BEFORE THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

LICENSE NO. NPF-29

DOCKET NO. 50-416

IN THE MATTER OF

MISSISSIPPI POWER & LIGHT COMPANY
and
SYSTEM ENERGY RESOURCES, INC.
and
SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION

AFFIRMATION

I, T. H. Cloninger, being duly sworn, state that I am Vice President, Nuclear Engineering and Support of System Energy Resources, Inc.; that on behalf of System Energy Resources, Inc., and South Mississippi Electric Power Association I am authorized by System Energy Resources, Inc. to sign and file with the Nuclear Regulatory Commission, this application for amendment of the Operating License of the Grand Gulf Nuclear Station; that I signed this application as Vice President, Nuclear Engineering and Support of System Energy Resources, Inc.; and that the statements made and the matters set forth therein are true and correct to the best of my knowledge, information and belief.

T. H. Cloninger

STATE OF MISSISSIPPI
COUNTY OF HINDS

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the County and State above named, this 31st day of August, 1988.

(SEAL)

Notary Public

My commission expires:

My Commission Expires Sept. 21, 1991

A. SUBJECT

1. NL 88-05 Eliminate Fuel Transfer Canal Gate Requirement

2. Affected Technical Specifications:

   a. 3.5.2 footnote *
      page 3/4 5-6

   b. 3.5.3 footnote *
      page 3/4 5-8

B. DISCUSSION

1. Currently the Limiting Condition for Operation requirement that the suppression pool and ECCS be operable during Mode 5 is not required provided the reactor vessel head is removed, the cavity is flooded, the reactor cavity and transfer canal gates in the upper containment pool are removed and water level is maintained within the limits of Technical Specifications 3.9.8 and 3.9.9 (reference Specifications 3/4 5.2 and 3/4 5.3). This volume of water is sufficient to provide irradiated fuel the necessary cooling and core flooding capability to justify no operable ECCS and/or suppression pool which may be required during periods of maintenance.

2. Failure of the Horizontal Fuel Transfer System (HFTS) has occurred during heavy use periods in past refueling outages. Maintenance and repair of the HFTS requires that the transfer canal gates be installed to allow the transfer canal to be drained. To eliminate a critical path delay during refueling outages, considerable material resources have been invested to increase the reliability of the HFTS. This includes such things as a new high reliability push-pull mechanism and upgrading or eliminating underwater cables and switches. However, if a failure of the HFTS should occur, the current requirement that the transfer canal gate be removed while the suppression pool and/or all ECCS are inoperable could result in significant critical path extension.

3. Local Leak Rate Testing (LLRT) of the HFTS penetration also requires the transfer canal be drained (i.e., the transfer canal gate installed). The current LCO requirement of having the transfer canal gate removed precludes performing this LLRT while the suppression pool and/or all ECCS are inoperable. This reduces the scheduling window available for this outage activity thereby increasing the risk of critical path delays.

4. To prevent significant outage complications in the event that the HFTS does malfunction, as well as to provide a more flexible scheduling window for LLRT on the HFTS containment penetration, SERI is requesting to delete the requirement that the transfer canal gate be removed in

the described condition. This proposed change is consistent with other approved Technical Specifications for Mark III containments (i.e., River Bend, Perry and Clinton).

C. JUSTIFICATION

1. In the operational condition applicable to this change, the unit is refueling with the vessel head removed and a substantial volume of water over the core to serve as a heat sink and source of makeup to maintain the core covered. This volume is contained within the vessel and vessel cavity area (approximately 340,000 gallons) and in the upper containment fuel pool above the bottom of the cavity-to-containment pool gate (approximately 140,000 gallons). The fuel transfer area is also currently required to be flooded with its gate removed providing an additional volume of water above the bottom of its gate (approximately 48,500 gallons). This small fuel transfer area where the horizontal fuel transfer system (HFTS) on the containment side is located, contains only a fraction of the available source of water. The unavailability of this fractional volume will not have a significant effect on the inventory available as a heat sink or for maintaining the core flooded should an inadvertent loss of inventory occur.

2. Although there are no specific loss of vessel inventory events analysed in the refueling conditions affected by this change, any event of this nature is expected to be recognized and terminated prior to fuel uncovery. With the vessel head off, the cavity-to-containment pool gate removed and cavity level greater than 22' 8" above the vessel flange, approximately 480,000 gallons of inventory are available to maintain the core covered. Should a condition arise where inventory is being lost through, for instance, the recirc piping (21.7 inch inner diameter), the maximum flow rate possible for gravity drain through the piping, assuming the maximum postulated moderate energy line crack passing flow unrestricted, would allow approximately 14 hours prior to level reaching the top of active irradiated fuel (TAF). (In this event, due to the design of the jet pumps and core shroud, the core would remain flooded to 2/3 core height even with no actions to terminate the inventory loss or provide makeup.) This time is sufficient to effect actions needed to terminate the draining and/or provide alternate makeup capabilities.

   One other vessel connection drain path example evaluated as an inventory loss path was via the bottom head drain line (two 2" lines). Assuming unrestricted flow across the entire cross section of this path (i.e., a high energy break which is not postulated in the shutdown condition), a gravity drain event would take approximately 17 hours to reduce level to the TAF.

   If the inventory within the fuel transfer canal, above the bottom of its gate, were available during the above scenarios an additional 1.3 and 1.7 hours respectively would be available prior to level reaching the TAF. This difference is considered small with regard to the overall times available to respond to an event.

In general, the time to reach spent fuel uncovery for any loss of inventory event, whether due to gravity drain from a passive failure or a more rapid event such as misaligned shutdown cooling valves, is reduced by approximately 9%.

3. Prompt operator notification of any event which results in loss of inventory of the upper containment pool and/or reactor vessel is assured by control room annunciators. One alarm indication is provided by the drywell floor drain sump detecting ≥ 5 gpm inleakage. This leakage rate is ≤ 1% of the drain rates used in the above examples and therefore, would provide early detection of a progressing failure. In addition to this alarm, an upper containment pool or reactor cavity level decrease of 1-7/8 inches from the minimum required level will also annunciate in the control room. Operators are procedurally directed in the restoration of level as a result of this alarm.

4. The deletion of the requirement in the footnote of Technical Specifications 3.5.2 and 3.5.3 to remove the transfer canal gate will not degrade the heat removal capability of the UCP water volume beyond existing bounded conditions concerning time-to-boil. Based on a scenario in which all fuel pool cooling was lost (i.e., a station blackout), the fixed volume of water in the upper containment pool (UCP) would eventually begin to boil. A calculation was performed to determine the time-to-boil for the UCP with loss of all power and with no ECCS operable (AECM-86/0229; July 25, 1986). The calculation assumed that the reactor had been shutdown for 110 hours and that the initial pool temperature was at the allowable upper limit of 140°F. The calculation did not take credit for the volume of water in the UCP transfer canal. This calculation showed that the volume of water in the UCP with the transfer canal gate closed, would prevent the water from boiling in less than 8 hours.

5. The upper containment transfer canal gate is designed to isolate the transfer canal from the upper pool for Horizontal Fuel Transfer System (HFTS) maintenance. The gate is seismically qualified and is designed to withstand all loading conditions and remain watertight. The gate incorporates the same design, fabrication, and installation criteria as the existing liner plates. The gate design also features redundant, inflatable seals which are initially inflated using the Service Air system. Since the service air is disconnected after initial seal inflation, backup air supply is provided by a single bottle of compressed air, which is seismically supported at the gate area. In addition, existing administrative controls require frequent, routine surveillance of the gate seal pressure gauge when the gate is required.

   The transfer gates are designed such that in the event of total seal failure, and without taking any credit for backup air, the hydraulic pressure of the water against the gate would provide for limited sealing ability. Under this type of postulated seal failure, the UCP water inventory would begin to slowly drain through the failed seals. The limited sealing ability of the gate with failed seals would not allow for an immediate release of UCP water inventory.

6. Suppression pool makeup capability is only operable in operational conditions 1, 2 or 3. In addition, the suppression pool makeup system is disabled in operational condition 5, since suppression pool makeup from the UCP could result in inadvertent UCP drainage during refueling operations. As such, this proposed change has no effect on suppression pool makeup capability.

7. NRC reviews of other BWR-6 plant designs have not required the fuel transfer canal gates to be removed during the conditions which are the subject of this change request. In these instances a gate may serve as a barrier to contain the required volume. Similarly, earlier designs (i.e., BWR-4) did not have a transfer area separate from the cavity or fuel storage area. In each of these instances the volumes available within the cavity and fuel storage pools was judged adequate to satisfy the conditions which are the subject of this change request.

D. NO SIGNIFICANT HAZARDS CONSIDERATIONS

The following analysis about the issue of no significant hazards consideration, using the standard of 10CFR50.92, is provided in accordance with 10CFR50.91(a).

1. No significant increase in the probability or the consequences of an accident previously evaluated results from this change.

   a. There are no analysed accidents in the GGNS UFSAR which assume the fuel transfer canal gate open during periods when the suppression pool and/or all ECCS are inoperable. The deletion of the requirement in the footnote of Technical Specifications 3.5.2 and 3.5.3 to remove the transfer canal gate will not degrade the heat removal capability of the UCP water volume beyond existing bounded conditions concerning time-to-boil.

   b. Therefore, there is no increase in the probability or consequences of a previously analysed accident due to this change.

2. This change would not create the possibility of a new or different kind of accident from any previously evaluated.

   a. The installation of the fuel transfer canal gate results in the isolation from the upper fuel pool and reactor cavity of approximately 48,500 gallons of water. There remains approximately 480,000 gallons of water directly available to the vessel to maintain the fuel covered. The fractional change in available inventory does not affect the conduct of any operation, the function of any component or the introduction of any failure mechanism not previously evaluated.

   b. The upper containment transfer canal gate is designed to isolate the transfer canal from the upper pool for Horizontal Fuel Transfer System (HFTS) maintenance. The gate is seismically qualified and is designed to withstand all loading conditions and remain watertight. The gate incorporates the same design,

fabrication, and installation criteria as the existing liner plates. The gate design also features redundant, inflatable seals which are initially inflated using the Service Air system. Since the service air is disconnected after initial seal inflation, backup air supply is provided by a single bottle of compressed air, which is seismically supported at the gate area. In addition, existing administrative controls require frequent, routine surveillance of the gate seal pressure gauge when the gate is required.

The transfer gates are designed such that in the event of total seal failure the hydraulic pressure of the water against the gate would provide for limited sealing ability. Under this type of postulated seal failure, the UCP water inventory would begin to slowly drain through the failed seals. The limited sealing ability of the gate with failed seals would not allow for an immediate release of UCP water inventory.

c. Therefore the possibility of a new or different kind of accident from any previously evaluated is not created.

3. This change would not involve a significant reduction in the margin of safety.

a. Adequate margin of safety is maintained provided water level is above the top of active fuel as described in the Bases for Technical Specification Safety Limit 2.1.4. The elimination of the availability of the fuel transfer canal volume compared to the fuel pool and cavity areas represents approximately 9% of the total volume of these areas available to flood the reactor core. Examples of two potential loss of inventory scenarios involving gravity draining due to unisolctable passive failures were evaluated. The elimination of the requirement for this volume within the fuel transfer canal would reduce the time of core uncovery by 1.3 and 1.7 hours compared to total time to uncovery of 15 and 19 hours (with the gate removed) respectively in these examples. This difference is not considered significant.

b. Prompt operator notification of any event which results in loss of inventory of the upper containment pool and/or reactor vessel is assured by control room annunciators. One alarm indication is provided by the drywell floor drain sump detecting $\geq$ 5 gpm inleakage. This leakage rate is $\leq$ 1% of the drain rates used in the above examples and therefore, would provide early detection of a progressing failure. In addition to this alarm, an upper containment pool or reactor cavity level decrease of 1-7/8 inches from the minimum required level will also annunciate in the control room. Operators are procedurally directed in the restoration of level as a result of this alarm.

c. Given these early identifications of potential drain events and the time available to effect termination of the inventory loss, no significant reduction in the margin of safety is involved with the fractional loss in available drain volume due to this change.