

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report No: 50-461/98301(OL)

Licensee: Illinois Power Company

Facility: Clinton Power Station

Location: Route 54 West
Clinton, IL 61727

Dates: August 31, 1998 - September 4, 1998

Examiners: R. M. Bailey, Lead Inspector/Examiner
A. M. Stone, Examiner-in-Training

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

EXECUTIVE SUMMARY

Clinton Power Station NRC Examination and Inspection Report 50-461/98301

A licensee developed and NRC approved initial operator licensing re-take examination was administered to one applicant requesting a senior reactor operator (SRO) license to operate the Clinton Power Station. In addition, the inspectors observed a period of routine operations in the plant control room and the administration of an annual operating test to one operating crew.

Results: The applicant passed the operating retake examination but was not issued an SRO license to operate the Clinton Power Station pending completion of reactivity manipulations.

Operations Performance Summary:

- Operators on shift executed their duties in a professional manner and in accordance with station procedures and management expectations. (Section O1.1)
- Licensed operator performance during the annual operating test had declined such that it was apparent that the crew members had failed to retain mastery of needed operator skills. The facility's evaluators recognized unsatisfactory crew and individual performances and implemented steps to document the performance and prevent the crew from assuming control room watch standing responsibilities until properly remediated. (Section O4.1)

Operator Evaluation Summary:

- The original retake examination material failed to meet all of the guidelines in NUREG-1021 for developing the job performance measures examination. Additional attention was necessary to correct errors concerning prescribed question content and difficulty level. (Section O5.2)
- The applicant appeared to be poorly prepared on Technical Specification knowledge items, and demonstrated unfamiliarity with plant equipment location and operation. (Section O5.2)
- Implementation of the licensed operator continuing training program involving scheduling and developing operating examinations according to program guidelines was generally characterized by a safety significant focus with an emphasis on providing a valid discriminatory tool. Implementation of the licensed operator continuing training program involving the evaluation of operator performance in accordance with program guidelines was generally characterized by adequate performance standards and the use of qualified evaluators. However, the practice of evaluating one or more training objectives in multiple settings reduced the comprehensive effectiveness of the operating test and placed the examinees in a double jeopardy situation.

Report Details

I. Operations

O1 Conduct of Operations

O1.1 Control Room Activities

a. Scope (71707)

The inspectors observed routine control room activities for a two hour period. Activities observed included a shift turnover, verbal communications, and control room panel attentiveness.

b. Observations and Findings

During the shift turnover, the shift manager conducted a concise shift briefing on plant and equipment status, planned work activities, and Limiting Condition for Operations concerns. Individual operators were asked to participate in the discussion. Following the shift turnover, the panel operators performed a logging activity to record selected panel instrumentation readings. The crew engaged in routine face-to-face discussions and consistently used three-part communications when directing plant activities.

c. Conclusions

Operators on shift executed their duties in a professional manner and in accordance with station procedures and management expectations.

O4 Operator Knowledge and Performance

O4.1 Licensed Operator Performance Evaluations

a. Scope (71001)

The inspectors observed one operator during the validation of the job performance measure (JPM) portion of the initial retake examination and the performance of one operating crew during three dynamic simulator scenarios and two JPM sets. The inspectors assessed the operators' mastery of continuing training skills.

b. Observations and Findings

(1) Knowledge

During the validation of JPM No. 1, "Start Reactor Recirculation Pump 'A' in Slow Speed," for the initial retake examination, the licensed operator validating the JPM was directed to place the recirculation flow control valve (FCV) in the minimum open position. The operator performing the step noted that the FCV position meter indicated approximately 20% open and stated that the valve was in the minimum open position. The operator attempted to start the pump, but was

unsuccessful. Subsequently, the operator closed the FCV until the valve position meter indicated 0% valve position, attempted to start the pump, and the pump started. Based on a follow-up question, the inspectors verified that the FCV must be in the 0% indicated position before the control circuit would allow a successful start of the pump. The examiner was later informed that "minimum open position" was approximately 19% open when the FCV position meter indicated 0% valve position.

(2) Performance

Following a simulator scenario involving a safe shutdown earthquake with a loss of all AC power event, the licensee evaluators recommended an unsatisfactory grade for the crew's performance based upon failure to safely shutdown the unit in a rapid manner, to properly control reactor pressure, and to challenge each other during changing plant conditions. The lead evaluator promptly notified operations management and initiated action to remove the five operators from licensed duties until they were remediated and received a satisfactory grade during a simulator scenario. The inspectors reviewed the individual and crew performance evaluations, and compared the recommendations with the content of the proposed accelerated retraining program. The inspectors determined that the evaluation team's observations and recommendations were appropriate and in accordance with nuclear training and support guidelines.

c. Conclusions

Licensed operator performance for the observed crew had declined such that it was apparent that the crew members had failed to retain mastery of needed operator skills. The facility's evaluators recognized unsatisfactory crew and individual performances and implemented steps to document the performance and prevent the crew from assuming control room watch standing responsibilities until properly remediated.

O5 Operator Training and Qualification

O5.1 General Comments

An initial operator licensing retake examination was administered at the Clinton Power Station (CPS) to one applicant during the week of August 31, 1998. Although the applicant demonstrated satisfactory senior reactor operator (SRO) skills and knowledge and passed the retake examination, the applicant was not issued an SRO license to operate the Clinton Power Station because he had not completed all CPS training program and 10 CFR Part 55 licensing requirements.

A special inspection was performed using inspection procedure IP-71001, "Licensed Operator Requalification Program Evaluation," to assess the licensee's effectiveness in ensuring safe power plant operations by adequately evaluating individual operator and crew mastery of training skills. The inspectors did not assess the licensee's effectiveness in revising and maintaining the continuing training program, or maintaining active operator licenses in accordance with 10 CFR Part 55.53.

O5.2 Initial Retake Examination

a. Scope

Using guidelines provided in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Interim Revision 8, January 1997, the examiners reviewed each JPM for applicability and importance within the assigned safety function areas. The walk-through examination was reviewed to ensure that all requirements of Category B tasks were represented. The prescribed questions were reviewed for diversity and to determine if any were inappropriately written as direct look up or simple memory questions.

b. Observations and Findings

Licensee training personnel developed the operating re-test using the guidance provided in NUREG 1021, ES-301, D.3. The licensee submitted the test to the NRC for review and approval in a timely manner. An NRC examiner administered the operating test.

During review and validation of the retake examination, the following deficiencies were noted:

- (1) The submitted test material was technically accurate, but lacked adequate cues for performance feedback to the applicant during several of the simulated tasks. One task contained one simple critical step and was modified by the NRC examiner to include a fault to increase the difficulty level of the evolution. None of the tasks included a knowledge and ability catalog reference nor a training learning objective description. These items were discussed with the examination developer. Proposed changes were submitted to the NRC for review and were considered acceptable.
- (2) In general, prescribed questions submitted with each task could be answered via simple memory or direct lookup. Approximately one half of the original questions contained psychometric deficiencies which necessitated significant modification or replacement of the questions. These items were discussed with the examination developer. The licensee provided replacement questions or suggested revisions to the NRC. The proposed changes were acceptable and more closely met the guidelines in NUREG-1021.
- (3) During the performance of JPM No. 5, "Equalize Around and Open MSIVs (Main Steam Isolation Valves) per CPS No. 4411.09," the operator was directed to establish a differential pressure of less than or equal to 200 psid across the MSIVs. The step was designated as critical, but the simulator set up had the reactor shutdown and cooled down. Consequently, the operator was not required to take any action because the differential pressure was already less than 200 psid. The licensee changed this step to reflect a verification action which eliminated the critical performance step.

During administration of the examination the following deficiencies were noted:

- (1) During the performance of JPM No. 2, "Manually Initiate the High Pressure Core Spray System (HPCS)," the HPCS MANUAL INITIATION pushbutton would not respond to operator actions because the licensee had previously introduced a failure. However, the applicant was able to successfully arm and depress the pushbutton causing an automatic realignment of HPCS components. Upon questioning the licensee, the examiner was informed that a condition report existed documenting the simulator failure to override the switch. The failure was repeated two days later during a similar JPM task as part of the annual licensed operator requalification evaluation (see Enclosure 2, "Simulator Facility Report").
- (2) During the performance of JPM No. 10, "Respond to Abnormal Level in Component Cooling Water (CCW) Expansion Tank," the operator was directed to lower the level in the CCW Expansion Tank to within 105" to 117" using Section 8.2.2.2 of Procedure 3203.01, "Component Cooling Water (CC)". However, the examiner and applicant noted that the installed sight glass did not contain any recognizable markings to determine level in either inches or feet, and the applicant contacted the main control room to obtain the information from control room indications. During a follow-up review, the examiner noted in Section 8.1.2.3, "Manual Makeup of CCW Expansion Tank," direction that the water level should be maintained in the second sight glass from the top of the level gauge. The examiner also noted in Section 8.1.1.1, "Startup," direction that the expansion tank should be filled to the upper control band using a computer reference point (CC-BA401). A licensee representative was unable to provide clarification of the procedure's intent, but stated operator judgement was permitted.

The applicant demonstrated significant weaknesses in Technical Specification implementation and in plant equipment location and operation. While answering a prescribed question for a failed safeguards instrument, the applicant referenced the associated system's Technical Specification (TS) but failed to reference the more restrictive conditions governing instrumentation. During a task performance in the plant, the applicant failed to identify the location of the amphenol connectors for the directional control valves on the control rod drive system's hydraulic control units. During a different task performance in the plant, the applicant failed to identify the location of the component cooling water pump suction pressure reading.

c. Conclusions

The original retake examination material failed to meet all of the guidelines in NUREG-1021 for developing the JPM examination. Additional attention was necessary to correct errors concerning prescribed question content and difficulty level.

The applicant appeared to be poorly prepared on Technical Specification knowledge items, and demonstrated unfamiliarity with plant equipment location and operation.

O5.3 Requalification Inspection

a. Scope (71001)

The inspectors reviewed the licensee's proposed operating test material for the week of August 31, 1998. The inspectors compared the examination material with the program's sample plan to assess the validity of the operating test. The dynamic simulator scenario set consisted of five diverse scenarios. The job performance measures set consisted of ten separate tasks which were subdivided into five tasks for the senior reactor operators and five different tasks for the reactor operators.

b. Observations and Findings

The proposed dynamic simulator scenario portion of the operating test incorporated diverse safety risk events, such as Station Blackout, Anticipated Transient without Scram (ATWS), and Loss of Coolant Accident (LOCA), as described in the licensed operator exam development guidelines. An appropriate number of critical tasks were included in the scenarios. Each scenario contained credible events that included appropriate precursors. Major events were sequenced such that simultaneous malfunctions did not require outside operator assistance.

The walk-through portion of the operating test contained diverse safety system tasks as described in the licensed operator exam development guidelines. Each job performance measure (JPM) contained clearly identified task standards and critical steps needed to accomplish the task. The five JPMs selected for each examinee were consistent with the exam development guidelines and did not overlap among the reactor operator (RO) and senior reactor operator (SRO) tasks.

The scenario and JPM evaluations were conducted as scheduled while maintaining proper examination security measures. No evidence of undue operator stress was observed. In general, the licensee's evaluators maintained a proper distance and yet were able to adequately observe operator actions during the dynamic scenarios. The evaluators provided appropriate system response cues during the JPM tasks.

The CPS nuclear training and support guidelines included a statement that each dynamic simulator scenario should require the operators (usually SROs) to utilize the Technical Specifications (TS). While each scenario did require a TS entry, the inspectors observed that scenario event sequencing was paced such that as soon as the operator acknowledged entry into the required TS, the next event occurred soon afterwards without time for implementation of all actions. Improper sequencing of events could contribute to ineffective evaluations of TS implementation by operators.

Two of the five dynamic scenarios contained an ATWS condition requiring the operators to take emergency action to shut down the reactor. Additionally, each RO was required to respond to an ATWS condition and shut down the reactor during a JPM portion of the operating test. The inspectors noted that the nuclear training and support guidelines did not address the use of overlapping training objectives among dynamic scenarios, JPMs, and written questions when developing the examination material. Title 10 of CFR Part

55.59, "Requalification," requires operators to pass a comprehensive annual operating test. Significant overlap or duplication between portions of the examination may place the operator in a double jeopardy situation or reduce the effectiveness of the overall evaluation process.

The JPM outlines did not consistently provide needed information or give adequate direction to the evaluator as outlined in the nuclear training and support guidelines. For example:

- JPM No. 014201J003, "Use Alternate Means to Determine Control Rod Position," contained four critical steps for successful completion of the task, and the performance information stated that the sequence of steps was assumed unless denoted otherwise in the comments section of the JPM. The inspectors observed an SRO examinee perform the first critical step of the JPM, then state that he had completed the JPM task. A note in the procedure stated that the four main steps could be performed independently and in any order. The inspectors determined that the operator's action was correct. The inspectors were concerned that the JPM evaluation sheet contained no remarks to clarify the expectation that performance of any one of the four major steps constituted completion of the task.
- JPM No. 011286J009, "Perform WS/FP Cross Tie," directed operators to start the standby Service Water (WS) pump. The expected standard for this step involved control room operators starting the WS pump. However, there was no feedback cue for the evaluator to provide a response. The inspectors noted other occasions when the evaluator had been required to provide a response without the aid of a prescribed cue. The inspectors determined that the evaluator's responses were appropriate.

c. Conclusions

Implementation of the licensed operator continuing training program involving scheduling and developing operating examinations according to program guidelines was generally characterized by a safety significant focus with an emphasis on providing a valid discriminatory tool. Implementation of the licensed operator continuing training program involving the evaluation of operator performance in accordance with program guidelines was generally characterized by adequate performance standards and the use of qualified evaluators. However, the practice of evaluating one or more training objectives in multiple settings reduced the comprehensive effectiveness of the operating test and placed the examinees in a double jeopardy situation.

05.4 Examination Security

Examiners observed a potential breach of security during the validation phase of the initial retake examination. An operations training instructor who was not on the retake examination's security agreement entered the simulator control room area during the performance of a JPM task. The licensee's representatives immediately detained the individual, reviewed the security precautions taken, and verified proper posting of

warning signs. The instructor had signed on to the licensee's security agreement for the current requalification training evaluation period but failed to review the posted caution signs prior to entry into the simulator area. The licensee took prompt corrective action to place the individual on the initial retake examination's security agreement and to inform senior management of the occurrence.

O5.5 Simulator Fidelity

Examiners observed some simulator modeling deficiencies during the administration of the initial retake examination and licensed operator training evaluation processes. Examiners and facility evaluators were able to perform valid performance evaluations even with erroneous indications present. The examiners concluded that the identified deficiencies had not impacted the validity of the evaluations performed. Simulator fidelity issues are documented in Enclosure 2, "Simulation Facility Report."

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 September 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

D. Antonelli, Supervisor - Operations Training
J. Forman, Licensing Specialist
J. Hays, Shift Manager - Operations
*D. Hill, Instructor - Operations Training
B. Maguire, Director - Operations
J. Neuschwanger, Lead Instructor - Operations Training Requal
R. Price, Senior Instructor - Operations Training
M. Stickney, Supervisor - Licensing

NRC

T. Pruett, Senior Resident Inspector

(*) Personnel not in attendance at the management exit meeting on September 4, 1998.

INSPECTION PROCEDURES USED

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

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

SIMULATION FACILITY REPORT

Facility Licensee: Clinton Power Station

Facility Licensee Docket No: 50-461

Operating Tests Administered: August 31 - September 3, 1998

The following documents observations made by the NRC examination team during the January/February 1998, initial license 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 items were observed:

ITEM	DESCRIPTION
1	During the performance of the initial retake examination JPM to manually activate high pressure core spray (HPCS), the HPCS switch override failed to function upon demand allowing the automatic actuation of core spray equipment. The same override was attempted during a subsequent continuing training evaluation with a repeat of the failure to prevent automatic actuation. The licensee has documented this condition as a repeat problem.
2	During the performance of the continuing training evaluation of one crew, a remote actuated condition failed to function upon the initial actuation. A subsequent attempt to enter the malfunction resulted in the next remote actuated condition being activated. The licensee has documented this condition as a repeat problem.