



MISSISSIPPI POWER & LIGHT COMPANY

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July 28, 1984

NUCLEAR LICENSING & SAFETY DEPARTMENT

Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 & 50-417
License No. NPF-13
File: 0260/L-860.0
Request for Exemption in
Accordance with
10 CFR 50.12(a) - (Division
I, II, III Diesel Generators)
AECM-84/0399

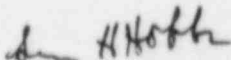

Dear Mr. Denton:

In recent discussions with your staff, Mississippi Power and Light Company (MP&L) has been requested to evaluate the need for exemption from certain regulations which may be implied by proposed operating license conditions. It is our understanding that these conditions may be incorporated into the full power amendment to the operating license for Grand Gulf Nuclear Station (GGNS).

Based on your staff's guidance and pursuant to 10 CFR 50.12(a), MP&L transmits its evaluation of the need for scheduler exemptions to the regulations identified in the attachment. This attachment provides the information required by 10 CFR 50.12(a), including a description of the issue addressed in each exemption and the basis upon which MP&L concludes that the exemption may be issued if the NRC concludes such exemptions are appropriate.

Please advise if additional information is required.

Sincerely,


 Larry F. Dale
Director, Nuclear Licensing & Safety

LFD/sad
Attachment

cc: (See Next Page)

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Member Middle South Utilities System

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cc: Mr. J. B. Richard (w/o)
Mr. R. B. McGehee (w/o)
Mr. N. S. Reynolds (w/o)
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung (w/a)
Office of Inspection & Enforcement
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Mr. J. P. O'Reilly (w/a)
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101 Marietta Street, N.W., Suite 2900
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JUSTIFICATION FOR THE REQUIRED EXEMPTION

NRC regulations provide for specific exemptions in 10 CFR 50.12(a). The Commission has provided additional guidance regarding this regulation in an order in the Shoreham proceeding¹, as modified by Commission action on July 25, 1984.²

In view of the standards in 10 CFR 50.12(a) and the Commission's guidance regarding the issuance of exemptions, we may synthesize the circumstances in which the requested exemptions are warranted as follows: (1) the activities to be conducted are authorized by law, (2) operation with the exemptions does not endanger life or property because such would involve no undue risk to the health and safety of the public; (3) the common defense and security are not endangered, and (4) the exemptions are in the public interest because, on balance, there is good cause for granting them (e.g., to avoid unnecessary delay and consequent financial hardship) and the public health and safety are adequately protected.

As demonstrated by the discussion herein, and in some instances supported by previous submittals to the Commission or previous safety evaluation reports, or both, referenced below, MP&L is entitled to the requested exemptions.

I. The Requested Exemptions and the Activities Which Would Be Allowed Thereunder Are Authorized by Law

MP&L is currently authorized to operate GGNS Unit 1 at low power (5% or less of full power) pursuant to License No. NPF-13, which was issued in accordance with the Atomic Energy Act as amended. GGNS Unit 1 has completed low power

1 Order, Long Island Lighting company (Shoreham Nuclear Power Station, unit 1), CLI-84-8, May 6, 1984.

2 Staff Requirements Memorandum MB40725A, July 27, 1984.

tests and, with the exception of the matters for which exemptions are sought, is essentially ready to perform the surveillance tests prerequisite to, and to commence, power ascension.

If the criteria established in 50.12(a) are satisfied, as they are in this case, and if no other prohibition of law exists to preclude the activities which would be authorized by the requested exemptions, and there is no such prohibition, then the Commission is authorized by law to grant this exemption request.³

II. The Requested Exemptions Will Not Endanger Life or Property

II.A GDC-I Exemption Request for Combustion Air Intake and Exhaust System

In its previous submittal AECM-83/0724, MP&L described its compliance with the requirements of GDC-I, "Quality Standards and Records", for the standby diesel engine air intake and exhaust system. The off-engine mounted piping and associated components, such as valves, fabricated headers, fabricated special fittings, and the like are designed, manufactured and inspected in accordance with the guidelines and requirements of ANSI Standard B31.1. The combustion air intake and exhaust system was not included in the diesel engine auxiliary systems for which augmented requirements were identified by NRC letter dated July 11, 1975. This letter required MP&L to implement its commitment to augment Quality Group D requirements for diesel generator auxiliary systems (diesel generator starting air, lube oil, and jacket water cooling auxiliary systems) with the following:

1. Liquid penetrant examination of welds in piping greater than 2" nominal pipe size.

3 See: U. S. vs. Allegheny-Ludlum Steel Corp., 406 U.S. 742, 755 (1972)

2. The assembly of the diesel generator auxiliary system shall be performed by qualified welders under the provisions of Section IX of ASME Code and the QA program covering the design and fabrication of the diesel generators.
3. All inspection records shall be maintained for the life of the plant. These records should include data pertaining to qualification of inspection personnel, examination procedures, and examination results.

In response to NRC concerns, MP&L responded in AECM-81/0324, dated August 26, 1981, that unlike other diesel generator auxiliary systems which benefit from higher quality requirements imposed on the pressure boundary, the combustion air intake and exhaust system would not benefit from higher quality due to mild service conditions. The existing Quality Group D and seismic Category I classification is commensurate with the service conditions imposed on the combustion air intake and exhaust systems and adequately ensures the integrity of the system. As further described in AECM-83/0724, dated November 15, 1983, the standby diesel generator combustion air intake and exhaust system incorporates significant design margin based upon actual service conditions, i.e., pressure and temperature. ANSI B.31.1 minimum thickness calculations were performed for design and service conditions for the exhaust piping. In addition, MP&L committed in FSAR Amendment 51, dated November 1981, to add the piping to the operational quality assurance program.

In Supplement 4 to the Grand Gulf Nuclear Station Safety Evaluation Report, the NRC concluded that License Condition 2.C.(33) of Operating License NPF-13 should be revised to reflect the following additional words:

"(2) Add (3) to paragraph (a) to read: 2.c.(33)(a)(3) Upgrade the combustion air intake and exhaust system for the standby diesel engines to meet the augmented Quality Group D requirements.

MP&L believes that this condition is not required. Based upon the design margins for the pipe wall thickness, operational quality assurance program for piping, maximum operating pressure of -0.5 to 1.0 psig, low pressure rating of components, the standby diesel generator combustion air intake and exhaust system piping provides a component quality level that is commensurate with the importance of the safety function performed. Therefore, an exemption to GDC-1 is not required. Nonetheless, if the NRC staff cannot reach a similar conclusion, MP&L believes that sufficient information has been presented in the previous submittals referenced above and herein to demonstrate that the standard of 10 CFR 50.12(a) regarding the endangerment of life or property has been met.

II.B GDC-1 Exemption Request for HPCS Diesel Engine Skid-Mounted and Standby Diesel Engine Auxiliary System Piping

In its previous submittals AECM-83/0689 and AECM-83/0724, MP&L described its compliance with the requirements of GDC-1, "Quality Standards and Records", for the HPCS diesel engine skid-mounted and standby diesel engine auxiliary system. This piping and associated components, such as valves, fabricated headers, fabricated special fittings, and the like are designed, manufactured and inspected in accordance with the guidelines and requirements of ANSI Standards B31.1 and N45-2 and 10 CFR 50, Appendix B as augmented by the requirements of NRC letter dated July 11, 1975. This letter required MP&L to implement its commitment to augment Quality Group D requirements for these diesel generator auxiliary systems with the following:

1. Liquid penetrant examination of welds in piping greater than 2" nominal pipe size.
2. The assembly of the diesel generator auxiliary system shall be performed by qualified welders under the provisions of Section VIII of ASME Code and the QA program covering the design and fabrication of the diesel generators.

3. All inspection records shall be maintained for the life of the plant. These records should include data pertaining to qualification of inspection personnel, examination procedures, and examination results.

MP&L concluded, and the NRC agreed as indicated in its July 11, 1975 letter, that implementation of the augmented Quality Group D requirements described above along with the Seismic Category I design requirements for the diesel generator auxiliary systems provided a component quality level that in general corresponds to Regulatory Guide 1.26, Quality Group C and is commensurate with the importance of the safety function of the diesel generator units. The auxiliary system piping and associated components are intentionally overdesigned (subject to low work stresses) for the application and thereby resulting in high operational reliability.

In Supplement 4 of the Grand Gulf Nuclear Station Safety Evaluation Report, the NRC concluded that testing to the requirements of "...ANSI Std. B31.1, which requires that the piping be leak tested at operating pressure during engine operation..." is unacceptable. The staff may have concluded ANSI Std B31.1 was not acceptable because it allows an initial service leak test and inspection when other types of tests are not practical or when leak tightness is demonstrable due to the nature of the service. However, in fact, ANSI B31.1 requires hydrostatic testing at a pressure of 1.5 times design pressure, but shall not exceed the maximum allowable test pressure of any nonisolated component, such as vessels, pumps, or valves, in the system. A pneumatic test may be used in lieu of a hydrostatic test if one of the following conditions exist:

1. When Owner's specification requires or permits the use of this test or an alternative;
2. When piping systems are so designed that they cannot be filled with water; or

3. When piping systems are to be used in services where traces of the testing medium cannot be tolerated.

Such pneumatic tests shall be performed not less than 1.2 nor more than 1.5 times the design pressure of the piping system.

In Supplement 4 to the Grand Gulf Nuclear Station Safety Evaluation Report, the NRC concluded that License Condition 2.c(33) of Operating License NPF-13 should be revised to reflect the following additional words:

"(1) Paragraph (a)(2) should read: 2.c.(33)(a)(2) Provide confirmation acceptable to the NRC that HPCS diesel engine skid-mounted and standby diesel engine auxiliary systems piping has been satisfactorily tested at a minimum hydraulic pressure equal to 125% of design pressure."

Specifically, the Grand Gulf Nuclear Station HPCS diesel engine skid-mounted piping and standby diesel generator auxiliary system off-engine mounted piping was either hydrostatically tested at 1.5 times the design pressure or pneumatically tested at 1.25 times the design pressure for piping systems designed and/or supported such that they cannot be safely filled with water or when the piping systems, which are not readily dried, are to be used in services where traces of the water cannot be tolerated. Therefore, the only aspect of the proposed license condition not fully satisfied is the use of pneumatic testing in lieu of hydraulic testing where hydraulic testing would not be feasible or safe.

As discussed above, the use of pneumatic testing is consistent with ANSI Std. B31.1. In addition, ASME, Section III, Section ND-6112.1 allows a pneumatic test in lieu of a hydrostatic test when any of the following conditions exist:

1. When components appurtenances, or systems are so designed or supported that they cannot safely be filled with liquid.

2. When components, appurtenances of systems which are not readily dried are to be used in services where traces of the testing medium cannot be tolerated.

Therefore, the use of pneumatic testing also meets the intent of ASME Section III Code.

MP&L believes that the proposed license condition has been satisfactorily satisfied and that HPCS diesel engine skid-mounted piping and standby diesel engine auxiliary system off-engine mounted piping comply with GDC-1. Therefore, an exemption to GDC-1 is not required. Nonetheless, if the NRC staff cannot reach a similar conclusion, MP&L believes that sufficient information has been presented in previous submittals and herein to demonstrate that the standard of 10 CFR 50.12(a) regarding the endangerment of life or property has been met.

II.C HPCS Diesel Generator Undervoltage Protection

The GGNS Divisions 1 and 2 electrical power systems are each equipped with two levels of redundant undervoltage protection. These two divisions of electrical power provide power to a broad range of equipment required for safety. Current regulatory practice requires two levels of undervoltage protection for nuclear power plant standby diesel generators. The purpose of the undervoltage protection is to trip offsite power so that safety related equipment will be loaded onto an onsite power supply and continue to perform its safety function without any adverse affects from an undervoltage transient or from a sustained undervoltage condition.

GGNS is equipped with a third division of electrical power which is dedicated to the High Pressure Core Spray (HPCS) System. Due to the fact that the HPCS Diesel Generator and the associated Division 3 electrical power system is dedicated to the HPCS system, there was never a design intent for the Division 3 to meet all requirements appropriate for the Division 1 and 2 standby onsite power supplies. Division 3 has only one level of redundant undervoltage protection.

The design criteria for GGNS Division 3 are discussed in the FSAR and General Electric Topical Reports NEDO-10905 and 10905-1. There is no description of or commitment to a second level of undervoltage protection. Furthermore, the single level of protection is specified generically in NEDO-10905-1 as 73% at 3 seconds to be determined specifically for each plant based on consideration of system fault conditions and overcurrent relay settings (determined to be 72% for GGNS). The present design of the Division 3 undervoltage protection is in compliance with the licensing basis of the plant.

Additionally, the Division 3 electrical equipment has substantial capability to function during undervoltage transients. FSAR Appendix 3A and Section 8.3.1.2.1 discusses the MP&L commitment to Regulatory Guide 1.9 (3/10/71). Exception is taken in the FSAR to the regulatory guide's requirements for undervoltage during initial loading transient. The HPCS system consists of one large pump and motor combination which represents more than 90% of the total load; consequently, limiting the momentary voltage drop to 25% and the momentary frequency drop to 5% would not significantly enhance the reliability of HPCS operation. However, the frequency and voltage overshoot requirements of Regulatory Guide 1.9 are met. 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, MOV operation in the 72% to 75% voltage range will occur with a high degree of confidence. The likelihood of the undervoltage being between 72% and 75% for a period long enough to damage the valve motors is extremely small.

The only other equipment connected to the Division 3 bus that could be adversely affected by undervoltage is the Division 3 battery charger which is not affected unless the voltage is less than 85% of nominal voltage; below 85% of nominal voltage the output and input current decrease, but there is not thermal or other damage. In any event, the Division 3 batteries will handle the DC load for at least two hours which provides ample time to correct the undervoltage conditions.

Based on the preceding discussions, it has been the MP&L position that GGNS Division 3 is in compliance with the design requirements and with the applicable regulations.

During recent discussions with the NRC staff, it has been indicated that GGNS will be required to provide additional Division 3 undervoltage protection. In accordance with requests from the staff, MP&L provided a commitment to the staff to evaluate the need for and implement any design changes found to be necessary to provide acceptable undervoltage protection for Division 3. This commitment is to be completed prior to restart following the first refueling outage. The commitment was transmitted by MP&L letter AECM-84/0326 on July 3, 1984. It is our further understanding that an explicit license condition is being contemplated by the staff.

MP&L believes that the contemplated license condition is not required, but to the extent that the NRC and its staff believe that additional undervoltage protection is required for Division 3 in order to comply with 10 CFR 50, Appendix A, Criterion 17 (GDC 17), MP&L hereby requests a scheduler exemption from GDC 17 until restart following the first refueling outage when evaluation and implementation of appropriate design changes to provide acceptable Division 3 undervoltage protection will be complete. MP&L believes that sufficient information has been presented in previous submittals and herein to demonstrate that the standard of 10 CFR 50.12(a) regarding the endangerment of life or property has been met.

II.D Division 3 Emergency Generator Test Mode Emergency Override

Position C.1.b.(3) of Regulatory Guide 1.108 states, "Where necessary, diesel generator design should include an emergency override of the test mode to permit response to bona fide signals."

In addition, Section 5.6.1.4 of IEEE Std 387-1977 states, "If the diesel engine is equipped to operate in either the isochronous or the droop mode, provisions shall be included to automatically place the engine governor in

an acceptable mode of operation when the diesel generator unit is required to operate automatically," and Section 5.6.2.2(1), "A start diesel signal shall override all other operating modes and return control of the diesel generator unit to the automatic control system."

MP&L believes that the design of Division 3 diesel generator incorporates the required features. The Division 1 and 2 diesel generators are designed to separate from the grid if a LOCA signal occurs while in the test mode. The reason to separate from the grid is to prohibit common mode failure from jeopardizing both the onsite and offsite power supplies to each divisional bus during LOCA. The GGNS Division 1 and 2 load shed and sequence system performs this protection function by immediately opening the Diesel Generator 11 or 12 breaker when a LOCA signal is received, if the diesel generator is in test. The automatic logic of Division 3 performs this same protective function, if required, by sensing the fault condition on the grid and then opening the offsite feeder breakers, leaving the Diesel Generator 13 connected to Division 3 bus in isochronous operation.

Both of the above discussed methods perform the function of protecting the onsite power supplies from potential common mode failures. In the event of a LOCA 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 diesel generator will not trip on overload upon start of the HPCS pump or upon degradation of the preferred source since protective devices would detect the condition and trip the incoming feeder breaker. In any event, as described in Section II.C, substantial capability exists for the Division 3 equipment to function during undervoltage transients. The start diesel signal would additionally override the test mode by initiating a bypass of all diesel generator trips except engine-overspeed and generator differential, as required by Regulatory Guide 1.9. Therefore, it may be concluded that either isochronous or

droop mode is "an acceptable mode of operation" in compliance with Section 5.6.1.4 of IEEE Std 387-1977.

Therefore, MP&L's evaluation indicates that the design of the Division 3 diesel generator is in compliance with all applicable regulatory requirements including the requirements of Position C.1.b.(3) of Regulatory Guide 1.108 and sections 5.6.1.4 and 5.6.2.2(1) of IEEE Std 387-1977, as stated in the FSAR and in the General Electric Licensing Topical Report NEDO-10905 that has been approved by the NRC. Nevertheless, during recent conversations with the NRC staff, it has been indicated that GGNS will be required to provide additional emergency override of test mode features. In accordance with requests from the staff, MP&L provided a commitment to the staff to evaluate and propose any necessary design changes required to incorporate an emergency override of the test mode for the Division 3 diesel generator. This commitment is to be completed prior to restart following the first refueling outage. The commitment was transmitted by MP&L letter AECM-84/0326 on July 1984. It is our further understanding that an explicit license condition is being contemplated by the staff.

MP&L believes that the contemplated license condition is not required, but to the extent that the NRC staff believes that additional design enhancement is required in order to comply with General Design Criteria 17, of Appendix A, 10CFR Part 50, MP&L hereby requests a schedular exemption from this requirement until startup following the first refueling outage to evaluate and propose any necessary design changes required to incorporate an emergency override of the test mode for the Division 3 diesel generator. MP&L believes that sufficient information has been presented in previous submittals and herein to demonstrate that the standard of 10 CFR 50.12(a) regarding the endangerment of life and property has been met.

II. E Diesel Generator Trip Functions

The design of the GGNS diesel generator trip system for Divisions 1 and 2 incorporate four trips that remain in effect during emergency operation. They are:

1. Engine overspeed - single channel trip
2. Generator differential - single channel trip
3. Generator ground overcurrent - single channel trip
4. Low lube oil pressure - (2) out of (3) logic

The design of Division 1 and 2 diesel generators is in compliance with the FSAR and Regulatory Guide 1.9 (3/10/71) to which MP&J. is committed. A subsequent revision Regulatory Guide 1.9 incorporated Branch Technical Position ICSB 17 which 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 complies with this latest requirement except that it incorporates a generator ground overcurrent trip without coincident logic. 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 protection system.

Regulatory Guide 1.9 requires measures be taken to ensure that spurious actuation of protective trip devices does not prevent the diesel generator unit from performing its function. The Class 1E Division 1 and 2 diesel generator's are low resistance grounded at the generator neutral and are provided with inverse time delay type static overcurrent relays. The application and coordination of the protective devices has been analyzed and determined to be of such reliability that degradation of the distribution

system will not occur from spurious ground fault trips. As discussed in MP&L letter AECM-84/0240, dated April 20, 1984, the Grand Gulf Division 1 and 2 diesel generators have exceptional reliability with a failure rate roughly one half the industry average. Therefore, even though the treatment of the generator ground overcurrent trip may not conform to the latest staff requirements, the requisite high level of diesel generator reliability is evident. Furthermore, none of the few failures to start or run experienced to date have been caused by a failure of this trip. Therefore, sufficient empirical evidence supports a finding that the diesel generators are highly reliable without satisfying this additional staff requirement.

Based on the preceding discussion, it has been the MP&L position that the protective feature of the generator ground overcurrent trip function will not adversely affect the availability and reliability of the GGNS diesel generators. During recent discussions with the NRC staff, it has been indicated that GGNS will be required to bypass or provide coincident logic for certain diesel trips. In accordance with requests from the staff, MP&L provided a commitment to the staff to evaluate the need for and implement any design changes found to be necessary with regard to bypassing or providing coincident logic for certain diesel generator trips. This commitment is to be completed prior to restart following the first refueling outage. The commitment was transmitted by MP&L letter AECM-84/0326 on July 3, 1984. It is our further understanding that an explicit license condition is being contemplated by the staff.

MP&L believes that the contemplated license condition is not required, but to the extent that the NRC and its staff believe that this protective feature is not in compliance with 10 CFR 50, Appendix A, Criterion 17 (GDC 17), MP&L hereby requests scheduler exemption from the requirements of GDC 17 until startup following the first refueling outage in order to evaluate and implement any design changes found necessary to bypass or implement coincident logic for diesel generator trips (other than engine overspeed and generator differential overcurrent) retained upon an ECCS actuation signal which do not now utilize coincident logic. MP&L believes that sufficient information has been presented in previous submittals and

herein to demonstrate that the standard of 10 CFR 50.12(a) regarding the endangerment of life and property has been met.

III. The Requested Exemptions Will Not Endanger the Common Defense and Security

The common defense and security are not implicated in this exemption request. Only the potential impact on public health and safety is at issue.

IV. The Requested Exemption is in the Public Interest

The requested exemption is 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 since, as shown above, in spite of deviations from staff interpretations of what is required to meet certain regulations that post dates the FSAR review for GGNS Unit I, the health and safety of the public will be adequately protected.

Grand Gulf Unit I 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 facility will be placed in commercial operation. All of the requested exemptions discussed in Section II above are schedular. In instance, the delay associated with performing deferred activities now rather than at the first refueling outage ranges from several weeks to several months. In some instances, such as the hardware associated with the additional undervoltage protection for the Division III power system, procurement time is presently uncertain and could add additional months.

In any case, a corresponding delay in commercial operation of Grand Gulf Unit I would be occasioned by delay at this stage. Middle South Energy Inc., and South Mississippi Electric Power Association own undivided ownership interests of 90% and 10%, respectively, in Grand Gulf Nuclear Station Unit I. Any delay in the commercial operation of Grand Gulf Nuclear Station Unit I would cause the cost of the unit to increase at the rate of more than \$20 million per month. Under

standard ratemaking practices these costs would eventually have to be borne by ratepayers of the affected utilities. This substantial financial impact of a delay in commercial operation on the owners of Grand Gulf Nuclear Station Unit 1 and the customers of the utilities which will receive the output is not warranted inasmuch as, as shown above, the public health and safety are adequately protected. Moreover, the equities of the situation favor the granting of the requested exemptions because MP&L has met its FSAR commitments, and as to all five schedular exemptions, the need for schedule adjustments arises because the Staff has subsequently added new requirements or adopted new interpretations, even though MP&L met the licensing bases current at the time of FSAR review and issuance of the SER and Supplements 1 through 4.