



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

Report Nos.: 50-369/85-13 and 50-370/85-12

Licensee: Duke Power Company  
 422 South Church Street  
 Charlotte, NC 28242

Docket Nos.: 50-369 and 50-370

License Nos.: NPF-9 and NPF-17

Facility Name: McGuire 1 and 2

Inspection Conducted: March 4-8, 1985

Inspectors:	<u><i>[Signature]</i></u>	<u>4/25/85</u>
	B. T. Debs	Date Signed
	<u><i>[Signature]</i></u>	<u>4/25/85</u>
	F. R. McCoy	Date Signed
	<u><i>[Signature]</i></u>	<u>4/25/85</u>
	L. P. Modenos	Date Signed
Approved by:	<u><i>[Signature]</i></u>	<u>4/26/85</u>
	C. A. Julian, Section Chief	Date Signed
	Division of Reactor Safety	

SUMMARY

Scope: This routine, unannounced inspection involved 99 inspector-hours on site in the areas of maintenance activities, licensed and non-licensed employee training, and licensed operator requalification training.

Results: Of the four areas inspected, one apparent violation was identified (Failure of licensed training personnel to fully participate in the requisite lecture and segment test program, see paragraph 5.b). However, as a result of the current NRC policy statement on training and qualification of nuclear power plant personnel, this item is being carried as an unresolved item pending further NRC evaluation.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*T. L. McConnell, Station Manager
- \*R. L. Weber, Director, Nuclear Projects
- \*S. R. Frye, Director, Operator Training
- \*G. W. Cage, Superintendent of Operations
- \*D. J. Rains, Superintendent of Maintenance
- \*G. W. Grier, Corporate QA Manager
- \*J. O. Barbour, QA Manager, Operations
- \*T. Parker, Training Supervisor
- \*N. McCraw, Compliance Engineer
- \*J. C. Wolfmeyer, Senior Instructor
- \*G. A. Figueroa, Maintenance Planning Engineer
- \*R. P. Muschick, Maintenance Engineer
- \*D. Motes, Support Engineer
- \*C. Taylor, Training/Safety Coordinator

#### NRC Resident Inspectors

- \*W. Orders
- \*P. Skinner

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on March 7, 1985, with those persons indicated in paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during this inspection.

### 3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

### 4. Unresolved Items\*

Two unresolved items were identified during this inspection; one concerning failure of licensed training personnel to fully participate in the requisite

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\*An Unresolved Item is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation.

lecture and segment test program (paragraph 5.b) and the second concerns discrepancies between documented and committed training times for one SRO (paragraph 6b).

5. Licensed Operator Requalification Training (41701)

An inspection was performed in the area of licensed operator requalification training in order to verify that the program is in conformance with NRC requirements, that the program is properly implemented, and that the program is technically adequate. With the exception of those specific deficiencies or weaknesses noted herein, it was determined that in general the program was satisfactory, with evidence of significant improvement in recent years.

- a. The inspectors noted that currently, the FSAR section 13.2.2.3 provides the only formal description of a requalification program which can be considered to be NRC approved. This program description is basic and non-specific and delineates minimum program requirements. Annually, an uncontrolled document is issued to specifically delineate the Duke Power Company, McGuire Nuclear Station requalification program for NRC licensed personnel (hereafter referred to as the Training Summary). Additionally, a training schedule for a licensed operator requalification is issued annually to identify specific course lectures to be taught during the year's requalification program and to identify when these courses will be taught. Together, the Training Summary and training schedule adequately describe the requalification program for a given year. The inspectors do not consider that the program which is specified in the FSAR is descriptive enough to represent the formal NRC approved program and that the Training Summary should be resubmitted formally to the NRC for approval. The licensee stated that although prior year training summaries had not been submitted for NRC approval, the 1985 Training Summary was submitted to the NRC on February 20, 1985. It is considered that the Training Summary, once approved, could be better controlled if issued as a station procedure or training center procedure.

A review of the 1984 Training Summary reflected that, in general, it exceeded the criteria established in the FSAR. The program delineated in this Training Summary provided for a preplanned fundamental review and operational proficiency lecture series with segment exams being administered at the end of each two-week segment of the lecture series, a simulator (or plant) skills training and evaluation phase with administration of an annual simulator exam, an operational review program, and an annual requalification examination.

- b. The preplanned lecture series consists of fundamental review and operational proficiency lectures. These lectures are provided on a five-shift rotation basis in five segments, with each segment comprising approximately two weeks of lecture and self study time for each shift. At the end of each segment, a topical or segment test is administered for material covered during that time frame. The minimum time requirement for lecture attendance delineated in the Training

Summary is 100 hours per person. A review of selected records indicated that, with the exception of training instructors, personnel participate in approximately 90% of the lectures provided, thereby exceeding the 100 hour minimum criteria. Records also reflected that, again with the exception of training instructors, personnel do take the segment test at the end of each segment.

In the case of four training instructors, training records did not reflect participation in requisite lectures for 1984 and also reflected that these four personnel had not taken 1984 segment tests. There are no provisions in the FSAR or 1984 Training Summary allowing exemption of these personnel from participation in lectures or segment tests. Although this is contrary to 10 CFR 55, Section 55.33 and Appendix A, this finding is being carried as an unresolved item pending further evaluation with respect to the current NRC policy statement on training and qualification of nuclear power plant personnel (URI - 50-369/85-13-01, 50-370/85-12-01).

A review of the 1985 Training Summary submitted to the NRC for approval on February 20, 1985, revealed that provisions are identified in that Summary for exempting backup licensees from lectures and for segment test participation in certain circumstances as management needs dictate. It appears that these provisions for exemption are not specific enough to ensure adequate training of all backup licensees. The inspectors consider that this provision of the Training Summary should be revised to identify which specific backup licensees may be exempted and under what condition they may be exempted. The licensee acknowledged this concern. Resolution of this issue is identified as an Inspector Followup Item (IFI - 50-369/85-13-02; 50-370/85-12-02).

The content of training conducted during each segment may consist of fundamental review lectures, operational proficiency lectures, self study periods, and simulator training. The licensee stated that the hours of lecture attendance recorded on the training records (TSR-10 Training Content Summaries) is a compilation of hours spent in fundamental review and operational proficiency lectures as well as hours spent in self study for each segment. The inspectors consider that self study time should not be included in the hours recorded on the TSR-10. These times should reflect only time spent in lecture participation. The licensee acknowledged this concern.

A review of TSR-10 forms for selected personnel reflected that lecture hours documented on the form could not be fully substantiated by lecture attendance records for Segments 1 and 2 of 1984 due to the cumbersome method of documenting lecture attendance for those two segments. The TSR-10 forms had not yet been finalized or filed as permanent records at the time of this finding. The inspectors discussed with appropriate management and training center personnel the necessity of ensuring that records are accurate and compatible with substantiating material. With regard to the TSR-10 form in question, actions should be taken to correct any errors or inconsistencies prior to submitting these forms as permanent records. The licensee stated

that the manner of documenting lecture attendance during 1984 Segments 1 and 2 was recognized as cumbersome at that time and a new method of documentation was implemented for subsequent segments. The licensee stated that this new method of documentation was more manageable and traceable. A review of the new method indicated that there was no certification provided to assure that the data presented was complete and accurate for each individual. The inspectors consider such certification to be desirable. The licensee acknowledged this concern. This is identified as an Inspector Followup Item (IFI - 50-369/85-13-03; 50-370/85-12-03).

The licensee is currently revising lesson plans to be compatible with recent INPO guidelines. The licensee estimates this work package to be approximately 85% complete. A review of selected lesson plans which have been revised indicated that they were satisfactory. A comparison of selected old and new lesson plans reflected significant improvement in this area.

- c. The inspectors reviewed the scope of simulator training and consider that the amount of material covered annually meets that delineated in NUREG-0737 and 10 CFR 55 Appendix A. The minimum time requirement for annual simulator training is only 20 hours; however, the program appears to be sufficiently well defined and managed to provide adequate training in this short time frame. The licensee acknowledged this observation and noted that sharing of simulator time for both Catawba and McGuire operators is the limiting factor with respect to the amount of time that personnel have the simulator available to them.

A review of records for selected personnel indicated that those personnel attended simulator training as required and took an annual simulator examination.

- d. The operational review program consists of immediate and non-immediate review of selected operationally related events, reportable occurrences, nuclear industry information and changes to existing operational guidance or equipment. Additionally, this program provides a method for assuring review of contents of all abnormal and emergency procedures every two years. A review of selected records indicated that this program is implemented at McGuire. The inspectors noted that although other records document completion of this program, TSR-10 forms are not used for this purpose. Consequently, it is possible for plant records to indicate satisfactory completion of the requalification program when in fact, operational review data which is designated as non-immediate may not have been reviewed. The licensee acknowledged this concern. Resolution of this issue is identified as an Inspector Followup Item (IFI - 50-369/85-13-04; 50-370/85-12-04).

The operational review program together with the operational proficiency lectures appear to constitute the program for feedback of operating experience to plant staff required by NUREG-0737 paragraph I.C.5. With the administrative requirement for lecture attendance

being attendance for only a minimum of 100 hours of lectures, it is possible that personnel could fulfill minimum lecture attendance requirements without receiving all operational proficiency lectures and consequently, not fully participate in the program for feedback of operating experience to plant staff. The licensee stated that a review of records for selected backup licensees revealed cases where lecture attendance records could not substantiate full participation in the operational proficiency lectures. Action should be taken to ensure that all licensed individuals fully participate in the program for feedback of operating experience and to ensure that administrative requirements do not inadvertently allow personnel to not fully participate. This is identified as an Inspector Followup Item (IFI - 50-369/85-13-05; 50-370/85-12-05).

- e. A selected review of 1984 annual requalification written examinations indicated that the examinations were comprehensive and properly graded. A review of training records reflected that the only personnel exempted from the annual examination were those whose records were annotated to indicate that they had obtained an NRC license in the last six months. Five separate examinations are administered each year; one for each of the rotating shifts. Each training instructor takes an annual examination for which he did not participate in preparation or review.

The licensee stated that the following year's requalification lectures are based in part on generic weaknesses noted in the annual requalification examination as well as input from Operations Staff and internal and external training center requirements. The inspectors noted that the basis for defining the specific lectures to be administered each year is not specifically and/or concisely identified. It is considered that the Training Summary would be an appropriate document for delineating this basis. The licensee indicated that this observation would be evaluated for possible implementation.

- f. As a result of recent NRC concerns with respect to active engagement of backup licensees applying for license renewal, the licensee implemented a program to periodically place backup licensees on shift. This program is defined in Operations Management Procedure 1-10. In February 1985, this program was first put into effect for backup licensees, thirteen of whom went on shift after not having been actively performing the function of an operator or senior operator for greater than four months. It is noted that in all cases, the licensee stated that these individuals were under direct supervision and surveillance of the normal duty SRO or Shift Supervisor for at least the first 12 hour shift on watch. Discussions with selected backup licensees reflected that for the individuals interviewed, this supervision and surveillance was in effect for every shift that they were on and was essentially continuous.

#### 6. Non-Licensed Employee Training (41700)

- a. The inspector reviewed the overall training and retraining activities

for non-licensed employees and general training for licensed employees to assure conformance with the licensee commitments. The licensee conducts the basic training program through their Technical Training Center (TTC). This training represents the initial General Employee Training (GET) program and all the required instructional modules for maintenance personnel. The maintenance training encompasses Fundamental Training, Fundamental Shop Skills Training, Station Familiarization Training, Advanced Shop Skills Training, Special Shop Skills Training, Periodic Retraining, and Supervisory Training. The Training and Safety Section/Training Unit provides annual requalifications on GET. The Training Unit keeps track of the annual GET requalification program on a computerized program. The inspector selected several employees and verified that their personnel retraining records agreed with the computer printouts.

The maintenance personnel receive on-the-job training to improve their knowledge and skills to perform assigned job functions. The licensee stated that on-the-job training is given by each department but does not have a structured program to assure that all maintenance personnel receive such training. The licensee has recognized this, and they are planning to implement the Employee Training and Qualification System (ETQS) as a continuing training program for Mechanical and I&E maintenance personnel. Until the ETQS program is established and implemented, this will be identified as an Inspector Followup Item (50-369/85-13-06; 50-370/85-12-06).

- b. The inspector reviewed Shift Technical Advisor (STA) training for licensee STAs assigned to shifts "A" through "E" and one acting relief STA. Of the training records reviewed, the inspector found that the STAs had received an engineering or related science degree, hold a senior reactor operator license, and had received the requisite STA training which the licensee has incorporated into the senior reactor operator training program.

While reviewing the STA training records, the inspector noticed some apparent irregularities associated with the NRC license application, NRC Form 398, for one senior operator. Section 12.1 "Nuclear Fundamentals" of this NRC Form 398 indicates 17 weeks of the fundamental training. A review of examination score documentation for the licensee's Nuclear Fundamentals Module indicated that the aforementioned SRO/STA completed the individual module segment examinations but apparently was exempted along with four other candidates from taking the comprehensive examination. Although the candidate was issued an NRC licensee on March 31, 1984, a letter dated May 9, 1984 has been placed in the operators' training folder exempting the above individuals from "Systems and Components General and Specific" training based on their past work experience. This letter did not provide justification for exempting the candidate from the comprehensive examination. Discussion with licensee management indicated that prior revisions of the Nuclear Production Department Training Plan allowed candidates to

bypass sections of the operator training program on a case by case basis. The purpose of the letter which had been later placed in the training folders was to provide documented justification for allowing select candidates to bypass certain fundamental training based on technical education or power plant work experience.

According to Duke Power Company's Nuclear Production Training Plan, Revision 1, dated 7/9/84, Section 10.6.3 "all modules, except Nuclear Fundamentals, may be bypassed by appropriately experienced personnel." Licensee management indicated that prior revisions of the corporate training plan, in effect at the time of the aforementioned candidate's training, provided vague guidance for exemption. Such exemption were admittedly not well documented. This fact, was, in part, responsible for the current specific requirements concerning training exemption.

Regarding NRC Form 398 section 12.3 Simulator Operations, the inspector's review indicated that there were 11 weeks of documented attendance opposed to the 12 weeks indicated on the application. Licensee representatives indicated that this error was made due to calculating the time by subtracting the end dates from the start dates of this training as opposed to computing the actual attendance of the candidate. This error in conjunction with the licensee's projection of training completion when the license application was submitted (prior to training completion) resulted in the licensee committing to 25 weeks of SRO training in section 12.4 of the application. In fact, it appears that an actual training duration of only 22.8 weeks took place. During subsequent telephone conversations between NRC Region II personnel and Duke Power Company Technical Training Center personnel, the licensee indicated that the difference between the calculated actual duration and the duration committed to on the NRC Form 398 may be attributed to holidays occurring during this time frame and to not accounting for stress training administered to the group of SRO's during this time frame. The NRC will review documentation supporting this information during a future inspection. Pending completion of this review, this item will be identified and carried as an unresolved item (URI - 50-369/85-13-07, 50-370/85-12-07).

The inspector also observed that the subject senior operator had failed a Simulator Audit Examination administered by the licensee prior to nominating the candidate for a license. Training management indicated that, although no specific documentation is available, weak areas demonstrated on the examination are reviewed by the training staff with the candidate before nomination.

#### 7. Maintenance Program (62702)

An inspection was performed in the area of planning for corrective maintenance. The program for this phase of maintenance activities was determined to be adequate.

The inspectors followed up on the preventive and corrective maintenance aspects of a recent diesel generator failure.

- a. During an Engineered Safety Features (ESF) test on diesel generator (D/G) 2A on January 31, 1985, a valid failure was experienced by the D/G due to low lube oil pressure. Inspections were made to determine the cause for low lube oil pressure. Troubleshooting was conducted on various electrical and mechanical components of the diesel. Also, calibrations on lube oil pressure switches were checked and were found to meet design specifications. Upon inspection of the strainer, foreign material (subsequently determined to be babbit flakes a bearing component) were found. The strainer was cleaned and the babbit material was discarded. After 18 hours of troubleshooting, the cause of the low lube oil pressure had not been determined. A decision was made to run D/G 2A, unloaded, to do additional troubleshooting. On February 1, 1985, operators attempted to start D/G 2A; however, the diesel tripped on low crankcase vacuum in 20 seconds.

When the diesel was re-started, the A & B lube oil pumps started cycling and an abnormal vibration of the engine was audibly detected. The test run was terminated and the engine declared inoperable. Inspection of the crankcase covers was performed and bronze and babbit material were found along the ledges of the inspection covers indicating bearing damage had occurred.

The bearings liners are made of 0.5 inch steel which is bonded to an approximately 0.015 inch thick layer of bronze and then an approximately 0.004 inch thick layer of babbit. There are 10 main bearings in D/G 2A.

An inspection of all main bearings following the incident showed that the bronze and babbit on bearings numbered 5, 6, 7, 8 and 9 had been worn off and the steel layers were exposed. Cavitation erosion (pitting) and extrusion of steel was visible on those bearings. Main bearings 1, 2, 3 and 10 had heavy scratching of the babbit layer but it was not deep enough to penetrate into the bronze layer. The babbit on main bearing 4 was worn off and the bronze layer was visible. The bearing failures appeared to be due to mechanical damage caused by scoring of the crankshaft surface and the bearing. It has not been determined what initiated the scoring.

Investigations as to the cause of the main bearing failures, revealed that the base plate of D/G was misaligned with the engine rail which the diesel sits on. The engines' base was twisted causing possible over loading of the main bearings. The engine failure may be attributed to this misalignment, however, at this time it can not be determined how much contribution the misalignment had on the failure.

The inspector reviewed the following construction documentation and verified the diesel and rail installations:

Construction Procedure 329, dated 9/3/75 "Diesel Generator Alignment and Inspection Requirements"

D/G Unit Alignment Record, dated 8/26/77

Structural Grouting Inspection, dated 11/16/76

DWG No. MC-1231-10 Rev. 12, dated 7/2/82 "Diesel Generator Building - Unit 2 Sections and Details"

DWG No. 8221-0058 dated 4/3/70 "Engine Rail Assembly"

During the installation of the D/G on the engine rail there were no tight tolerance requirements to assure proper alignment provided at that time by the D/G manufacturer. The manufacturer was present during installation and Construction Procedure 329 requirements were met at that time. After the event, the D/G manufacturer provided tight tolerance requirements between the D/G and the engine rail to the licensee. The licensee has now met these new tolerances for D/G 2A and will assure the other D/Gs also meet these new tolerances.

No violations or deviations were identified.

- b. The licensee has developed a lubrication oil removal, replacement and analysis program for the D/Gs. The details of this program appear in local procedure MP/O/A/7300/02 which was approved April 2, 1984. The procedure is employed by the license as a generic procedure for safety-related equipment.

Under the provisions of the aforementioned procedure, lubrication oil samples were drawn from the licensee's emergency diesel generators as follows:

<u>Diesel Generator</u>	<u>Date Sample Drawn</u>
1A	11/14/83 5/26/84
1B	11/14/83 5/26/84
2A	5/26/84 9/25/84
2B	5/26/84

These samples were sent to a lubricant vendor for analysis. The inspector noted that the lubrication oil sampling procedure does not provide specific qualitative acceptance criteria for evaluation of the oil. Discussions with licensee representatives indicated that the licensee had not provided the vendor with oil analyses acceptance

criteria. As a result, the vendor returned the analysis results to the licensee indicating that the values reported were normal. The vendor laboratory, however, made this determination based on street engine standards.

The inspector reviewed the analysis results for the licensee's four emergency diesel generators. Regarding the 2A diesel which catastrophically failed in January 1985, the inspector noted that over the approximate four months between samples, the concentration of specific metal contaminants (indicative of engine wear) increased by a factor of 33 times for chromium, and 4 times for lead and aluminum. Licensee Maintenance Management Procedure 5.1 (Revision 0), "Periodic Examinations/Adjustments" states, "Many plant components exhibit evidence of impending failure through readily identifiable symptoms. Recognition of these symptoms through inspections by knowledgeable observers is necessary to prevent equipment damage." Although the aforementioned procedure eludes to the necessity of tracking and trending, emergency diesel lubricating oil is not trended either in procedure MP/O/A/7300/02 or other maintenance procedures. The inspector stated to licensee management that although no specific regulatory requirement exists to track and trend lubrication oil analyses results, trending of the 2A emergency diesel lubrication oil might have alerted the licensee of impending failure of the diesel. Licensee management acknowledged the inspector's comments. No violations or deviations were noted.