DUKE POWER COMPANY

OCONEE NUCLEAR STATION

ATTACHMENT 1

TECHNICAL SPECIFICATIONS

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4.7 REACTOR CONTROL ROD SYSTEM TESTS

4.7.1 Control Rod Trip Insertion Time Test

Applicability

Applies to the surveillance of the control rod trip insertion time.

Objective

To assure the control rod trip insertion time is within that used in the safety analyses.

Specification

The control rod insertion time shall be measured at either full flow or no flow conditions as follows:

a. For all rods following each removal of the reactor vessel head,

b. For specifically affected individual rods following any maintenance on or modification to the control rod drive system which could affect the drop time of those specific rods, and

c. For all rods at least once following each refueling outage.

The maximum control rod trip insertion time for an operable control rod drive mechanism, except for the Axial Power Shaping Rods (APSRs), from the fully withdrawn position to 3/4 insertion (104 inches travel) shall not exceed 1.66* seconds at reactor coolant full flow conditions or 1.40 seconds for no flow conditions. For the APSRs it shall be demonstrated that loss of power will not cause rod movement.

If the trip insertion time above is not met, the rod shall be declared inoperable.

* - For Unit 1 Cycle 15, Group 1, Rod 8 and Group 2, Rod 5 may be considered operable with an insertion time $\leq$ 2.00 sec provided:

1) the average insertion time for the remaining rods in Groups 1 and 2 is $\leq$ 1.50 sec, and

2) the core average negative reactivity insertion rate is within the assumptions of the safety analysis.

Bases

The control rod trip insertion time is the total elapsed time from power interruption at the control rod drive breakers until the control rod has completed 104 inches of travel from the fully withdrawn position. The specified trip time is based upon the safety analysis in FSAR Chapter 15.

A rod is considered inoperable if the trip insertion time is greater than the specified allowable time or the core average negative reactivity insertion rate is less than the assumptions of the safety analysis.

REFERENCES

(1) FSAR, Section 15

(2) Technical Specification 3.5.2

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ATTACHMENT 2

MARKUP OF CURRENT TECHNICAL SPECIFICATIONS

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If the trip insertion time above is not met, the rod shall be declared inoperable.

* - For Unit 1 Cycle 15, Group 1, Rod 8 and Group 2, Rod 5 may be considered operable with an insertion time ≤ 2.00 sec provided:

1) the average insertion time for the remaining rods in Groups 1 and 2 is ≤ 1.50 sec, and

2) the core average negative reactivity insertion rate is within the assumptions of the safety analysis.

Bases

The control rod trip insertion time is the total elapsed time from power interruption at the control rod drive breakers until the control rod has completed 104 inches of travel from the fully withdrawn position. The specified trip time is based upon the safety analysis in FSAR Chapter 15.

A rod is considered inoperable if the trip insertion time is greater than the specified allowable time or the core average negative reactivity insertion rate is less than the assumptions of the safety analysis.

REFERENCES

(1) FSAR, Section 15

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ATTACHMENT 3

TECHNICAL JUSTIFICATION

Technical Justification

Recent testing of control rod drop times has resulted in the identification of drop times which are in excess of the expected drop time of approximately 1.3 seconds to 3/4 inserted. The Tech Spec acceptance criterion for drop time is 1.66 seconds to 3/4 inserted. The testing has in some cases required multiple drops of the same control rod in order to meet the acceptance criterion. The exercising of the rods typically results in improvement in the drop time with each successive drop, and after several tests the acceptance criterion can be met. Control rod drop testing is required at BOC prior to startup. Recently an EOC test was performed on Unit 2 for a rod which was slow at BOC. The result of this test was a failure. This result raised a concern regarding other control rods which tested slow, the concern being that the drop time lengthened during the fuel cycle. For Unit 1 Cycle 15, control rods 1-8 and 2-5 were slow at BOC. It is therefore possible that the drop time has increased during Cycle 15, and that the Tech Spec acceptance criterion might not be met if a test were performed. This evaluation determines whether there is any safety significance associated with these two rods potentially having a longer drop time than that assumed in the FSAR Chapter 15 analyses.

The FSAR Chapter 15 analyses assume that a reactor trip results in the insertion of negative reactivity consistent with the 1% shutdown margin Technical Specification, including the most reactive control rod stuck in the fully withdrawn position. The rate of negative reactivity insertion is based on the combination of an assumed rod position vs time curve and a reactivity worth vs position curve, both of which are conservative for the core design and control rod design. The rod position vs time curve includes the effect of the rod drop time. It has been confirmed that the rod drop time in Tech Specs is consistent with the accident analysis assumption. Therefore, any combination of control rod worth and rod drop time can be evaluated against the FSAR assumed reactivity vs. time curve.

For the two rods in question, a 2.0 second drop time to 3/4 inserted has been selected for evaluation. For the remaining control rods, a 1.5 second drop time to 3/4 inserted has been selected for evaluation. Based on these assumptions, the remainder of Unit 1 Cycle 15 can be evaluated. The approach is to determine if the faster insertion of the unaffected rods will offset the slower insertion of the two rods in question. The combined reactivity insertion vs. time of all rods can then be compared to the reactivity insertion assumed in the FSAR for all rods dropping at the Tech Spec drop time of 1.66 seconds to 3/4 inserted.

In order to quantify the control rod worths for Cycle 15, nuclear design computer simulation models were used. These are the same models used to design Cycle 15, and are NRC-approved methods. As a first cut, the two rods in question plus the worst stuck rod were all assumed to be stuck rods. The remaining rods in the core were assumed to drop within 1.66 seconds to 3/4 inserted. A shutdown margin calculation was then performed at 50 EFPD (the core has already exceeded this point in cycle) and at EOC. The results of these calculations indicated that the shutdown margin was maintained with all three of these rods fully withdrawn from the core. Therefore, not only would the FSAR analyses remain valid if the two rods in question dropped slower than the Tech Spec limit time, in fact these could remain fully stuck without any impact on the shutdown margin. The FSAR steam line break analysis has not been evaluated for power peaking with multiple stuck rods, however the analysis remains valid provided that the rods fall within 2.0 seconds. The proposed shorter drop times for the unaffected rods, and the longer drop time for the two rods in question are therefore acceptable.

The results of the above evaluation support the conclusion that, it is acceptable during Cycle 15 for a control rod drop time acceptance criterion of 2.0 seconds to 3/4 insertion for control rods 1-8 and 2-5 and 1.50 seconds for the remainder of the rods in Groups 1 and 2. In fact, these two rods can be accomodated stuck in the fully withdrawn position without impacting the shutdown margin. Although the proposed 1.5 second drop time for the unaffected rods in Groups 1 and 2 is acceptable, it is unnecessary. Therefore, there is no safety significance associated with the possibility that these two control rods might have rod drop times longer than the current Technical Specification limit.

The proposed interim acceptance criteria would apply through the end of the current unit 1 cycle (EOC 15 - currently scheduled for April 1994). In the event this TS change is not approved, Unit 1 would be unnecessarily shutdown and drained down in order to access the CRDMs. Given the safety significance of the two slow rods, it is considered prudent to apply the interim acceptance criteria for the remainder of the current Unit 1 fuel cycle.

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ATTACHMENT 4

NO SIGNIFICANT HAZARDS CONSIDERATION EVALUATION

Attachment 4
No Significant Hazards Consideration Evaluation
Environmental Impact Statement

Duke Power Company (Duke) has made the determination that this amendment request involves a No Significant Hazards Consideration by applying the standards established by NRC regulations in 10 CFR 50.92. This ensures that operation of the facility in accordance with the revised control rod drop time test acceptance criteria for Unit 1 Cycle 15 would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated:

Each accident analysis addressed within the Oconee Final Safety Analysis Report (FSAR) has been examined with respect to the changes proposed within this amendment request. There is no significant increase in the probability of any Design Basis Accident (DBA) as a result of this change, nor is there a significant increase in the consequences of a DBA as a result of this change, since the revised test acceptance criteria assure the ability of the control rods to mitigate design basis accidents. Specifically, the revised test acceptance criteria assures that the negative reactivity insertion rate is within the assumptions of the safety analysis.

(2) Create the possibility of a new or different kind of accident from any accident previously evaluated:

Operation of ONS in accordance with the revised control rod drop time test acceptance criteria will not create any failure modes not bounded by previously evaluated accidents. Consequently, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Involve a significant reduction in a margin of safety:

The revised control rod drop time test acceptance criteria for Unit 1 Cycle 15 assures that the negative reactivity insertion rate assumed in the accident analysis is met. Thus existing margins of safety are preserved. Therefore, there will be no significant reduction in any margin of safety.

Duke has concluded based on the above and the technical justification in Attachment 3 that there are no significant hazards considerations involved in this request.

Environmental Impact Statement

The proposed Technical Specification change has been reviewed against the criteria of 10 CFR 51.22 for environmental considerations. As shown above, the proposed change does not involve any significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor increase the individual or cumulative occupational radiation exposures. Based on this, the proposed Technical Specification change meets the criteria given in 10 CFR 51.22(c)(9) for categorical exclusion from the requirement for an Environmental Impact Statement.

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ATTACHMENT 5

JUSTIFICATION FOR EMERGENCY SITUATION

Justification for Emergency Situation

The information provided below provides recent history and data for rod drop time testing. Briefly, following correction of a computer problem the need to perform selected "as-found" rod drop time tests was identified. The first opportunity to perform this testing was during Unit 2 shutdown on April 29, 1993. Based on the results of the Unit 2 testing and previous tests of Unit 1 Group 1 - Rod 8 and Group 2 - Rod 5 at 09:00 on May 4, 1993 the two Unit 1 rods were declared inoperable. Based on this information, it can be concluded that this emergency situation could not be avoided.

During the last outage on Unit 2 group 3 rod 8 had to be dropped several times before it passed the test acceptance criteria. Then it was tested again during our current refueling outage and again was found to be slow. A work request was initiated to replace this drive mechanism. This report will give data on this rod during the past several outages. Also, Unit 1 had 2 rods which had to be dropped several times during its last outage before they met the test accpetance criteria. Their times during the past several outages will also be listed in this report.

However, one extremely important thing to remember is the problem with the computer during outages before 1992. In the past if rods were dropped sometimes they did not record a drop time. These rods were then dropped again until they recorded a time. The problem was that the program for rod drop timing automatically ended after 1.381 seconds. This meant that any rod greater than this time would not be recorded. This was not known however until the computer group investigated this problem. Therefore, in the past no one knew that the computer had a problem or that we may have had slow rods. For this reason past data will show how many times it took to get the rods below the 1.381 second time so that the computer would record, except for the times that a multi-amp was hooked to record this data. For this reason we do not know what times these rods were, except that they were greater than 1.381.

Unit 2 Results

Group 3 rod 8

April 29, 1993	Drop 1	1.965
	Drop 2	1.974
	Drop 3	1.915
March 4, 1992	Drop 1	1.784
	Drop 2	1.692
	Drop 3	1.664
	Drop 4	1.627
	Drop 5	1.599
October 25, 1990	Drops 1 thru 5 > 1.381 seconds = did not record	
	Drop 6	1.598 with multi-amp timer
July 3, 1989	Drops 1 thru 6 > 1.381 seconds = did not record	
	Drop 7	1.341

April 7, 1988 Drop 1 1.270

As an additional note looking at past outages to see if there were any problems with any other rods only group 3 rod 8 seemed to be a problem for Unit 2. Rod location C-5 seemed to have taken several times to drop to be recorded, but it dropped fine during the last outage on March 4, 1992 with a time of 1.372 seconds.

Unit 1 Results

January 29, 1993

Group 1 rod 8

Drop 1 1.712
Drop 2 1.680
Drop 3 1.669
Drop 4 1.650
Drop 5 1.636

Group 2 rod 5

Drop 1 1.743
Drop 2 1.677
Drop 3 1.668
Drop 4 1.633
Drop 5 1.626 OAC 1.6117 Multi-Amp
Drop 6 1.606 OAC 1.5860 Multi-Amp

September 27, 1991

Group 1 rod 8

Drops 1 and 2 > 1.381 = did not record
Drop 3 1.6092 with Multi-Amp

Group 2 rod 5

Drops 1 and 2 > 1.381 = did not record
Drop 3 1.3649 with Multi-Amp

June 4, 1990

Group 1 rod 8

Drop 1 1.373
Drop 2 > 1.381 = did not record
Drop 3 1.325

Group 2 rod 5

	Drops 1 and 2 > 1.381 = did not record Drop 3 1.371 with Multi-Amp
February 13, 1989	**Group 1 rod 8**
	Drop 1 1.373
	Group 2 rod 5
	Drop 1 > 1.381 = did not record Drop 2 1.379 Drop 3 1.355
November 5, 1987	**Group 1 rod 8**
	Drop 1 1.374
	Group 2 rod 5
	Drop 1 1.368

No other rods have any noticeable degraded drop times for Unit 1.