U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-255
License No:	DPR-20
Report No:	50-255/98004(DRS)
Licensee:	Consumers Energy Company 212 West Michigan Avenue Jackson, MI 49201
Facility:	Palisades Nuclear Generating Plant
Location:	27780 Blue Star Memorial Highway Covert, MI 49043-9530
Dates:	March 25 through April 1, 1998
Inspectors:	M. Bielby, Reactor Engineer J. Larizza, Reactor Engineer
Approved by:	Melvyn Leach, Chief, Operator Licensing Branch Division of Reactor Safety

EXECUTIVE SUMMARY

Palisades Nuclear Generating Plant
NRC Inspection Report 50-255/98004

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 a review of training administrative procedures, written and operating examination material; observation and evaluation of operator performance and licensee evaluators during a requalification operating examination; an assessment of simulator fidelity; an evaluation of program controls to assure a systems approach to training; and a review of requalification training records. In addition, the inspectors observed a period of control room operations. The inspectors used the guidance in inspection procedures (IP) 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 the appropriate focus on plant evolutions in progress. The large number of control room panel caution tags could potentially have a detrimental effect on efficient plant operations. (Section O1.1)

- Operator performance during the annual requalification examination demonstrated a lack of commitment in complying with the facility's conduct of operations procedures. Communications activities during crew briefs and routine operations did not consistently meet the licensee's expectations. Operators and training staff tolerated poorly written procedures and failed to identify those procedures for revision. (Section O1.1)

- Operator error related events were not directly attributable to inadequate or ineffective training, but rather due to a lack of application of training on the part of the operators. (Section 05.1)

- The quality of the Category B examination questions was poor and resulted in a Level IV violation. The operating examinations (Job Performance Measures (JPM) and dynamic simulator scenarios) were generally at the appropriate level of difficulty to distinguish between competent and non-competent operators. The quality of the dynamic simulator scenario could be improved by consistently providing expected operator actions to evaluators and developing challenging technical specification problems. (Section O5.2)

- The licensee administered the operating examination in accordance with their program guidance, and regulatory requirements. The licensee displayed several attention to detail weaknesses and a failure to apply a rigorous standard during performance evaluations. The licensee's JPM validation process failed to identify poorly written procedures before they were administered during the annual requalification examination. The licensee had an effective operating examination security program. (Section O5.3)

- Mechanisms for feedback of performance weaknesses to the operators and training staff existed. The training program feedback process appeared to be satisfactorily implemented. (Section O5.4)

- The remediation program was being implemented in accordance with the licensee's program and regulatory requirements. (Section O5.5)

- Operator license conditions were in conformance with program guidance and regulatory requirements. (Section O5.6)

REPORT DETAILS

I. Operations

O1 Conduct of Operations

O1.1 Control Room and Operator Observations

a. Inspection Scope (71707)

The inspectors observed routine control room activities during full power operation and observed a shift briefing after completion of individual shift turnovers. The inspectors performed a walkdown of the primary control panel; reviewed caution tags, and questioned operators about plant and equipment status.

The inspectors observed administration of the annual operating (Job Performance Measure (JPM) and dynamic simulator scenario) requalification examination to an operating crew.

b. Observations and Findings

Operators used clear and concise three-part communications to direct operations in and out of the control room. Access to the control room was controlled in the work center supervisor office, reducing the number of plant staff personnel in the control room to a minimum. Control room operators were attentive during the shift brief and continued to methodically monitor control room indications after the brief. When questioned by the inspectors, the control room operators were knowledgeable of plant and equipment status.

There were a large number of cardboard and yellow placard caution tags on the primary plant control panels. When questioned, the control room operators were knowledgeable of the information on the cards and did not feel the large number of cards was a distraction from good plant operations.

During execution of the JPM portion of the annual operating examination the inspectors noted the following actions that involved operator performance issues:

- The operators used good self-checking techniques during performance of the JPM portion of the operating examination.

- Two operators performed system operating procedure SOP-12, Attachment 2, Revision 28, two different ways while performing JPM ASLD-01A, "Reset Alternate Feedwater Actuation System (AFAS)." One operator reset all the AFAS modules (tripped and non-tripped), while the other operator only reset the tripped modules. The procedure did not specify which method to use, but was written such that all modules would be reset. The operators did not question which method was correct, nor did they identify the procedure weakness.

- System operating procedure SOP-1, Revision 38, directed operators to start either the AC or DC oil lift pump while executing the procedure. No guidance is provided concerning which pump is preferred and operators performing JPM ASED-02, "Primary Coolant Pump (PCP) Shutdown," did not question the procedure weakness.

- SOP-1, Revision 38, (noted above) eventually required the PCP and both oil lift pumps to be tripped, which caused two annunciators to alarm. Operators did not identify the expected alarms ahead of time, or reference the associated alarm response procedure after the annunciators alarmed while performing the JPM.

- While executing SOP-37, Revision 9, Step 7.4.3.b.7, during a JPM, an operator stated the step was vague concerning which alarms should have annunciated. The operator then placed an "N/A" in the step and continued. The inspector observed that no anticipated alarm energized. The operator failed to initiate a procedure change to correct the procedure.

During execution of the dynamic simulator scenario portion of the annual operating examination the inspectors noted the following actions that involved operator performance issues:

- The operators did not consistently use good self-checking techniques when responding to events.

- Communications were inconsistent and sometimes did not meet the licensee's standard for three-part communications. Some operators failed to repeat back or acknowledge orders. On one occasion, one of the Nuclear Shift Operators (NSOs) opened three containment isolation valves to re-establish containment cooling water (CCW) to the containment coolers without informing the second NSO. The second NSO had been carefully monitoring service water (SW) pressure due to a loss of power to two of three SW pumps. The first NSO was unaware that the 2nd NSO was monitoring the SW system. The added heat load to the CCW heat exchangers caused a significant decrease in SW pressure which could have resulted in a loss of SW and complicated plant recovery.

- Overall Control Room Supervisor (CRS) briefings were inconsistent and poor. Sometimes the opening or closing statement was missing. The past, present, and future status was not always clear and concise. The crew members only acknowledged "ready" once during two scenarios that contained multiple briefings. In every briefing the CRS asked crew members if there were any questions or concerns. The inspectors identified only one briefing during the two scenarios that contained all of the elements of a good brief.

- Operator acknowledgment of expected and unexpected alarms was inconsistent and sometimes did not meet the licensee's standard, Procedure No 4.00, Attachment 10, Revision 20, "Alarm Response Standard."

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 the appropriate focus on plant evolutions in progress. The large number of control room panel caution tags could potentially have a detrimental effect on efficient plant operations.

Operator performance during the annual requalification examination demonstrated a lack of commitment in complying with the facility's conduct of operations procedures. Communications activities during crew briefs and routine operations did not consistently meet the licensee's expectations. Operators tolerated poorly written procedures and failed to identify those procedures for revision.

O5 Operator Training and Qualification

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. That review included the following:

- NRC inspection reports
- Most recent Systematic Assessment of Licensee Performance (SALP-14) report
- Selected Licensee Event Reports (LERs)

b. Observations and Findings

The inspectors noted several events related to personnel error. One significant event for failure to recognize that all control rods were taken out of service to perform maintenance while at power was a programmatic breakdown in conduct of operations activities and included poor knowledge of, and failure to follow technical specifications. Additional events represented a lack of questioning attitude:

- LER 97-001 identified that while synchronizing the Main Generator to the grid on January 1, 1997, T_{AVE} dropped below the minimum temperature (525 ^{0} F) required for criticality as specified in technical specifications. Again during shutdown, T_{AVE} also dropped below minimum criticality temperature. The event occurred because the control rod withdrawal rate to increase power was not sufficient to match the increase in steam demand. The operators over-relied on the simulator and Technical Data book to exactly model actual plant response.

- Inspection report, 97013, documented the use of an inadequate procedure on October 12, 1997. The report identified that system operating procedure

(SOP-1), "Primary Coolant System," allowed the operator to start a primary coolant pump while the steam generator secondary temperature was greater than the cold leg temperature. This lack of questioning attitude was also related to another event in inspection report 97008 for exceeding the rated reactor thermal power.

The following events represented poor self-checking:

- Inspection report, 97011, documented that operators failed to ensure service water drain valves were closed on September 2, 1997. As a result, the component cooling water system could have potentially been drained in an Appendix R design bases fire.

- Inspection report, 97018, documented a mispositioned N_2 isolation valve was found on a nitrogen bottle at nitrogen station 3B during performance of surveillance MO-29, "Engineered Safety System Alignment."

- Inspection report 98002, identified a failure to properly secure a watertight door.

Training designed to prevent the identified operator errors and deficiencies had been presented to the operators prior to events. Additional training was provided to address the operator knowledge weaknesses and performance deficiencies after the events occurred at the facility.

c. Conclusions

The operator error related events reviewed by the inspectors were not directly attributable to inadequate or ineffective training, but rather, due to a lack of application of training on the part of the operators.

O5.2 Requalification Examination Material

a. Inspection Scope (71001)

The inspectors reviewed the training department's licensed operator requalification training sample plan, and compared that with the annual written examinations and operating tests administered. A selected review of the written and operating examinations administered to different operating crews during the previous weeks was also done to verify compliance with program guidance. The following documents were also reviewed:

- 1997 - 1998 Palisades Licensed Operator Sample Plan
- AP 4.05, "Operator Training," Revision 14
- Palisades Nuclear Training Procedure (PNT) 2.0, "Preparation of Training and Evaluation Guides," Revision 4
- PNT 7.0, "Simulator Training," Revision 3
- NUREG-1021, "Operator Licensing Examination Standards for Power Reactors,"

- NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 8, January 1997
- The set of 6 JPMs used during Week 5 of the operating examinations
- The set of two dynamic simulator scenarios used during Week 5 of the operating examinations
- Two annual written examinations, the first of which was administered on January 21, 1998, and the second on January 28, 1998

b. Observations and Findings

Each written examination consisted of a Category A, (static simulator) examination and a Category B, (classroom) examination. The Category A written examination made good use of the plant specific simulator. The Category B written examination required a broad spectrum of plant procedures to answer the questions. The licensee's program allowed examination authors to use up to 75% of the questions on an examination on any subsequent examination. The licensee's guidance was considered non-conservative because of the minimal 5% of new knowledge that would be required to pass the second examination with a score of 80%. In actuality, the second examination reviewed by inspectors duplicated approximately 55% of the questions from the first reviewed examination and was, therefore, within the licensee's guidelines. The inspectors determined that although an excessive amount of question overlap existed between the two written examinations they reviewed, they did not identify any breach of written examination integrity.

The Category B written examination was of poor quality with a low level of difficulty and was improperly constructed. Training procedure, PNT 2.0, Section 6.3.5, stated that the licensee would follow NUREG-1021 to develop evaluation guides (written examinations). Nine of the 23 questions on the Category B written examination were considered direct look-up questions, primarily because they only required an operator to recall the procedure in which to find the answer. Ten of the 23 questions were considered simple knowledge level questions because they required simple recognition, or recall of facts or specifics, rather than demonstration of understanding by using the knowledge to address a problem. NUREG-1021, Section ES-602, Attachment 1 prohibits the use of direct look-up or memory knowledge level questions on open-reference examinations. As a result of administering the Category B open-reference examination with 19 of 23 questions in a direct look-up or memory format, the annual written examination was not considered a comprehensive examination. This was considered a violation of 10 CFR 55.59(c).
(VIO)(50-255/98004-01(DRS)).

The previous licensed operator requalification training program inspection conducted the week of May 1, 1996 also identified direct look-up and memory knowledge level questions on the Category B written examination. During that inspection the inspectors identified the improper questions prior to examination administration and the training department corrected the identified deficiencies prior to examination administration.

A set of six different JPMs was used each week. None of the JPMs was repeated from week to week during the annual operating examination. One JPM was appropriately designated as "SRO only." One JPM, ASLD-01A, "Reset AFAS," was designated as an alternate path JPM because it required the operator to identify a system fault to the shift supervisor. The inspectors determined it did not meet the attributes of an alternate path JPM because after identification of the fault it did not require completion of the assigned task using an alternate method found in approved procedures.

Each scenario inspected contained sufficient safety significant tasks to evaluate the operating crew's ability to safely operate the plant during normal, abnormal, and emergency conditions. The major transients and malfunctions after Emergency Operating Procedure (EOP) entry increased the level of difficulty and provided a good evaluation of EOP usage. Some of the events leading up to the major transient were less challenging because they did not require significant operator analysis to diagnose the event, or required minimal operator action to mitigate the event. The major expected operator actions were not always provided in the scenario guides, which increased the possibility of inconsistent evaluations. Entries into Technical Specifications were obvious and not a good tool for evaluation of operator competency at using Technical Specifications.

c. Conclusions

The quality of the Category B examination questions was poor and resulted in a Level IV violation. The operating examinations (JPMs and dynamic simulator scenarios) were generally at the appropriate level of difficulty to distinguish between competent and non-competent operators. The quality of the dynamic simulator scenario could be improved by consistently providing expected operator actions to evaluators and developing challenging technical specification problems.

O5.3 Requalification Examination Administration and Operator Performance

a. Inspection Scope (71001)

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

- Observed requalification operating examination administration and evaluation
- Observed operator performance during the requalification operating examination
- Interviewed licensee personnel (operators, instructors, training management, and evaluators)
- Reviewed the licensee's administrative procedures
- Reviewed PNT-12.0, "Licensed Operator Examination Security," Revision 0, Dated 2/4/98
- Reviewed CR No. 98-0403, "Potential Loss of Control of Licensed Operator Annual Exam Material"

b. Observations and Findings

The inspectors observed the licensee administer five JPMs (three on the plant specific simulator, two in the plant) to each operator. The licensee stated they had incorporated a "zero tolerance" program in which any action that was procedurally directed, including an action that simply verified an expected status or parameter, was considered "critical" and must be completed to receive a satisfactory grade. The inspectors agreed with the licensee's overall pass/fail decisions. The evaluators demonstrated a lack of attention to details as demonstrated by the following JPM administration and evaluation process observations:

(1) Prior to commencing each JPM, the evaluator informed the operator of the expected time limit to perform the task. NUREG 1021, Appendix E, Part D - Walk-through Test Guidelines, step 4, allows evaluators to inform the operator of time critical JPMs, but not of time limits associated with other JPMs.

(2) During JPM ASLD-01A, "Reset AFAS," an inspector observed two operators perform the system operating procedure SOP-12, Attachment 2, Revision 28, two different ways. One operator reset all the AFAS modules (tripped and non-tripped), while another operator only reset the tripped modules. The procedure did not specify which method to use, but was written such that all modules would be reset. The evaluator accepted both methods as correct. The evaluator failed to identify and correct the procedure weakness.

(3) During the JPM ASED-02, "Primary Coolant Pump (PCP) Shutdown," the inspectors observed that the system operating procedure SOP-1, Revision 38, directed operators to start either the AC or DC oil lift pump. The evaluator failed to determine which would be the preferred pump and accepted the start of either pump. Additionally, the procedure eventually required the PCP and both oil lift pumps to be tripped, which caused two annunciators to alarm. An operator being examined did not identify the expected alarms ahead of time, nor reference the associated alarm response procedure after the annunciators alarmed. The evaluator did not identify the operator's failure to identify the expected alarms or failure to reference the associated alarm response procedure.

(4) During the JPM ASDC-01, "Set Up Radwaste Radiation Indication/Alarm -1049 Module," an operator being evaluated stated that SOP-37, Revision 9, Step 7.4.3.b.7 was vague on which alarms should have annunciated. The operator then put an "N/A" in the step and continued. The inspector observed that no alarm came in. The evaluator failed to follow up on clarification of the procedure step.

The inspectors observed the licensee administer two dynamic scenarios to one operating crew that consisted of five licensed operators in the positions of Shift Supervisor (SS), CRS, Shift Engineer/Shift Technical Advisor (SE/STA), NSO-Reactor

and NSO-Turbine. Two of the three senior reactor operators (SROs) were rotated into the CRS position from the SE/STA position between scenarios to allow evaluation of directing EOPs. The third SRO had previously been evaluated directing EOPs. Immediately following each dynamic scenario termination, the evaluators asked follow-up questions to clarify observations. The inspectors agreed with the licensee's pass/fail decisions for the crew and individuals. Overall, the evaluators did a good job of identifying procedural performance issues. However, the following administrative and evaluation items were observed during the dynamic scenario examination process:

(1) After completion of each scenario, the licensee evaluators did not caucus and co-ordinate follow-up questions to be asked of the operators.

(2) The licensee inconsistently documented comments for justification of competency ratings. All "1's", most of the "2's" and some "3's" were supported by comments.

The operator performance weaknesses observed by the inspectors, plus additional deficiencies, were identified by the licensee evaluators and discussed during their crew and individual evaluations. The inspectors reviewed the licensee's final results and discussed aspects of the operator performance with the licensee. The inspectors agreed with the overall pass/fail determinations of the operating crew and individual operator performances.

The licensee administered the same JPMs to a staff and operating crew. The two groups each contained five operators. A detailed schedule was prepared for administration of the two in-plant and three simulator JPMs. The schedule designated three rooms in which to sequester operators with various degrees of JPM knowledge through the course of the JPM operating examination. The various evaluators and JPMs they were administering were included on a time line, with additional time allotted for transit between the plant and simulator, and lunch breaks. The inspectors did not observe any compromise of the JPM examination during its administration.

c. Conclusions

The licensee administered the operating examination in accordance with their program guidance, and regulatory requirements. The licensee displayed several attention to detail weaknesses and a failure to apply a rigorous standard during performance evaluations. The licensee's JPM validation process failed to identify poorly written procedures before they were administered during the annual requalification examination. The licensee demonstrated a strong commitment to examination security.

O5.4 Requalification Training Program Feedback

a. Inspection Scope (71001)

The interviewed staff personnel and reviewed the following documents to assess the licensee's training program feedback system effectiveness:

- [Operations] Self Assessment Report-February, 1998
- Nuclear Performance Assessment Department Training and Qualification Audit, PA-97-13, September 8 - 19, 1997
- Nuclear Performance Assessment Department Training and Qualification Audit, PA-96-28, October 21 - December 13, 1996

b. Observations and Findings

The operations self assessments were critical and identified appropriate items for improvement. The training and qualification audits were not recent, but did identify emerging training issues. A review committee was actively involved in the requalification training process to address weaknesses identified during training and evaluations.

c. Conclusions

Mechanisms for feedback of performance weaknesses to the operators and training staff existed. The training program feedback process appeared to be satisfactorily implemented.

O5.5 Remedial Training Program

a. Inspection Scope (71001)

The inspectors performed a review of the following records and procedures to assess the licensee's remedial training program effectiveness:

- Completed remediation packages
- AP 4.05, "Operator Training," Revision 14

The inspectors reviewed three remediation packages (dated February 27, 1998; March 20, 1998; and March 23, 1998) associated with individual failures of JPMs.

b. Observations and Findings

All three packages identified the JPM failure, the deficiency that caused the failure, recommended appropriate remediation to address the deficiency, and re-tested the individual by administering a new set of five JPMs that addressed the deficiency. The inspectors determined that the level of detail was consistent between the remediation packages and no evidence of an improper or inadequate level of remediation and re-testing was apparent.

c. Conclusions

The remediation program was being implemented in accordance with the licensee's program and regulatory requirements.

O5.6 Conformance with Operator License Conditions

a. Inspection Scope (71001)

The inspectors reviewed the licensed operator medical and active license qualification programs to assess licensed operator compliance with regulatory requirements and the following licensee procedures and records:

- PNT 6.0, "Operator NRC Licensing Application And Renewal Requirements," Revision 1
- AP 4.05, "Operator Training," Revision 14
- Operator proficiency watch records
- Ten licensed operator medical records selected at random.

b. Observations and Findings

The licensed operator medical records contained appropriate documentation to validate operator medical qualifications to perform licensed duties. No required physicals exceeded the program allowed dates and no violation of regulatory requirements were identified. Additionally, the inspectors verified that operators who were respirator certified had eyeglass inserts for their respirators.

The licensee's guidance for maintaining operator licenses active clearly identified the appropriate control room licensed operator positions and required on-shift time to maintain an active license. Further review of the licensee's watch standing proficiency records indicated they were properly crediting active license duty watch standing hours.

c. Conclusions

Operator license conditions were in conformance with program guidance and regulatory requirements.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors met with licensee representatives on April 1, 1998, to discuss the scope and findings of the inspection. On April 13, 1998, a telephone exit was conducted to inform the licensee that a potential violation item discussed during the exit on April 1, 1998, would become a comment in the report. During the exit meetings, the inspectors discussed the processes reviewed by the inspectors during the conduct of this inspection and the likely content of the final inspection report. Licensee representatives did not identify any documents or processes as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

G. Boss, Operations Manager
E. Chatfield, Training Manager
B. Dotson, Licensing
R. Frigo, Operations Training
N. Haskell, Licensing Director
M. Kane, Operations
D. Malone, Operations Superintendent
T. Nelson, Operations Training
C. Oberlin, Operations Training
P. Rewa, Operations Training
D. Rogers, General Manager Plant Operations
P. Schmidt, Operations Training

NRC

M. Bielby, Reactor Engineer

INSPECTION PROCEDURES USED

IP 71001:	Licensed Operator Requalification Program Evaluation
IP 71707:	Plant Operations

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-255/98004-01	VIO	Failure to administer a comprehensive licensed operator requalification written examination

Discussed

NONE

Attachment 1

SIMULATION FACILITY REPORT

Facility Licensee: Palisades

Facility Licensee Docket Nos: 50-255

Operating Tests Administered: March 25 - 26, 1998

This form is to be used only to report observations. These observations do not constitute 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 that may be used in future evaluations. No licensee action is required in response to these observations.

While conducting the simulator portion of the operating tests, the following items were observed (if none, so state):

ITEM	DESCRIPTION

None identified.