

10CFR50.90

April 6, 2006
5928-03-20437

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Three Mile Island Nuclear Station, Unit 1
Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: Emergency License Amendment Request No. 332 – Emergency Diesel Generator

Pursuant to 10CFR50.90, AmerGen Energy Company, LLC (AmerGen) hereby requests the following amendment to the Technical Specifications (TS), Appendix A, of the Three Mile Island Nuclear Station, Unit 1 (TMI Unit 1), Facility Operating License. This License Amendment Request (LAR) proposes to revise TS 3.7.2.c, "Unit Electric Power System," to increase the TS allowed outage time (AOT) with one (1) inoperable emergency diesel generator from seven (7) days to ten (10) days, on a one-time basis. A description of the proposed change is included in Attachment 1 to this letter.

The proposed change has been reviewed by the Plant Operations Review Committee and approved by the Nuclear Safety Review Board.

AmerGen requests approval of the proposed amendment by 2100 hours on April 9, 2006, based on the expiration of the current Technical Specification AOT at that time to prevent an unnecessary shutdown of TMI Unit 1. As described in the attached submittal, public safety is not compromised by extending the TS AOT. There is an inherent safety benefit of repairing the EG-Y-1A diesel generator without shutting the plant down when compared to shutting the plant down without EG-Y-1A diesel available. The NRC previously approved similar emergency amendments to extend EDG TS AOTs, including one recently for Fermi Unit 2 (Amendment No. 171, approved February 6, 2006).

Therefore, in accordance with 10 CFR 50.91 "Notice for public comment; State consultation," paragraph (a)(5), AmerGen is requesting NRC approval of the proposed amendment on an emergency basis. Sufficient time is not available to support 30 days for prior public comment on a schedule to prevent an unnecessary plant shutdown upon the expiration of the current AOT. An explanation of the emergency and why it could not be avoided is included in Attachment 1. Once approved, this amendment will be implemented prior to the expiration of the current AOT.

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We are notifying the State of Pennsylvania of this application for changes to the TS and Operating License by transmitting a copy of this letter and its attachments to the designated state official.

If you have any questions or require additional information, please contact Dave Helker at (610) 765-5525.

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

DBB

4/6/06
Executed on



Pamela B. Cowan
Director – Licensing and Regulatory Affairs
AmerGen Energy Company, LLC

- Attachment 1: Description of Proposed Change, Technical Analysis, and No Significant Hazards Consideration
- Attachment 2: Marked-up Technical Specification Pages
- Attachment 3: Print-ready Technical Specification Pages

cc: S. J. Collins, Administrator, Region I, USNRC
D. M. Kern, USNRC Senior Resident Inspector, TMI Unit 1
F. Saba, USNRC Project Manager, (via FedEx)
D. Allard, Director, Bureau of Radiation Protection – PA Department of Environmental Resources
Chairman, Board of County Commissioners of Dauphin County
Chairman, Board of Supervisors of Londonderry Township
File No. 06017

ATTACHMENT 1

TMI Unit 1

Docket No. 50-289

License No. DPR-50

Emergency License Amendment Request No. 332 - Emergency Diesel Generator

**Description of Proposed Change, Technical Analysis, and
No Significant Hazards Consideration**

ATTACHMENT 1 CONTENTS

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1.0 INTRODUCTION

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," AmerGen Energy Company, LLC (AmerGen) is proposing that the TMI Unit 1 Facility Operating License be amended to revise the Technical Specifications (TS) associated with the Emergency Diesel Generators (EDG). The proposed change to TS 3.7.2.c, "Unit Electric Power System," would increase the TS allowed outage time (AOT) for one inoperable Emergency Diesel Generator from seven (7) days to ten (10) days, on a one-time basis, to support emergent maintenance and repair on Emergency Diesel Generator EG-Y-1A. This extended AOT will be effective from 2100 hours, April 9, 2006 until 2100 hours, April 12, 2006. AmerGen requests approval of the proposed amendment by 2100 hours, April 9, 2006, to prevent an unnecessary TMI Unit 1 shutdown as a result of the expiration of the AOT of TS 3.7.2.c. As described in Section 5.0 below, extending the TS 3.7.2.c AOT and avoiding the risk incurred by a plant shutdown, will not compromise public safety.

TMI Unit 1 Emergency Diesel Generator, EG-Y-1A, is presently inoperable due to a planned EDG maintenance outage. During this maintenance outage, excessive pump drive to flex-drive clearances were found on the Main Lube Oil Pump (EG-P-4A) and the Engine Driven Fuel Oil Pump (EG-P-9A), and wear was identified on the lube oil gear teeth. The cause of the excessive pump clearances and lube oil gear teeth damage is preliminarily identified to be from a worn flex-drive unit bearing. An Equipment Apparent Cause Evaluation will be performed to verify the cause of the worn bearing.

Due to the additional time required to replace the worn flex-drive unit bearing and return EG-Y-1A EDG to an operable status, the current TS AOT of seven (7) days, which expires at 2100 hours on April 9, 2006, may be exceeded. The current schedule for restoration of Emergency Diesel Generator, EG-Y-1A, supports declaring the diesel operable on April 8, 2006 at 1900 hours. AmerGen is requesting a one-time extension of this seven (7) day allowed outage time by an additional 3 days to assure adequate time is available for completion of repairs, post-maintenance testing, and surveillance testing of the EDG. In accordance with 10 CFR 50.91(a)(5), AmerGen is requesting NRC approval of the proposed change on an emergency basis, as sufficient time is not available to allow 30 days for prior public comment on a schedule to prevent an unnecessary plant shutdown at the expiration of the existing AOT.

Basis for Emergency

The need to request an emergency TS change arose from an unexpected condition found during a planned diesel generator major mechanical inspection performed on EG-Y-1A beginning April 2, 2006.

During performance of the routine EDG inspection, maintenance personnel identified that the pump drive to flex-drive clearance on the Main Lube Oil Pump (EG-P-4A) and the Engine Driven Fuel Oil Pump (EG-P-9A) was excessive. The cross drive to governor drive clearance for EG-P-9A was found to be 0.024", with an acceptance criteria of 0.002"- 0.006". The pump drive to flex-drive clearance for EG-P-4A was found to be 0.016", with an acceptance criteria of 0.002"- 0.006". The lube oil pump drive also indicated signs of wearing a knife-edge on the gear teeth due to the excessive clearance. After disassembly the gear was inspected and no knife-like condition was found. The suspected cause of this excessive clearance is a worn flex-drive unit bearing. A preliminary investigation revealed the excessive wear could have resulted from a high number of diesel generator fast starts performed over the life of the diesel. This issue has been entered into the site Corrective Action Program (CAP) for resolution and determination of

causes and corrective actions. An Equipment Apparent Cause Evaluation will be performed to confirm this preliminary assessment.

If the EG-Y-1A EDG mechanical inspection had been completed based on original scope during the initial planned inspection duration, TS 3.7.2.c would have been exited prior to the expiration of the seven (7) day AOT.

The work is currently scheduled to complete on April 8, 2006 at 1900 hours. The TS 3.7.2.c action was entered on April 2, 2006 at 2100 hours, and will expire on April 9, 2006 at 2100 hours. As a result of the complexity of repairing the pump drive to flex-drive clearances on the EG-P-9A and EG-P-4A pump drives, replacement of the lube oil pump drive gear assembly, and restoration of EG-Y-1A operability, a one-time TS change is requested to ensure that TMI Unit 1 would not be unnecessarily required to shut down.

AmerGen could not have foreseen the need for this TS change prior to identification of the unacceptable pump drive to flex-drive clearances and worn lube oil pump drive gear assembly. The EG-Y-1A EDG did not exhibit signs of operational degradation prior to the scheduled maintenance outage. Therefore, AmerGen requests that this proposed TS change be considered under emergency circumstances as described in 10 CFR 50.91(a)(5).

2.0 DESCRIPTION OF PROPOSED CHANGE

AmerGen proposes to revise TS 3.7.2.c, "Unit Electric Power System," as follows:

The 7-day allowed outage time of Technical Specification 3.7.2.c, which was entered on April 2, 2006, at 2100 hours, may be extended one time by an additional 3 days to complete repair and testing of EG-Y-1A.

The proposed change will permit completing required corrective maintenance and repair on EG-Y-1A EDG engine driven pumps, EG-P-9A and EG-P-4A pump drives, replacement of the lube oil pump drive gear assembly, and return emergency Diesel Generator EG-Y-1A to an operable status. The extension of the existing seven (7) day AOT to ten (10) days will prevent exposure to the inherent risks associated with an unnecessary plant shutdown.

3.0 BACKGROUND

Description of Events

Completion of repairs, post-maintenance testing, and surveillance testing to establish operability may not be completed prior to expiration of the (7) day AOT. At the conclusion of the (7) day AOT, TS 3.7.2.c would require, in accordance with TS 3.0.1, that within 1 hour, actions shall be initiated to place the unit in Hot Standby within the next 6 hours, and Hot Shutdown within the following 6 hours of the AOT expiration time of 2100 hours on April 9, 2006.

The purpose of this amendment request is to request additional time in order to satisfactorily complete repairs, post-maintenance testing, and surveillance testing of the EG-Y-1A EDG. AmerGen has determined that the risk of extending the seven-day allowed outage time by an additional 3 days does not warrant the inherent risks associated with an unnecessary plant shutdown. Accordingly, AmerGen is requesting that the seven-day AOT

specified by TS 3.7.2.c, be extended one time by an additional 3 days to allow completion of repairs and testing of EG-Y-1A diesel. This requested extension would be limited to the current period of EDG EG-Y-1A inoperability.

Basis for Current Requirements

The operability requirements for the alternating current (AC) power sources during plant operation ensure that sufficient power will be available to supply the safety-related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant alternating power sources satisfy the requirements of General Design Criteria 17, "Electric Power Systems," of Appendix A to 10 CFR 50.

The TMI Unit 1 offsite or preferred power for the AC power system is supplied from the 230 kV transmission system through the auxiliary transformers. Alternate power for the engineered safety feature (ESF) is available through alternate feeder breakers that can feed the ESF bus from the opposite auxiliary transformer when the unit is not at power. The main and alternate feeder breakers are administratively controlled so that in no case can the two offsite power sources be tied together during power operations. Transfer to and from the opposite auxiliary transformer source without interruption is possible, but the EDG of that particular bus must be used to make the transfer.

The two redundant ESF divisions include two 4.16 kV buses. These buses service all 4.16 kV safety loads, as well as provide a power bus for lower subdivisions at 480 V AC and 120 V AC for ESF equipment. Administrative controls prevent cross-connecting the two divisions while critical.

Within a division, AC loads are divided into two groups, each supplied by its auxiliary transformer. An EDG is assigned to power each load group, when required. The EDGs are connected to a dedicated bus. In case of a loss of offsite power, a load shedding scheme initiates tripping all breakers on 4160 V and 480 V, except 4160/480 V transformer, ESF motor control center feeders, and previously running HPI or LPI pumps. After the onsite power source (EDG) reaches normal voltage and frequency, sequential loading follows if an engineered safeguards condition exists.

The availability of offsite power, coupled with the availability of the remaining operable EDG, continues to provide adequate assurance of the capability to provide power to the ESF buses under postulated accident conditions. Also available as an alternate AC power source is the Station Blackout (SBO) diesel, which is available within ten minutes of the onset of the SBO event, and has sufficient capability and capacity to operate systems necessary for coping with a station blackout for the required station blackout duration of four hours to bring the plant to a and maintain it in safe shutdown.

The TS Action requirements specified for the levels of degradation of the power sources provide restrictions for continued facility operation commensurate with the level of degradation. The operability requirements for the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least one of each of the onsite alternating current power sources and associated distribution systems operable during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite alternating current source.

Reason for Requesting Emergency Amendment

Regulation 10 CFR 50.91(a)(5) states that where the Nuclear Regulatory Commission (NRC) finds that an emergency situation exists, in that failure to act in a timely manner would result in derating or shutdown of a nuclear power plant, or in prevention of either resumption of operation or of increase in power output up to the plant's licensed power level, it may issue a license amendment involving no significant hazards consideration without prior notice and opportunity for a hearing or for public comment. The regulation also states that the NRC will decline to dispense with notice and comment on the determination of no significant hazards if it determines that the licensee has abused the emergency provision by failing to make timely application for the amendment and thus itself creating the emergency. The regulation requires that a licensee requesting an emergency amendment explain why the emergency situation occurred and why the licensee could not avoid the situation. As explained below, an emergency amendment is needed to preclude an unnecessary plant shutdown, and AmerGen could not have reasonably avoided the situation or made timely application for an amendment.

Reason Emergency Situation Has Occurred

The emergency situation resulted from several unforeseen problems that occurred during this EDG maintenance outage that was originally scheduled to be completed within the TS seven (7) day AOT. The problems associated with the Main Lube Oil Pump (EG-P-4A) and the Engine Driven Fuel Oil Pump (EG-P-9A) drive clearances, and the replacement of the lube oil pump drive gear assembly, as well as the time required to complete repairs, post maintenance testing, and surveillance testing associated with these problems is the cause for the current emergency situation for which a license amendment is being requested.

AmerGen has determined that the risk of extending the seven-day allowed outage time by an additional 3 days does not warrant the inherent risks associated with an unnecessary plant shutdown. Neither a routine nor an exigent amendment could be processed within the available time. Therefore, an emergency amendment is needed to preclude an unnecessary shutdown.

Reason the Situation Could Not Have Been Avoided

On April 2, 2006, at 2100 hours, EDG EG-Y-1A was declared inoperable for a scheduled maintenance outage, entering the seven-day action statement of Technical Specification (TS) 3.7.2.c. During the outage, maintenance personnel identified that the pump drive to flex-drive clearance on the Main Lube Oil Pump (EG-P-4A) and the Engine Driven Fuel Oil Pump (EG-P-9A) was excessive. The cross-drive to governor-drive clearance for EG-P-9A was found to be 0.024", with an acceptance criteria of 0.002"- 0.006". The pump drive to flex-drive clearance for EG-P-4A was found to be 0.016", with an acceptance criteria of 0.002"- 0.006". The lube oil pump drive also indicated signs of wearing a knife-edge on the gear teeth due to the excessive clearance. After disassembly the gear was inspected and no knife-like condition was found. The suspected cause is a worn flex drive unit bearing. A preliminary investigation revealed the excessive wear could be a result of a high number of diesel generator fast starts performed over the life of the diesel. This issue has been entered into the site Corrective Action Program (CAP) for resolution and determination of causes and corrective actions. An Equipment Apparent Cause Evaluation will be performed to confirm this preliminary assessment.

There is reasonable assurance that the flexible drive gear backlash out of tolerance condition that was found on EG-Y-1A does not exist on EG-Y-1B based on several indications.

The most recent 24 month PM performed on EG-Y-1B in October 2004 found no abnormal wear on the flexible drive gears or associated pump gears. The results in the surveillance procedure for the affected pumps indicated "No Deficiencies Noted All Satisfactory." The PM is scheduled at 24-month intervals because this is considered a reasonable interval to find any new wear-related conditions that arise before they lead to a degraded condition that may affect operability of the component. The EG-Y-1B diesel has performed acceptably in its most recent surveillance runs and showed no signs of degradation on any of the pumps connected to the flexible drive. During its most recent surveillance, completed on March 15, 2006, the engine started and carried its load acceptably for 1 hour and therefore met its acceptance criteria, with the only noted deficiency being on a thermocouple. The engine fast started and accepted load successfully during its most recent fast start demand during Power Transfer Testing in T1R16 refueling outage in November 2005.

The other indications available to monitor the performance of the EG-Y-1B diesel (i.e., oil analysis and vibrations) have given no indications that there may be a problem with these gears and bearings wearing abnormally. On a monthly basis, TMI Unit 1 implements an industry standardized test slate for diesel engine crankcase oil. The test slate consists of six (6) specific analyses designed to: analyze the lubricating properties of the oil by evaluating its physical characteristics (moisture, viscosity, flashpoint, and base number) and, assess the component condition through the evaluation of wear materials (direct-read ferrography and spectrochemical analysis). The results of these analyses are evaluated after each sample (monthly).

In October of 2004, TMI Unit 1 replaced the oil in the crankcase of the EG-Y-1B Emergency Diesel Generator based on sample results for base number, which is an indicator of the normal depletion of additives in the oil.

A review of the analysis parameters that evaluate component wear (direct-read ferrography and spectrochemical analysis) shows no significant trend changes since the oil was installed in 2004. Wear particle concentrations (direct-read ferrography) remain in the 15 to 20 range, which is well below the AmerGen established limit of 100. Spectrochemical analysis shows no increase in metallic trace elements. The Fairbanks Morse vendor representative indicates that iron content in oil would be the first indicator of abnormal wear on these gears and bearings. It was indicated that oil analysis would show this condition long before any significant degradation occurred.

Vibration data was reviewed for EG-Y-1B. Data is recorded monthly during routine testing. Vibration information is recorded on both Turbochargers, the Engine Block, as well as the Generator frame and end bearing. The review included data taken from October 2002 through March 2006. The data shows that all readings were acceptable during this time period and were within limits given by the manufacturer, Fairbanks Morse. There were no adverse trends noted on EG-Y-1B, and no indication of issues with the flexible drive.

This type of condition is relatively uncommon in the industry and no other symptoms are present that would indicate that this condition would exist on the EG-Y-1B diesel. There are numerous engines in the industry with similar run hours to the TMI engine that have not exhibited this type of condition, so it is reasonable to believe that this condition is not solely attributable to the time in service of the TMI emergency diesels. While fast starts are considered a contributor to the out of tolerance condition of the bearings in this gear assembly, since this is the time when they carry the most load, some other condition had to be present for this wear to occur on this engine. Search of industry operating experience for this type of condition has turned up three

(3) similar instances. These occurred at Limerick, Calvert Cliffs, and ANO. These plants attributed the condition to installation practices. The Limerick condition was attributed to not having installed the pump gear assembly flush with the engine. Extent of condition was evaluated and the condition was not found on any of the other seven (7) engines at the Limerick site. The Calvert Cliffs condition was attributed to improper installation of the Turbocharger. INPO Failure Report No. 712 indicated that when Calvert Cliffs inspected their 1B DG and 2B DG for extent of condition, there was no sign of abnormal gear wear and backlashes were within manufacturer's specifications. The ANO condition was attributed to installing the gear with incorrect number of teeth.

The TMI Unit 1 Equipment Apparent Cause (EACE) Evaluation process will determine the cause of the TMI equipment out of tolerance issue. It is not expected that engine run hours or fast starts alone are the cause of the current wear condition. Disassembly of the EG-Y-1A gear assembly was closely observed by engineering. It preliminarily appears that the bearing holding plate for the radial bearing was manufactured out-of-flatness, which may have allowed axial clearance in the radial bearing holding assembly to occur over the life of the engine.

Based on initial evaluation, it has been determined that the as-found condition on the EG-Y-1A EDG would not have presented a past or current operability concern. The engine would have been able to perform its required mission if called upon prior to entering this system outage. It has performed acceptably during its most recent surveillance runs up to and including the pre-inspection run coming into the current diesel outage. Additionally, EG-Y-1A fast started and carried its load during the load transfer testing that occurred in T1R16 refueling outage (November 2005). The wear condition was found early in its progression by the PM program and is being corrected before it would have affected engine performance. The Emergency Diesel Generator EG-Y-1A was last overhauled in April 2004. A review of the analysis parameters that evaluate component wear (direct-read ferrography and spectrochemical analysis) show no significant trend changes since the last overhaul in April of 2004. Wear particle concentrations (direct-read ferrography) remain in the 20 to 25 range, which is well below the AmerGen established limit of 100. Spectrochemical analysis shows no increase in metallic trace elements. Iron concentration in EG-Y-1A is 8-10 ppm higher than that in EG-Y-1B. However, this can be attributed to the fact that the oil in EG-Y-1A has been in the unit for 8 years. These positive oil analysis results are consistent with the minimal wear that was found on the EG-Y-1A gears and bearings. Vibration data was reviewed for EG-Y-1A. Data is recorded monthly during routine testing. Vibration information is recorded on both Turbochargers, the Engine Block, as well as the Generator frame and end bearing. The review included data taken from October 2002 through March 2006. The data shows that all readings were acceptable during this time period and were within limits given by the manufacturer, Fairbanks Morse. There were no adverse trends noted and no indication of issues with the flexible drive.

The removed EG-Y-1A flex-drive has been disassembled, and minimal wear was found on the gears after cleaning. They were cleaned and judged acceptable for reuse by engineering and the Fairbanks Morse vendor representative. The gear shaft was inspected and showed minimal wear and was judged acceptable for reinstallation. The radial bearing, which is considered the source of the backlash clearances, was removed and inspected and it was judged by the Fairbanks Morse representative, and engineering, to have some slightly abnormal wear, but not wear that was excessive to the point of near or imminent failure. The pictures of the affected gears and bearings have been reviewed by engineering and indicated that the wear present, as well as the effect of the as-found backlash readings on the engine, were minimal. Because the area where these backlash measurements are taken is very tight, and therefore prone to error,

the measurements were retaken on the next shift by Fairbanks Morse vendor representatives to ensure accuracy, and the largest backlash measurement found was 0.012" versus an original maximum measurement of 0.024". Fairbanks Morse has indicated that 0.002"- 0.012" has been provided to other customers with 3800TD 8-1/8 engines (the same as TMI) as acceptable as left tolerances for backlash measurements for in-service components. They have verified that these tolerances are applicable to our engine. The component, being slightly out of tolerance or at the high end of its acceptance band, was replaced to ensure long-term reliability, but it is expected that EG-Y-1A would have performed if called upon. Understanding that, there is no reason to believe that this condition, which is not expected to exist on the EG-Y-1B, would have any impact on operability of the engine.

AmerGen could not have reasonably foreseen exceeding the seven-day Allowed Outage Time of TS 3.7.2.c. The original EG-Y-1A EDG maintenance outage schedule was extended only after routine maintenance inspections identified the pump drive clearance issues. These additional repair activities were beyond the planned scope of the maintenance outage. The time required to replace the gear and bearing assemblies extended the completion time of the outage and may exceed the current seven-day AOT. This additional work extended the outage, which was originally scheduled for 3 days and 15 hours, to approximately 5 days and 22 hours.

Completion of repairs, post-maintenance testing, and surveillance testing to establish operability may not be completed prior to expiration of the seven day allowed outage time. AmerGen is requesting a one-time extension of this seven (7) day allowed outage time by an additional 3 days to assure adequate time is available for completion of repairs, post-maintenance testing, and surveillance testing of the EDG. AmerGen has determined that the risk of the requested allowed outage time extension does not warrant the inherent risks associated with an unnecessary plant shutdown. This requested extension would be limited to the current period of EDG EG-Y-1A inoperability.

AmerGen therefore considers that the situation could not have been avoided and there is justification for requesting the proposed license amendment on an emergency basis.

4.0 REGULATORY REQUIREMENTS & GUIDANCE

10 CFR 50.36, "Technical specifications," provides the regulatory requirements for the content required in a licensee's TS. Criterion 3 of 10 CFR 50.36(c)(2)(ii) requires a limiting condition for operation to be established for a structure, system or component that is part of a primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. The Emergency Diesel Generators satisfy these criteria.

AmerGen has determined that the proposed change does not require any exemption or relief from regulatory requirements, other than the Technical Specifications, and does not affect conformance to any General Design Criteria differently than described in the UFSAR.

5.0 TECHNICAL ANALYSIS

The integrity of the reactor coolant system, fuel and other components of the primary system of a nuclear plant can be adversely affected by the number of thermal or power transients that they are subjected to during their lifetime. As each additional thermal transient can affect this integrity, it is prudent to avoid such transients provided the health and safety of the public is preserved. Additionally, the cycling of the unit through a thermal transient cycles the secondary plant systems, as well as increases challenges to the operators. Placing the unit in hot shutdown requires additional routine surveys and inspections within the reactor building that increase personnel exposure.

The proposed amendment to allow a one-time extension of the allowed outage time for EG-Y-1A is based on the following considerations.

Risk from Proposed Allowed Outage Time Extension

A quantitative Probabilistic Risk Analysis (PRA) for the extended TMI Unit 1 EDG EG-Y-1A allowed outage time was produced by comparing the quantified values for Core Damage Frequency (CDF), and Large Early Release Frequency (LERF), with EDG EG-Y-1A out of service versus the baseline "average maintenance" results. The evaluation determined that the risk associated with maintaining the unit at power for an additional 3 days beyond the present TS allowed outage time with an EDG unavailable falls within the applicable regulatory guidance. AmerGen has concluded that the one-time, single EDG TS allowed outage time change has an acceptably small quantitative impact on plant risk (based upon the guidance provided in NRC Regulatory Guide (RG) 1.174 and 1.177).

The evaluation was performed using the TMI PRA model. The evaluation used the Average Maintenance PRA model to generate the Baseline CDF numbers, which were compared to model results with EDG EG-Y-1A out-of-service and all other maintenance terms set to zero (planned maintenance on all other risk significant equipment will be disallowed during the extended AOT). The values calculated for Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP) were determined based on the additional 3-day EDG EG-Y-1A outage. The numerical analysis is shown below:

$$\text{ICCDP} = (\text{CDF}_{\text{EDGA}} - \text{CDF}_{\text{base}}) * \text{At}$$

Where:

ICCDP = Incremental Conditional Core Damage Probability (per RG 1.177)
 CDF_{EDGA} = Core Damage Frequency with EDG 1A out-of service - 4.7E-5 /yr
 CDF_{base} = Core Damage Frequency for the baseline quantification - 3.4E-5 /yr
At = Change in duration for the proposed one-time AOT extension - 3 days.

$$\text{ICCDP} = (4.7\text{E-}5 / \text{yr} - 3.4\text{E-}5 / \text{yr}) * (3 \text{ days} / (365 \text{ days/yr})) = 1.1\text{E-}7$$

and

$$\text{ICLERP} = (\text{LERF}_{\text{EDGA}} - \text{LERF}_{\text{base}}) * \text{At}$$

ICLERP = Incremental Large Early Release Probability (per RG 1.177)

LERF_{EDGA} = Large Early Release Frequency with EDG EG-Y-1A out-of-service - 4.4E-6 /yr

LERF_{base} = Large Early Release Frequency for the baseline quantification - 3.7E-6 /yr

At = Change in duration for the proposed one-time AOT extension - 3 days.

$$\text{ICLERP} = (4.4\text{E-}6 \text{ /yr} - 3.7\text{E-}6 \text{ /yr}) * (3 \text{ days} / (365 \text{ days/yr})) = 6.4\text{E-}9$$

The above calculated values are well below the stringent thresholds specified in RG 1.177 (an ICCDP of 5.0E-7 and an ICLERP of 5.0E-8) for a permanent Technical Specification change.

All TMI CDF calculations were performed using the current approved 2004 Revision 1 version of the TMI Level 1 PRA model. This is a CAFTA single top model, that includes impacts from internal flooding. The LERF calculations were performed with an updated interim CAFTA model, which has been converted from the current approved RISKMAN Level II model. This interim LERF model was used as it provides the best available Level II PRA quantifications at this time. A parametric uncertainty analysis was done on the model; the error factor for CDF is approximately 2. No uncertainty analysis has been performed on the LERF results. A limited gap analysis was done on the Level 1 PRA model to support the development of the MSPI basis documents and no issues were found that would affect the conclusions of this analysis of the risk associated with the extension of the EDG AOT.

The following are relevant features of the TMI PRA electric power model:

- Power to the 4kV ESF buses 1D and 1E is provided from either offsite power via the auxiliary transformers and 6.9 kV buses, or emergency diesel generators. DC power is required to start the EDGs and is needed for all 4kV breaker actuations.
- The SBO Diesel Generator is used to provide power to one bus following the failure or unavailability of the associated EDG. If both EDGs fail, the fault tree logic will allow the SBO DG to provide power to only one ESF bus. Operator action is required to start and load the SBO DG. Fire Service Water is required for SBO DG cooling.
- Common cause is considered between all three (2 EDG and one SBO) diesel generators, as well as their respective output breakers and fuel oil transfer pumps.
- Initiating events are considered for Loss of Offsite Power and loss of Bus 1D or 1E. Consequential Loss of Offsite Power events are considered; different probabilities for consequential LOOP are used for general transients and LOCA events.
- Offsite Power recovery is considered. The non-recovery probability is a convolution of different recovery times, based on the various times to core damage due to different size RCP Seal LOCAs. During a SBO event, a Seal LOCA is guaranteed to occur.

The analysis was completed with the following assumptions:

1. The Average Maintenance PRA model was utilized to generate the baseline numbers. This model represents normal plant operation at full power and includes failure terms for all systems, as well as nominal initiating event frequencies.

2. In the model used to determine the CDF/LERF associated with EDG EG-Y-1A out of service, all maintenance events for the other risk significant components were set to zero (with the exception of the EDG EG-Y-1A maintenance event). Elective maintenance will be restricted on all other risk significant equipment during the duration of the extended AOT.
3. EDG EG-Y-1A will be returned to service within 10 days from the initial LCO entry. Thus, the assessment evaluates the 3 additional days of unavailability beyond the 7 day AOT in the TS.
4. No adjustment is made to equipment failure probabilities even though some credit could be given due to restricting access to certain plant equipment required to guarantee the safe shutdown of the plant in the event of a transient.
5. No credit was taken for compensatory measures that may be taken to decrease operator or equipment failure rate.
6. No credit is given for the recent periodic testing of the diesel generators (which would tend to reduce their failure probabilities).
7. A cutset truncation limit of IE-11 was utilized for all quantifications.
8. There is some amount of non-negligible risk associated with the transition and shutdown periods with the EG-Y-1A diesel generator unavailable. This risk has not been quantified but as a conservative measure, no credit is given for offsetting the online risk with the transition and shutdown risk that would be incurred by shutting down the unit.

In addition to the above analysis, a sensitivity study was performed by changing the TMI PRA model Initiating Event Frequency for the Loss of Offsite Power to a frequency of 4.56E-02/yr for the duration of the extended AOT. This initiating event frequency was taken directly from the NRC SPAR model. The results of this analysis show slightly higher calculated values for a 3-day extension, but still below the RG 1.177 criteria (ICCDP = 2.3E-7 and ICLERP = 1.2E-8).

Operation and Maintenance Restriction Commitments

The following identifies those actions committed to by AmerGen. Any other actions discussed represent intended or planned actions by AmerGen, and are not regulatory commitments. The compensatory measures have been entered as regulatory commitments in the TMI Unit 1 Commitment Management System, which complies with Nuclear Energy Institute 99-04, Revision 0, "Guidelines for Managing NRC Commitment Changes."

- a. While in the extended EG-Y-1A outage time period, overall plant risk will be managed by the existing Maintenance Rule (a)(4) program. This program utilizes the PARAGON™ software to evaluate unique plant configurations. The PARAGON model has the capability of running the TMI CAFTA PRA model in the same manner as PRAQuant and/or EOOS to generate configuration specific risk numbers. This PRA information is combined with deterministic Defense-in-Depth information to obtain an overall risk color. AmerGen procedure WC-AA-101 addresses the actions required to be taken at each risk level.
- b. In accordance with WC-AA-101 "On-Line Work Control Process", the plant is in a "YELLOW" risk condition, and is expected to remain in this category for the extended outage period on EG-Y-1A. Flagging/Robust barriers have been established on protected equipment per HU-AA-101 "Human Performance Tools And Verification Practices." This specific equipment includes:

- EG-Y-1B – “B” Emergency Diesel Generator
 - 1E 4160V Switchgear (“B” train Emergency Safeguards (ES) 4160V switchgear)
 - EG-Y-4 Station Blackout Diesel Generator
- c. The following restrictions will be in effect until EDG EG-Y-1A is restored to an Operable status:
- Elective maintenance will not be performed on the EG-Y-1B EDG or the SBO Diesel.
 - Elective maintenance will not be performed in the switchyard that would challenge the offsite power connections or offsite power unavailability.
 - Elective maintenance will not be performed on the opposite train Emergency Core Cooling System (ECCS) equipment
- d. Additionally, elective maintenance and testing normally allowed during EDG EG-Y-1A maintenance will be rescheduled to a time that is not coincident with the extended AOT, in order to minimize aggregate risk. This will specifically include the following systems/components:
- Emergency Diesel Generator B
 - Station Blackout Diesel (SBO)
 - Offsite Power Lines/ 230 KV Switchyard
 - 125V DC
 - AC Power (4KV – 480V)
 - Instrument Air Compressors 1A, 1B, and 4
 - Turbine Bypass Valves
 - Atmospheric Dump Valves
 - Decay Heat Removal
 - Decay Heat Closed Cooling Water
 - Decay Heat River Water
 - PORV/ PORV Block valves
 - Emergency Feedwater
 - Fire Service Water Pumps 1, 2, and 3
 - Makeup/ HPI
 - Condensate Pumps
 - Main Feedwater
 - Nuclear River Water
 - Nuclear Service Closed Cooling Water
 - Secondary Closed Cooling Water
 - Intermediate Closed Cooling Water
 - MS-PT-950 & 1184 - "A" & "B" OTSG Steam Pressure Transmitters
- e. The following actions will be taken to provide an increased assurance of grid stability:
- No test or maintenance activities that could reduce switchyard reliability will be performed.

- Three Mile Island will contact the system dispatcher to ensure that no short-term activities adversely affecting grid stability are planned or have transpired.
- f. Operations shift briefings will be conducted to review procedural guidance for utilization of the Station Blackout (SBO) Diesel in the event of a loss of off-site power. These briefings will also include the potential impacts of severe weather and any grid disturbances.

The above-mentioned items that are restricted from maintenance during the extended AOT period have a non-negligible impact on risk. For comparison purposes, the ICCDP and ICLE:RP were calculated using the average maintenance model for both the baseline quantification and the case with EG-Y-1A out of service. These runs give a measure of the risk associated with the contingency action to restrict elective maintenance on the systems listed in item (d) above. Those numbers are calculated as 3.7E-7 for ICCDP and 6.4E-9 for ICLE:RP.

Conclusion:

As discussed above, there is no significant difference in nuclear safety risk by extending the AOT for 3 days to accomplish repairs and testing to EDG EG-Y-1A. Additionally, there is an inherent safety benefit of repairing EDG EG-Y-1A without shutting the plant down when compared to shutting the plant down without EDG EG-Y-1A available. Therefore, requiring this repair to be performed during shutdown would result in additional plant equipment and personnel challenges without any significant benefit to the safety of the plant or the health and safety of the public.

In addition to the risk insights discussed above, redundant equipment exists to ensure that the onsite emergency AC power supply function is performed. The redundant equipment (i.e., EG-Y-1B) will be maintained in an operable condition in accordance with TS. Appropriate plant redundant and support systems (including non-TS equipment) will be considered as protected systems to ensure there is no undue risk of redundant or support equipment inoperability during the extended TS 3.7.2.c time frame. Work on EG-Y-1A will be prioritized such that work will be performed around the clock in accordance with site administrative procedures. In addition, to ensure that the work proceeds in an orderly, yet expeditious manner, the Outage Command Center (OCC) has been activated to ensure that appropriate focus is placed on scheduling, prioritization, contingencies and relief turnover. Senior Corporate and Site Management personnel will continue to closely monitor the work activities to assure prompt completion.

6.0 REGULATORY ANALYSIS

Existing TS Actions would require a plant shutdown if EG-Y-1A is not returned to an operable status within the seven (7) day AOT. The PRA analysis has shown that the increase in risk from extending the AOT from seven (7) days to ten (10) days is less than the stringent threshold criteria specified in RG 1.177 for a permanent TS change. The restriction of other safety-related or risk significant components being considered as protected equipment during the extended EG-Y-1A AOT will assure that redundant systems and equipment are available in the unlikely event of an accident that would require these components to function properly.

In conclusion, based on the considerations above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the

issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

7.0 NO SIGNIFICANT HAZARDS CONSIDERATION (NSHC)

AmerGen Energy Company, LLC (AmerGen) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed change affects the Allowed Outage Time for TS 3.7.2.c. The proposed change allows a one-time extension of the current Allowed Outage Time for the inoperable Emergency Diesel Generator (EDG) EG-Y-1A from seven (7) days to ten (10) days. The proposed change does not affect the design of the EDGs, the operational characteristics or function of the EDGs, the interfaces between the EDGs and other plant systems, or the reliability of the EDGs. Limiting conditions for operation and their associated allowed outage times are not considered initiating conditions for any accident previously evaluated, nor are the EDGs considered initiators of any previously evaluated accidents. The EDGs are provided to mitigate the consequences of previously evaluated accidents, including a loss of offsite power. The consequences of previously evaluated accidents will not be significantly affected by the extended EDG Allowed Outage Time because a sufficient number of onsite AC power sources will continue to remain available to perform the accident mitigation functions associated with the EDGs, as assumed in the accident analyses. Thus the consequences of accidents previously evaluated are not affected by the proposed change in Allowed Outage Time. To fully evaluate the effect of the proposed EDG Allowed Outage Time extension, Probabilistic Risk Assessment (PRA) methods and a deterministic analysis were utilized. The results of the analysis show no significant increase in Core Damage Frequency (CDF) or Large Early Release Frequency (LERF) based upon the guidance provided in Regulatory Guide 1.174 "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications".

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change does not involve a change in the design, configuration, or method of operation of the plant. The proposed change will not alter the manner in which equipment operation is initiated, nor will the functional demands on credited equipment be changed. The proposed change allows operation of the unit to continue while EDG EG-Y-1A is repaired and retested. The proposed extension does not affect the interaction of EDG

EG-Y-1A with any system whose failure or malfunction can initiate an accident. As such, no new failure modes are being introduced.

Therefore, the proposed action does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change does not alter the plant design, nor does it affect the assumptions contained in the safety analyses. Specifically, there are no changes being made to the EDG design, including instrument setpoints. The proposed change has been evaluated both deterministically, and using risk-informed methods. Based upon these evaluations, margins of safety ascribed to EDG availability and to plant risk have been determined to not be significantly reduced. The evaluation has concluded the following with respect to the proposed change:

Applicable regulatory requirements will continue to be met, adequate defense-in-depth will be maintained, sufficient safety margins will be maintained, and any increases in CDF and LERF are small and consistent with the NRC Safety Goal Policy Statement (Federal Register, Vol.5 1, p. 30028 (51 FR 30028), August 4, 1986, as interpreted by NRC Regulatory Guides 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications"). Furthermore, increases in risk posed by potential combinations of equipment out of service during the proposed extended EDG EG-Y-1A Allowed Outage Time will be managed under a configuration risk management program consistent with 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," paragraph (a)(4).

The availability of offsite power coupled with the availability of the other EDG and the use of on-line risk assessment tools, as well as planned compensatory measures, provide adequate compensation for the potential small incremental increase in plant risk associated with the extended EDG EG-Y-1A Allowed Outage Time. The proposed extended EDG EG-Y-1A Allowed Outage Time in conjunction with the availability of the other EDG, continues to provide adequate assurance of the capability to provide power to the engineered safety features (ESF) buses.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, AmerGen concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

8.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," paragraph (c)(9). Therefore, pursuant to 10 CFR 51.22(t), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

9.0 PRECEDENT

AmerGen has researched previously approved emergency Technical Specification amendments that had been approved by the NRC with regards to the one-time extension of EDG TS AOT. The NRC previously approved similar emergency/exigent amendments, to extend EDG TS AOTs based on PRA analyses, for Fermi 2 (Amendment No. 171, approved February 6, 2006), D. C. Cook Unit 2 (Amendment No. 264, approved December 10, 2003), South Texas Project, Unit 2 (Amendment No. 148, approved December 23, 2003), and Edwin I. Hatch Plant, Units 1 and 2 (Amendment Nos. 227 and 169, approved February 22, 2002).

ATTACHMENT 2

TMI UNIT 1

Docket No. 50-289

License No. DPR-50

Emergency License Amendment Request No. 332 – Emergency Diesel Generator

Marked-Up Technical Specification Pages

TS page 3-43

CONTROLLED COPY

- c. Both diesel generators shall be operable except that from the date that one of the diesel generators is made or found to be inoperable for any reason, reactor operation is permissible for the succeeding seven days* provided that the redundant diesel generator is:
1. verified to be operable immediately;
 2. within 24 hours, either:
 - a. determine the redundant diesel generator is not inoperable due to a common mode failure; or,
 - b. test redundant diesel generator in accordance with surveillance requirement 4.6.1.a.

In the event two diesel generators are inoperable, the unit shall be placed in HOT SHUTDOWN in 12 hours. If one diesel is not operable within an additional 24 hour period the plant shall be placed in COLD SHUTDOWN within an additional 24 hours thereafter.

With one diesel generator inoperable, in addition to the above, verify that: All required systems, subsystems, trains, components and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE or follow specifications 3.0.1.

- d. If one Unit Auxiliary Transformer is inoperable and a diesel generator becomes inoperable, the unit will be placed in HOT SHUTDOWN within 12 hours. If one of the above sources of power is not made operable within an additional 24 hours the unit shall be placed in COLD SHUTDOWN within an additional 24 hours thereafter.
- e. If Unit 1 is separated from the system while carrying its own auxiliaries, or if only one 230 kV line is in service, continued reactor operation is permissible provided one emergency diesel generator shall be started and run continuously until two transmission lines are restored.
- f. The engineered safeguards electrical bus, switchgear, load shedding, and automatic diesel start systems shall be operable except as provided in Specification 3.7.2c above and as required for testing.
- g. One station battery may be removed from service for not more than eight hours.
- h. If it is determined that a trip of the Unit 1 generator, in conjunction with LOCA loading, will result in a loss of offsite power to Engineered Safeguards buses, the plant shall begin a power reduction within 24 hours and be in HOT SHUTDOWN in an additional 6 hours, except as provided in Specification 3.7.2.e above.

* The 7-day allowed outage time of Technical Specification 3.7.2.c, which was entered on April 2, 2006 at 2100 3-43 hours, may be extended one time by an additional 3 days to complete repair and testing of EG-Y-1A.
Amendment No. 88, 188, 212, 224,

ATTACHMENT 3

TMI UNIT 1

Docket No. 50-289

License No. DPR-50

Emergency License Amendment Request No. 332 – Emergency Diesel Generator

Print-Ready Technical Specification Pages

TS page 3-43

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* The 7-day allowed outage time of Technical Specification 3.7.2.c, which was entered on April 2, 2006 at 2100 hours, may be extended one time by an additional 3 days to complete repair and testing of EG-Y-1A.