ENCLOSURE 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION OF REVISED TECHNICAL SPECIFICATIONS FOR DIESEL GENERATOR TESTING GRAND GULF NUCLEAR STATION UNIT 1 DOCKET NO. 50-416

1.0 INTRODUCTION

The Mississippi Power and Light (MP&L) Company proposed changes to the Technical Specification concerning diesel generator testing for Grand Gulf Unit 1 by letter May 22, 1986. Some of the changes are in response to Generic Letter 84-15, some changes are proposed to meet the intent of Generic Letter 84-15 to reduce unnecessary diesel generator testing, and other changes are proposed to clarify present requirements.

The objective of diesel generator periodical surveillance testing is to meet the reliability goals of Regulatory Guide 1.108 for the diesel generators. Such surveillance testing provides a degree of assurance of the availability of the diesel generators in mitigating various transients and postulated events following a loss of offsite power. Therefore, the existing DG testing concept is that the above assurance has to be demonstrated with more frequent testing as the number of failure increases. Thus, Standard Technical Specifications require that the DGs be tested in accordance with Regulatory Guide 1.108 where the test interval depends on the demonstrated DG performance. Furthermore, the test interval is established conservatively on a per nuclear unit basis rather than on a per diesel generator basis. The proposed changes to the Technical Specification regarding the diesel generator testing consist of (i) reducing the number of "fast cold" starts, (ii) eliminating excessive testing, (iii) alleviating the frequency of certain testing which may have a potential for degradation of the DG and (iv) modifying the test interval basis on failures per diesel generator unit rather than per nuclear unit.

2.0 EVALUATION

MP&L has proposed the changes to Technical Specifications to accomplish its objective to reduce diesel generator testing. The staff has for sometime been evaluating the frequency of DG testing and the associated potential for severe degradation of engine parts due to frequent cold fast start testing. The staff concludes that this fast start test frequency can be reduced to minimize this potential without affecting the overall DG reliability. The licensee was also encouraged to propose TS changes in additional areas identified below to reduce excessive DG testing. These changes are made as an interim action on DG testing prior to final resolution of Generic Issue B-56, and are consistent with Generic Letter 84-15 guidelines.

(1) Reduced testing of diesel generators from every 8 hours to once within 24 hours when a diesel generator or offsite line is inoperable.

(2) Testing of DGs based on the number of failures on a per diesel generator basis rather than unnecessarily testing all diesel generators.

(3) Reduced test frequency for an individual diesel generator based on the number of failures from the present minimum interval of every three days to a minimum of seven days.

The staff has reviewed the proposed changes to determine whether these changes are in line with the above guidelines. The results of our review are as follows:

1. TS 3/4.8.1, A.C. Sources, ACTION a and b:

Present TS ACTION a Statement "With either one offsite circuit or diesel generator 11 or 12," is divided into the two Action Statements, which are ACTION a," With one offsite circuit," and ACTION b, "With either diesel generator 11 or 12". ACTION a statement added the following sentence, "If a diesel generator of the above required A.C. electric power sources has not been successfully tested within 24 hours prior to entry into this ACTION Statement," and ACTION b statement added the following sentence "If the diesel generator is inoperable due to any cause other than preplanned preventative maintenance or testing and the remaining diesel generator has not been successfully tested within 24 hours prior to entry into this ACTION Statement."

The objective of the action statement in the existing Technical Specifications is to demonstrate the immediate operability of the remaining A.C. electrical sources by performing Surveillance Requirement whenever one offsite circuit or either diesel generator 11 or 12 of the required A.C. electrical sources is inoperable. Successful testing of the required A.C. electrical sources for its operability prior to entry into this ACTION Statement, does not meet the above stated objective and does not provide a positive assurance of the availability of the remaining A.C. power sources after entry into ACTION Statement. The staff concludes that these additional sentences of the ACTION Statements are not in accordance with the intent of Standard Technical Specifications and the guidelines provided in GL 84-15 as indicated above and are, therefore, not acceptable.

The remainder of the ACTION a and b statements are in accordance with the above guideline and therefore are acceptable.

2. ACTION c:

The time requirement for testing the remaining two operable diesel generators is presently within 2 hours and once per 8 hours thereafter. The proposed change will require testing of the operable diesel generators pursuant to Specification 4.8.1.1.2.a.4 only once within 8 hours. This change is consistent with the above guideline and therefore is acceptable.

The last sentence of present ACTION b has been deleted with proposed ACTION c changes. The deletion of the restoration statement for two offsite circuits and diesel generators 11 and 12 within 72 hours is purely administrative and is proposed only for clarification and therefore the proposed change to delete the last sentence of present Action b is acceptable.

3. ACTION d:

The only change to ACTION d is editorial in nature due to the proposed renumbering of the Action Statements and the addition of new ACTION i. The additional ACTION i is not acceptable as evaluated below and therefore reference to ACTION a or b should be changed to ACTION b or c as applicable.

4. ACTION e:

Present test requirements for diesel generators 11, 12 and 13 with two of the required offsite circuits inoperable are to perform 4.8.1.1.2 a.4 for one diesel generator at a time, within 2 hours and at least once per 8 hours thereafter. The proposed change will allow diesel generator testing to be performed once within 8 hours. The proposed change complies with the above guidelines to reduce excessive diesel generator testing and therefore is acceptable.

The restoration requirement of 72 hours for both of the inoperable offsite circuits is deleted from the current ACTION d and not included in proposed ACTION e. As discussed in the justification for proposed ACTION c changes above, this change is acceptable.

5. ACTION f:

With both diesel generators 11 and 12 inoperable, diesel generator 13 is presently required to be tested within 2 hours and at least once per 8 hours thereafter. The provisions of this action require either diesel generators 11 or 12 to be returned to service within 2 hours to avoid plant shutdown and also demonstrate the operability of the diesel generator 13 by performing Surveillance Requirement 4.8.1.1.2.a.4* within 2 hours. If either diesel generator 11 or 12 is not returned to service within 2 hours, action must be taken to shut the plant down regardless of the operability of the diesel generator 13. However, for the plant cold shutdown, the licensee may test the only remaining onsite A.C. power source, i.e., diesel generators 13, to provide assurance that this diesel generator is operable. Therfore, testing exclusively the diesel generator 13 with both diesel generators 11 and 12 inoperable has no engineering rational and should not be imposed by the technical specifications requirement.

Based on a discussion with the licensee, the licensee agrees with the above modified action and this technical specification Action f should be revised accordingly.

6. ACTION g:

Present ACTION f for diesel generator 13 inoperable requires testing of diesel generators 11 and 12 within 2 hours and at least once per 8 hours thereafter. The proposed change deletes the requirement to test diesel generators 11 and 12. The licensee provides a justification that diesel generator 13 supplies power to only the HPCS system and is not connected to diesel generators 11 or 12 or the loads they supply, and also diesel generator 13 is a different type and is manufactured by a different company from diesel generators 11 and 12 and hence common mode failure is not a likely occurrence.

According to 3/4.5 "Bases of Emergency Core the Cooling System," in the Grand Gulf Technical Specifications, ECCS Division 1 consists of the low pressure core spray system and low pressure coolant injection subsystem "A" of RHR system and the automatic depressurization system (ADS) as actuated by trip system "A". Division 2 consists of low pressure coolant injection subsystems "B" and "C" of the RHR system and the automatic depressurization system as actuated by trip system "B". ECCS Division 3 consists of the high pressure core spray system. The HPCS system is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the reactor coolant system and loss of coolant which does not result in rapid depressurization of the reactor vessel.

With the HPCS system inoperable, adequate core cooling is assured by the operability of both the LPCS and LPCI systems after depressurization through redundant diversified automatic depressurization system. In addition, the reactor core isolation cooling (RCIC) system, a system for which no credit is taken in the safety analysis, will automatically provide makeup at reactor operating pressures on a reactor water level condition. For a given design basis event, the analysis of the ECCS shows that the failure of high pressure core spray (HPCS) requires the function of both the LPCS and LPCI systems powered by its respective onsite A.C. electrical sources on depressurization. Even though the onsite A.C. electrical sources are electrically independent and separate, the three divisional ECCSs perform their emergency core cooling functions as complementary to one another. Therefore, the staff does not agree with the licensee's premise that the failure of diesel generator 13 which supports the HPCS does not affect the ECCS functions of LPCS and LPCI supported by diesel generator 11 or 12. Based on the above ECCS assumptions and our evaluation, with the HPCS diesel generator inoperable the diesel generators 11 and 12 are required to demonstrate their operability by the Surveillance Requirement. Therefore, the proposed change to delete the requirements to test diesel generators 11 and 12 in response to an inoperable diesel generator 13 (HPCS) is denied. However, with a view to reduce unnecessary testing of diesel generators 11 and 12, the staff recommends

approval of a change to current Technical Specification requirements of "within 2 hours and at least once per 8 hours" to "once within 2 hours."

7. ACTION h and ACTION i:

Based on the discussion of the LCO in the Technical Specification of Grand Gulf as described in item 6, ACTION g above, the new requirements in the proposed ACTION h and ACTION i are not acceptable.

8. SURVEILLANCE REQUIREMENTS 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5

A footnote is proposed to be added to each of these Surveillance Requirements to specify relaxations in the present cold start and loading requirements. With the proposed changes all diesel generator starts for the purpose of these surveillance requirements may be preceded by an engine prelube period. The footnote to Surveillance Requirement 4.8.1.1.2.a.4 proposes that diesel generator starts (10 sec) from standby only be performed once per 184 days. All other starts for the purpose of satisfying Surveillance Requirement 4.8.1.1.2.a.4 may be preceded by warmup procedures as recommended by the manufacturer so that the mechanical stress and wear on the diesel engine is minimized. The proposed change of the footnote regarding the diesel generator starts and gradual loading are consistent with the guidelines in GL 84-15 and therefore is acceptable.

9. TABLE 4.8.1.1.2-1

Testing the diesel generator provides a degree of assurance of the availability of the DGs during between tests. The DG testing concept reflected on this table is that the above assurance has to be demonstrated with more frequent testing as the number of DG failures increases. Thus, current TS requires that diesel generators be tested in accordance with RG 1.108 where the test interval depends on the demonstrated DG failure. Also, the test interval is established conservatively on a per nuclear unit basis, rather than on a per diesel generator basis. Test intervals that are too short could have an adverse impact on DG reliability. The staff and industry consensus is that current requirements for testing of good DGs do not improve reliability of the good DGs and may be a factor in potential degradation of the good DGs and may have negative effects on their overall expected life and hence such testing is not warranted. Therefore, we concur with the licensee's proposal to limit DG failure on a per diesel generator basis rather than on a per nuclear unit basis and the frequency of testing a DG will be based on its own failure. This is consistent with General Letter 84-15 guideline on DG reliability and is, therefore, acceptable.

The licensee has proposed changes to Technical Specification Table 4.8.1.1.2-1, to include routine testing at intervals of 31 days and seven days based on the number of failures per diesel in the last 20 tests. The proposed test interval is based on GL 84-15 reliability program which gives a diesel generator reliability goal of 0.95 and is a part of ongoing generic issue GI B-56 on

Diesel Generator Reliability in Support of USI A-44 Station Blackout Resolution. Therefore, the staff has concluded that the present Grand Gulf Technical Specification, which maintain a reliability goal of 0.99, is consistent with the Standard Technical Specifications and should not be changed until the final resolution of GI B-56 and USI A-44. Therefore, the request to include routine testing based on the number of failures per diesel in the last 20 tests for a reliability goal of 0.95 is not acceptable.

However, with a view to reduce unnecessary testing a DG the staff recommends approval of a change to current Technical Specifications Table 4.8.1.1.2-1 of the minimum interval of every three days to a minimum of every seven days.

3.0 CONCLUSION

The licensee has proposed general reductions in the testing frequency requirements for the onsite emergency diesel generators in the Grand Gulf Technical Specifications. These changes involve both routine surveillance testing and special testing due to restriction of the plant operation. The staff has reviewed the licensee's submittals and concludes the following:

(1) Reckoning diesel generator failures on a per diesel generator basis rather on a per nuclear unit basis is consistent with GL 84-15 and is, therefore, acceptable.

(2) Testing of diesel generators at intervals of 31 days and 7 days based on the number of failures per diesel generator in the last 20 tests and 100 tests is not in accordance with Standard Technical Specifications and is, therefore, unacceptable.

(3) Reducing testing of diesel generators on Grand Gulf from every 8 hours to once within 24 hours when a diesel generator or offsite supply is inoperable is in accordance with GL 84-15 and is, therefore, acceptable. However, an additional condition to ACTION a statement which reads "If a diesel generator of the above required A.C. electrical power sources has not been successfully tested within 24 hours prior to entry into this ACTION Statement," and an additional condition to ACTION b statement which reads "If the diesel generator is inoperable due to any cause other than preplanned preventative maintenance or testing...," are inconsistent with Standard Technical Specifications objectives and therefore, these additional conditions are denied.

(4) With both diesel generators 11 and 12 inoperable, the diesel generator 13 is presently required to be tested for availability within 2 hours and at least once per 8 hours thereafter. The proposed change in ACTION f statement will require diesel generator 13 testing only once within 8 hours.

As stated in our evaluation above, with diesel generator 11 and 12 both

inoperable, the provisions of this action require either inoperable diesel generator 11 or 12 to be returned to service within 2 hours to avoid plant shutdown and also demonstrate the operability of the only remaining onsite A.C. power source, i.e., diesel generator 13, within 2 hours. Testing exclusively the diesel generator 13 with both diesel generators 11 and 12 inoperable has no engineering rational and should not be imposed by the technical specifications requirement. The licensee agrees with modified Action f.

(5) Licensee's request to delete the existing Technical Specification Surveillance Requirements for diesel generator 11 and 12 when diesel generator 13 (HPCS) becomes inoperable is not acceptable for reasons given in the above evaluation. However, the staff recommends a change to current Technical Specification requirements of "within 2 hours and at least once per 8 hours" to "once within 2 hours."

(6) The footnotes propose that diesel generator starts (10 sec) and loading (60 sec) from standby only be performed once per 184 days. All other starts for the purpose of satisfying Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5, may be preceded by warmup procedures and may also include gradual loading as recommended by the manufacturer so that the mechanical stress and wear on the diesel generator is minimized. The proposed changes follow the guidance provided in GL 84-15 to reduce cold fast starts. Also, it is the staff's engineering judgement that an overall improvement in diesel engine reliability and availability can be gained by performing diesel generator starts for surveillance testing using engine prelube and gradual loading procedures as recommended by the manufacturer to reduce engine stress and wear. The proposed changes incorporate these recommendations by requiring fast start criteria (10 sec) and fast load criteria (60 sec) to be imposed only once per 184 days, and by allowing warmup before the diesel engine starts and gradual loading for tests other than those performed once per 184 days and therefore these proposed footnotes are acceptable.

It should be noted that some of the proposed changes to the Surveillance Requirements which are not acceptable at this time are part of the ongoing generic issue GI B-56 on Diesel Generator Reliability. Some of the above approved changes are acceptable as an interim action on diesel generator testing prior to final resolution of GI B-56 and are consistent with Generic Letter 84-15 guidelines.