided operators with the correct focus to enhance their individual operating and knowledge skills.

O5.5 Conformance with Operator License Conditions

a. Inspection Scope (71001)

The inspectors reviewed the following documents to assess the facility and operator licensees' compliance with 10 CFR 55 license condition requirements:

Records and procedures pertaining to maintaining active operator licenses.
Records and procedures pertaining to reactivating licenses.
Attendance records for classroom training for classes required to maintain a license.

b. Observations and Findings

The self assessment report completed by the Braidwood Production Training Center's inspection team found that inconsistencies existed when an individual or a crew performance was determined to be unsatisfactory. The correct notification to the control room was made by training department personnel; however, operations department personnel did not always correctly document the notification. Clarification was issued to the Shift Managers to instruct them on the correct disposition of the notification.

Adequate procedures and checks existed to prevent an inactive or disqualified licensee from assuming a control room watch. The inspectors found three operators reactivating inactive licenses while training department personnel were unaware of anyone in the process of activating a license.

The classroom lecture attendance records for 1998 had been recently entered into a computer program for attendance tracking purposes. Attendance records for 1997 had not been entered into the program. In some cases documentation of attendance at required classes was not immediately apparent or available to the inspectors; however, the inspectors determined that operators attended all required classroom lectures.

c. Conclusions

Adequate procedures exist to prevent an inactive or disqualified licensee from assuming a control room watch. A communications shortcoming between operations and training was detected when it was determined that three licensees were reactivating licenses without informing training department personnel. Tracking of classroom attendance was poorly implemented.

O8 Miscellaneous Operations Issues

O8.1 Review of Nuclear Generation Group (NGG) Strategic Reform Initiative Number 12

a. Inspection Scope

The inspectors reviewed the status of the licensee's strategic reform initiatives associated with NGG-12, "Reinforce Training Programs for Improved Performance." The two items reviewed included:

Optimize and Standardize Training, Step 4: Upgrade selected training programs.

Achieve a Consistent High Level of Performance from Training Programs, Step 1: Establish processes for on-going oversight and critical self assessment.

b. Observations and Findings

The inspectors reviewed two action steps outlined in the licensee's training improvement initiatives. The first item involved an upgrade of selected training programs, such as engineering personnel, non-licensed operator, and initial operator license training, to achieve optimum programs that incorporate best practices and advantages of scale.

The inspectors reviewed the Nuclear Operating Directive concerning licensed operator initial training program dated June 1, 1998. The directive described the training process and trainee evaluation methods including remediation and re-evaluation criteria for those individuals not meeting training objectives and management's expectations. The program also included site-specific NRC commitments and expectations with respect to missed classes. The inspectors found that similar programs were developed for the non-licensed operator initial and continuing training programs and the engineering support personnel training programs.

The second issue involved establishing a process for on-going oversight and critical self-assessments to ensure improved training performance was sustained. The inspectors met with the Learning Services Superintendent and the NGG Training Assessment Coordinator to discuss the implemented program and enhancements under development. The program consisted of two parts, an on-going oversight provided by the corporate organization and self-assessments conducted by site personnel. The on-going oversight included review of the site's self-assessments to evaluate the depth and scope of the effort and to verify findings and corrective actions. The site self-assessments consisted of planned evaluations of site-specific concerns and corporate initiatives. A corporate procedure developed by representatives from each site ensured consistency in implementation. The program provided the opportunity to communicate the findings from one site to the remainder of the organization through weekly phone calls, publication of the assessment report, quarterly discussions between the sites, and possible evaluation during a later assessment. Findings were tracked through the site's problem identification form program or through the corporate action tracking program. The licensee planned to evaluate the effectiveness of corrective actions to these findings through an effectiveness review process which is under development.

c. Conclusions

The licensee met the initial goals and objectives of the NGG Strategic Reform Initiatives associated with reinforcing the training programs.

O8.2 (Closed) Violation 50-454/97016-01; 50-455/97016-01

This severity level IV violation involved the failure of plant personnel to notify the NRC within four hours of discovering that procedural inadequacies with the Byron Emergency Operating Procedures existed that would cause an operator response to a steam generator tube rupture event to exceed limits documented in the Updated Final Safety Analysis Report.

The inspectors reviewed the violation and the ComEd letter (BYRON 97-0242), which documented the reason for the violation, corrective steps to be taken to avoid further violation, and a date when full compliance was to be achieved.

The licensee determined that the root cause of the violation was that an inappropriate decision was made by the Regulatory Assurance Supervisor. Facility management committed to the NRC to write a Licensee Event Report (LER) documenting the concern and make a revision to the facility's reportability manual to clarify the requirements for reporting of procedural problems.

The inspectors determined that the supervisor was counseled on conservative decision making with respect to ENS notifications, the appropriate LER was issued, and the facility's reportability manual was revised to clarify the procedural problem reporting requirements. This item is closed.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the examination and inspection observations and findings to members of the licensee's management on December 4, 1998. The licensee acknowledged the findings presented. No proprietary information was identified during the examination or at the exit meeting.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

- *B. Adams, Regulatory Assurance Manger
- *E. Bendis, Shift Operations Superintendent
- *R. Brown, LORT Lead Instructor
- *R. Colglazier, NRC Coordinator
- *T. Gierich, Operations Manager
- *K. Graesser, Site Vice President
- *J. Heaton, Operations Support Manager
- *W. Levis, Station Manager
- *S. Pettinger, Operations Training Supervisor
- *G. Smith, ILT Lead Instructor

NRC

- E. Cobey, SRI, Byron Station
- *B. Kember, RI, Byron Station

*Denotes attendance at exit meeting

INSPECTION PROCEDURES USED

- IP 71707, "Plant Operations"
- IP 71001, Licensed Operator Requalification Program Evaluation

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED

None

CLOSED

54/455-97016-01 VIO Failure of plant personnel to notify the NRC in accordance with 10 CFR 50.

DISCUSSED

None

SIMULATION FACILITY REPORT

Facility Licensee: Byron Nuclear Power Station

Facility Licensee Docket Nos: 50-454, 50-455

Operating Tests Observed: November 30 - December 2, 1998

The following documents observations made by the NRC examination team during the November 1998, requalification examination. These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of non-compliance 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 in response to these observations.

During the conduct of the simulator portion of the operating tests, the following item was observed:

ITEM	DESCRIPTION
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1

None