

8/31/89

RELATED CORRESPONDENCE
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of
MISSISSIPPI POWER & LIGHT COMPANY
MIDDLE SOUTH ENERGY, INC., AND
SOUTH MISSISSIPPI ELECTRIC POWER
ASSOCIATION
(Grand Gulf Nuclear Station, Unit 1)

DOCKETED
USNRC
'84 SEP -4 P.M.
Docket No. 50-416 0C

EXEMPTIONS FOR FULL POWER OPERATION

I.

Mississippi Power & Light Company (MP&L), Middle South Energy, Inc., and South Mississippi Electric Power Association (the licensee) are the holders of Facility Operating License No. NPF-13, which authorizes the operation of the Grand Gulf Nuclear Station, Unit 1 (the facility) at steady state reactor power levels not in excess of 191 megawatts thermal. The facility consists of a boiling water reactor (BWR/6) with a Mark III containment located in Claiborne County, Mississippi.

II.

A. Appendix J - Containment Airlock Testing

Testing of primary reactor containment leakage at Grand Gulf, Unit 1, is required by Appendix J, 10 CFR 50 and by the plant's Technical Specifications. Paragraph III.D.2(b) of Appendix J details three explicit airlock testing requirements which are to be included in the Technical Specifications.

Paragraph III.D.2(b)(ii) of Appendix J requires that airlocks opened during periods when containment integrity is not required by the plant's Technical Specifications shall be tested at the end of such periods at not less than the peak containment internal accident pressure, P_a . Technical Specification

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The staff has evaluated the licensee's requested exemption from paragraph III.D.2(b)(ii). Whenever the plant is in cold shutdown (Mode 4) or refueling (Mode 5), containment integrity is not required. However, if an airlock is opened during Modes 4 and 5, paragraph III.D.2(b)(ii) of Appendix J requires that an overall airlock leakage test at not less than P_a be conducted prior to plant heatup and startup (i.e., entering Mode 3). The existing airlock doors are so designed that a full pressure test, i.e., P_a (11.5 psig), of an entire airlock can only be performed after strong backs (structural bracing) have been installed on the inner door. Strong backs are needed since the pressure exerted on the inner door during the test is in a direction opposite to the accident pressure.

If the periodic 6-month test of paragraph III.D.2(b)(i) and the test required by paragraph III.D.2(b)(iii) are current, no maintenance has been performed on the airlock and the airlock is properly sealed, there should be no reason to expect the airlock to leak excessively just because it has been opened in Mode 4 or Mode 5.

However, the staff also concludes that to assure the airlock is properly sealed, the licensee shall substitute a seal leakage test which satisfies the requirements of paragraph III.D.2(b)(iii) of Appendix J for the full pressure test of paragraph III.D.2(b)(ii) before entering Mode 3 if the door has been opened while in Mode 4 or 5, provided no maintenance has been performed on an airlock that has been opened in Mode 4 or Mode 5. Whenever maintenance has been performed on an airlock, the requirements of paragraph III.D.2(b)(ii) shall be met by the licensee. Therefore, under the foregoing conditions, an exemption from the requirements of paragraph III.D.2(b)(ii) of Appendix J following normal door opening, is justified and acceptable for Grand Gulf, Unit 1.

B. GDC 17, Diesel Engine/Generator Electrical Protection Systems

The requirements for the onsite electric power supply system are specified in GDC-17 of Appendix A, 10 CFR 50. This requires, in part, that these systems shall have sufficient independence, redundancy and testability to perform their safety function assuming a single failure. GDC-17 further requires that the onsite electric power system, without benefit of the offsite system, provide sufficient capacity and capability to assure that certain specified vital functions are maintained in the event of postulated accidents. The onsite power system at Grand Gulf includes three separate diesel generators designated as supplying power for Division 1, 2 and 3 emergency busses. Three components of the diesel engines at Grand Gulf, Unit 1, do not fully comply with the requirements of GDC-17. These are: (1) the emergency override of the test mode for the Division 3 (High Pressure Core Spray System (HPCS)) diesel engine, (2) the second level of undervoltage protection for the Division 3 (HPCS) diesel engine and (3) the generator ground overcurrent trip function for the Division 1 and 2 (Standby) diesel generators. These will be discussed separately in the subsequent sections.

(1) Division 3 (HPCS) Emergency Generator Test Mode Emergency Override

The diesel generator design is required to include an emergency override of the test mode to permit response to bona fide emergency signals and to return the control of the diesel generator to the emergency standby mode. The emergency override feature is required to assure availability of the diesel generators should a LOCA signal occur during periodic testing. This has its basis in the requirements of GDC-17 for redundant available onsite emergency power sources for postulated accidents. The licensee did not provide this design feature on the Division 3 (HPCS) diesel generator. The licensee has

committed to provide this design feature for the Division 3 diesel generator at the first refueling outage.

In the interim, by letters dated July 28 and August 2 and 7, 1984, the licensee requested a partial exemption from GDC-17 permitting it to defer meeting the reliability requirements for the Division 3 (HPCS) diesel generator test mode emergency override until startup following the first refueling outage. The licensee provided the following information to support the request.

The design of Division 3 does not incorporate the test mode emergency override feature. Division 3 is dedicated solely to the HPCS system, 90% of the load from which is consumed by the HPCS motor. In the event of an ECCS actuation signal coincident with a loss of the preferred power source, the Division 3 diesel generator would start and accelerate to rated voltage and frequency, tie to the bus, and accept the entire HPCS load at once by block sequencing (the diesel generator would then be in isochronous mode). If the diesel generator were tied to the bus in parallel with the preferred source (droop mode) when these events occurred, the diesel generator would still respond as required.

The HPCS pump is a high pressure system required for reactor coolant makeup for small break loss of coolant accidents (LOCA) where reactor pressure is maintained. The licensee indicates in the submittals that substantial protective features currently exist for Division 3 diesel generator protection. The likelihood of a small break LOCA coincident with loss of offsite power and failure of the Division 3 diesel generator due to a lack of these additional protective features during the first cycle of operation is extremely small. If the HPCS system should fail (due to a postulated single failure or due to a failure associated with a lack of the additional protective features), the RCIC system is available for such small breaks to provide high pressure core makeup

and, if necessary, the automatic depressurization system would reduce reactor pressure to allow the low pressure Emergency Core Cooling System to provide makeup. Therefore, the licensee believes this exemption can be granted without endangering life and property.

The staff has evaluated the consequences of deferring the implementation of this design feature for the first operating cycle. The staff finds that the chance of a LOCA occurring with a loss of offsite power concurrent with a failure of one of the other diesel generators during the small time period of Division 3 (HPCS) diesel generator testing (a few days total) over the first operating cycle (18 months) is low. The staff thus concludes that the lack of the emergency override feature on the Division 3 (HPCS) diesel generator does not represent a significant hazard to the health and safety of the public over the first operating cycle. Therefore, until startup following the first refueling outage, the requested exemption from GDC-17 should be granted.

(2) Division 3 (HPCS) Diesel Generator Undervoltage Protection

The Division 3 power supply which provides power for the High Pressure Core Spray System (HPCS) is required to have two levels of undervoltage protection similar to the Division 1 and 2 power supplies. The second level of undervoltage protection (degraded voltage) is to assure protection against degraded offsite power to prevent damage to safety related equipment and to assure quality power by switching to diesel generators under degraded offsite power conditions. The basis for this level of undervoltage protection is derived from the requirement of GDC-17 that the onsite power systems have adequate capacity and capability to provide power for systems necessary to accommodate postulated events.

In the as-built design for the Division 3 bus, only one level of protection is provided (loss of voltage at 72%); degraded voltage protection is not provided. The licensee has committed to provide the second level undervoltage protection for Division 3 by the first refueling outage.

In the interim, by letters dated July 28, and August 2 and 7, 1984, the licensee requested a partial exemption from GDC-17 permitting it to defer meeting the reliability requirement for the Division 3 (HPCS) diesel generator undervoltage protection until startup following the first refueling outage. To support the request the licensee states that, although Grand Gulf is equipped with a third division of electrical power, Division 3 is dedicated to the High Pressure Core Spray (HPCS) System. The HPCS motor and all HPCS auxiliaries, except motor operated valves (MOVs), have overcurrent protection which will prevent damage from persistent undervoltage. The MOVs have a minimum 75% voltage operating capability by design specification. Considering design margin that is typically included, the licensee believes MOV operation in the 72% to 75% voltage range will occur with a high degree of confidence. The licensee further considers the likelihood of the undervoltage being between 72% and 75% for a period long enough to damage the valve motors extremely small.

The licensee states that the only other equipment connected to the Division 3 bus that will be adversely affected by undervoltage is the Division 3 battery charger which is affected at less than 85% of nominal voltage. The Division 3 batteries will handle the DC load for at least four hours which the licensee believes will provide ample time to recognize undervoltage conditions.

The HPCS pump is a high pressure system required for reactor coolant makeup for small break LOCA where reactor pressure is maintained. The licensee

indicates in the submittals that substantial protective features currently exist for Division 3 diesel generator protection. In addition, the likelihood of a small break LOCA coincident with loss of offsite power and failure of the Division 3 diesel generator due to a lack of these additional protective features during the first cycle of operation is extremely small. If the HPCS system should fail (due to a postulated single failure or due to a failure associated with a lack of the additional protective features), the RCIC system is available for such small breaks to provide high pressure core makeup and, if necessary, the automatic depressurization system would reduce reactor pressure to allow the low pressure Emergency Core Cooling Systems to provide makeup. Therefore, the licensee concludes this exemption can be granted without endangering life and property.

The staff has evaluated the consequences of deferring the implementation of this design feature for the first operating cycle. The staff finds that there is little likelihood of a degraded grid event requiring the HPCS concurrent with a single failure of one of the other diesel generators and a failure of the operator to take action to trip the offsite breaker to the HPCS bus manually (which allows the HPCS diesel generator to start and load) during the first operating cycle. The staff thus concludes that the lack of second level (degraded grid) undervoltage protection does not represent a significant hazard to the health and safety of the public over the first operating cycle. Therefore, until startup following the first refueling outage, the requested exemption from GDC-17 should be granted.

(3) Standby Diesel Generator Trip Functions

All diesel generator protective trips are required to be bypassed except

for diesel engine overspeed and generator differential current. Any other trips retained must utilize coincident logic in order to avoid spurious trips. The basis for this feature is derived from the GDC-17 requirement to minimize loss of emergency power concurrent with loss of offsite power. Bypassing diesel generator trips which are comparatively of lesser importance than the functioning of the emergency power source under accident conditions meets this requirement. The Division 1 and 2 (Standby) diesels at Grand Gulf do not have this design feature for generator ground overcurrent that either provides coincident logic or bypasses this trip under accident conditions.

The licensee has committed to implement this design change with regard to bypassing or providing coincident logic for the ground overcurrent generator trip. This commitment is to be completed prior to restart following the first refueling outage.

In the interim, by letters dated July 28, and August 2 and 7, 1984, the licensee requested a partial exemption from GDC-17 permitting it to defer meeting the reliability requirements for the Division 1 and 2 (Standby) diesel generator trip functions until startup following the first refueling outage. To support the request, the licensee provided the following information.

The licensee states that the design of the Grand Gulf diesel generator trip system for Divisions 1 and 2 (Standby) incorporates four trips that remain in effect during emergency operation. They are:

- a. Engine overspeed - single channel trip
- b. Generator differential - single channel trip
- c. Generator ground overcurrent - single channel trip
- d. Low lube oil pressure - (2) out of (3) logic

The licensee recognizes that the design for Division 1 and 2 diesel generators is not in compliance with the latest version of Regulatory Guide 1.9. Regulatory Guide 1.9 allows only engine overspeed and generator differential current trips. All other trips should be addressed in one of two ways: either, (1) a trip should be implemented with two or more independent measurements for each trip parameter with coincident logic provisions for trip actuation, or (2) a trip should be bypassed under accident conditions. The Grand Gulf design for Division 1 and 2 diesel generators incorporates a generator ground overcurrent trip without coincident logic.

The licensee states that the ground overcurrent trip function responds to slowly developing, relatively low magnitude ground fault conditions whereas the generator differential current trip function responds to fairly high levels of ground current within the differential protective zone. Outside the differential protective zone, ground relays associated with feeder breakers will actuate and isolate the ground overcurrent fault before the generator ground relay actuates. The ESF 4160 to 480 volt transformers are delta-wye and therefore will not pass a low voltage ground fault (less than 5 Kv) to the generator ground overcurrent protective system. The licensee considers the likelihood of a failure of the generator ground overcurrent trip function which would cause a trip of the diesel generator when it is required is small. The licensee also states that the likelihood of such a trip coincident with a loss of offsite power and a loss of coolant accident during the first cycle of operation is extremely small. Therefore, the licensee believes this exemption can be granted without endangering life and property.

The staff has evaluated the consequences of deferring the implementation of this design feature for the first operating cycle. The staff finds that there is little likelihood of a LOCA coincident with the loss of offsite power and both Division 1 and 2 diesel generators to spurious trip on this trip function during the first operating cycle. The staff, thus, concludes that the lack of this feature on diesel generators for Divisions 1 and 2 does not represent a significant hazard to the health and safety of the public over the first operating cycle. Therefore, until startup following the first refueling outage, the requested exemption from GDC-17 should be granted.

The licensee considers the requested exemptions to GDC 17 to be in the public interest in that any delay in commencement of the power ascension program would cause a day-for-day delay in the attainment of commercial operation and as shown above, the health and safety of the public will be adequately protected. Grand Gulf Unit 1 is physically complete in all essential respects and is ready for power ascension to full power. Upon satisfactory completion of the power ascension program in accordance with the license and Technical Specifications, the licensee will place the facility in commercial operation. The requested exemption discussed above is for a limited period. The delay associated with implementing this design change now ranges from several weeks to several months. Thus, the licensee concludes that such delays are unwarranted inasmuch as the public health and safety are adequately protected.

The staff agrees that, because granting the exemptions will not endanger life or property or the common defense and security, the delays that would be encountered to meet the regulation at this time are unwarranted.

III.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, the exemptions are authorized by law, will not endanger life or property or the common defense and security and are otherwise in the public interest. Therefore, the Commission hereby grants the exemptions as follows:

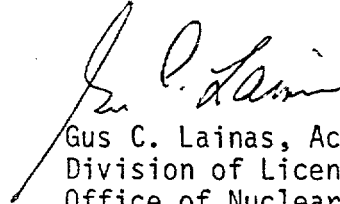
A. An exemption is granted from the requirements of Paragraph III.D.2(b)(ii), Appendix J, 10 CFR 50, for the containment airlock testing following normal door opening during periods when containment integrity is not required for the term of the operating license, provided that in lieu of the full pressure test required by III.D.2(b)(ii), the licensee shall, before entering operating modes requiring containment integrity, perform a seal leakage test which satisfies the requirements of III.D.2(b)(iii), and provided that no maintenance has been performed on the airlock.

B. Until startup following the first refueling outage, a partial exemption is granted from the requirements of GDC-17, Appendix A, 10 CFR 50 for:

- (1) the emergency override of the test mode for the Division 3 (HPCS) diesel engine,
- (2) the second level undervoltage protection for the Division 3 (HPCS) diesel engine, and
- (3) the generator ground overcurrent trip function for the Division 1 and 2 (Standby) diesel generators.

These Exemptions are effective upon publication of a finding of no significant impact.

FOR THE NUCLEAR REGULATORY COMMISSION



Gus C. Lainas, Acting Director
Division of Licensing
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 31st day of August 1984.