

METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER & LIGHT COMPANY
AND
PENNSYLVANIA ELECTRIC COMPANY
THREE MILE ISLAND NUCLEAR STATION, UNIT 1

Operating License No. DPR-50
Docket No. 50-289
Facility Operating License Amendment Request No. 176

This Facility Operating License Amendment Request is submitted in support of Licensee's request to change Appendix A to Operating License No. DPR-50 for Three Mile Island Nuclear Station, Unit 1. As a part of this request, proposed replacement pages for Appendix A are also included.

GPU NUCLEAR CORPORATION

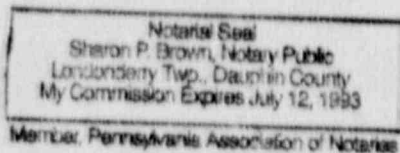
BY:

[Signature]

Vice President & Director, TMI-1

Sworn and subscribed
to before me this 23rd
day of March, 1990.

[Signature]
Notary Public



I. FACILITY OPERATING LICENSE AMENDMENT REQUEST NO. 176

GPUN requests that the attached revised page replace the following page of existing TMI-1 Operating License No. DPR-50:

Replace Page 7.

II. REASON FOR CHANGE

Section 103.c of the Atomic Energy Act of 1954 provides that a license is to be issued for a specified period not exceeding 40 years. 10 CFR 50.51 specifies that each license will be issued for a fixed period of time not to exceed 40 years from the date of issuance. The current licensed term for TMI-1 is 40 years commencing with issuance of the construction permit on May 18, 1968. Thus, the Facility Operating License for TMI-1 will expire at midnight May 18, 2008. Accounting for the time that was required for plant construction, this represents an effective operating license term of 34 years rather than 40 years. Therefore, GPUN requests that the TMI-1 Facility Operating License be extended from May 18, 2008 to April 19, 2014 to reflect forty (40) years from the date of issuance of the full-power license. This request represents a license extension of 5 years and 11 months to allow operation for the full design life.

Operation of TMI-1 until April 19, 2014 will be both practicable and economical. The plant is a major asset to Dauphin County and surrounding communities by virtue of its ongoing contributions to the property tax base and secondary benefits to the local economy from employee payroll, and from expenditures for goods and services to operate the plant. As a baseloaded generating station, it provides power and stability to the Pennsylvania-New Jersey-Maryland interconnection. The additional years of plant operation allowed by the proposed change would defer the need to install replacement baseload capacity, (which would result in substantial additional capital expenditures) or the need to purchase supplemental power from outside our system. Utilization of domestic sources of energy such as nuclear power helps reduce our nation's dependence on expensive imported oil.

This change is consistent with actions taken by the Commission in granting similar license extensions for the period between construction permit issuance and full power license issuance.

III. SAFETY EVALUATION JUSTIFYING CHANGE

The justification for this change addresses the suggested guidelines issued by NRC to supplement the April 30, 1985 policy letter from H. L. Thompson, Jr. to H. R. Denton on extending the operating life of nuclear power plants. These guidelines suggest that the following four items be addressed: significant environmental impacts, pressurized thermal shock, equipment qualification and technical specifications for inservice inspection and testing.

TMI-1 was designed, constructed and licensed for a 40-year service life as discussed in the TMI-1 Final Safety Analysis Report (FSAR). This design life is based upon operation at a thermal power level of 2568 MWt with a cumulative lifetime capacity factor of 80%. The Unit cumulative capacity factor to date is less than 80%, due in part to the fact that TMI-1 was maintained in a cold shutdown condition for a period of approximately six years from 1979-1985. Accordingly, none of the licensing issues forming the basis for the initial issuance of the operating license need be reconsidered in connection with this proposed amendment, since the amendment, if granted, would be fully supported by the initial licensing record. The rated thermal power upgrade to 2568 MWt was described in TMI-1 Technical Specification Change Request No. 184 which resulted in License Amendment No. 143, dated July 26, 1988.

The 40-year service life design criteria does not imply that some equipment and components will not wear out or require replacement during the plant lifetime. Design features were included in the construction and subsequent modification of TMI-1 which ensure the ability to test, inspect, and perform preventive and corrective maintenance of the plant structures, systems and components. Existing surveillance and maintenance programs are sufficient to maintain or determine the need for replacement of safety related components. Periodic inservice inspection and testing requirements have been incorporated into the plant Technical Specifications and procedures to provide further assurance that any unanticipated degradation of safety related systems, equipment or structures will be identified and corrected in a timely manner.

A. Equipment Impact

1. Mechanical Equipment

The primary side pressure boundary components within the Nuclear Steam Supply System (NSSS) scope were designed and constructed for a 40-year design life. The equipment design life is based on the time period of exposure to an operating environment. The 40-year design life is equivalent to 32 Effective Full Power Years (EFPYs). During the plant construction, materials were not exposed to the operating environment except for system functional tests. The system components were not subjected to a radiation environment until after the operating license became effective. GPUN is committed to a periodic inservice inspection program for the Reactor Coolant System per Technical Specification Section 4.2. Additional monitoring programs are currently in effect or are being developed to evaluate thermal/pressure cycles and to monitor fatigue effects on key components.

The B&W Owners Group Integrated Reactor Vessel Material Surveillance

Program (BAW-1543, Rev. 2A), approved by NRC for TMI-1 in a letter dated May 27, 1986, provides the means for continuously monitoring the cumulative effects of the neutron exposure on the materials of the reactor vessel throughout the life of the plant. The analyses of the TMI-1 plant specific surveillance capsules have confirmed that the predictions used in the analytical techniques for establishing operating limitations for the reactor vessel are conservative. Future TMI-1 plant specific material surveillance capsules will be analyzed at specified times throughout plant life in order to continue to ensure that the predictions used in the analytical techniques for establishing future operating limitations for the reactor vessel remain conservative.

Equipment outside the NSSS scope which is safety-related were similarly designed and constructed, and are being inspected and tested by appropriate Technical Specification and ISI/IST program requirements. It is concluded that the above equipment, with any necessary replacement, will be satisfactory for a 40 year operating life.

2. Pressurized Thermal Shock

GPUN provided an assessment of the fracture toughness requirements for protection against pressurized thermal shock as required by 10 CFR 50.61 (5211-86-2007, January 23, 1986). That assessment concluded that the screening criteria would be met for the limiting weld at the expiration of the current operating license. The NRC evaluation and acceptance of the fracture toughness assessment is documented in a safety evaluation for protection against pressurized thermal shock events, dated November 25, 1986.

Other recent TMI-1 reactor pressure vessel fluence projections have been provided in B&W Topical Report BAW-1901, "Analysis of Capsule TMI-1-C, GPUN, TMI-1, "March, 1986 (GPUN letter to NRC 5211-86-2080, dated May 5, 1986). Based on the analysis of Capsule TMI-1-C, the calculated cumulative fast fluences of the reactor vessel were below those previously projected, resulting in a reduction of the previously reported RT_{PTS} . At the proposed license expiration date of April 19, 2014, TMI-1 core exposure is estimated at 26 EFPY, assuming a 0.80 utilization factor (EFPY/calendar year) for future cycles. The accumulated fluence at the inside reactor vessel surface at 26 EFPY, assuming 24 month cycles with a modified very low leakage core design, and operation at 2568 MWt, is now projected to be $6.8E18n/cm^2$. Utilizing Regulatory Guide 1.99, Revision 2, which is expected to be adopted for application to the PTS Evaluation in the near future, this fluence gives a PTS Evaluation reference temperature of 262°F at the critical weld (SA-1526) which meets the screening criteria of 270°F at the proposed license expiration date.

GPUN is monitoring reactor vessel fluence with external reactor cavity dosimetry installed for operating Cycle 7 and will continue to participate in efforts to refine the evaluation of material fracture toughness properties, fluence analyses and dosimetry and vessel flux reduction using improved cycle design techniques. Any undesirable changes with respect to the screening criteria will be identified early and appropriate corrective actions or analyses undertaken. Current fluence projections at the proposed license expiration date are therefore considered to be acceptable.

3. Electrical Equipment and Environmental Qualification

The Environmental Qualification (EQ) program for electrical equipment operating in a harsh environment is described in the TMI-1 FSAR, Appendix 6B. The program ensures that EQ is maintained for required electrical equipment within the scope of 10 CFR 50.49.

Aging analyses have been performed for safety-related electrical equipment in accordance with 10 CFR 50.49, Environmental Qualification, to identify qualified lifetimes for this equipment. These lifetimes are incorporated into plant equipment maintenance and replacement practices to ensure that safety-related electrical equipment remains qualified and available to perform its safety function regardless of the overall age of the plant. Therefore, the electrical systems design, electrical equipment selection and application, and environmental qualification of electrical equipment has adequately considered or is not impacted by a 40-year operational lifetime.

The TMI-1 EQ program was evaluated by NRC and found acceptable in a safety evaluation dated April 18, 1985.

4. Spent Fuel Storage

Spent fuel generated between 2008 and 2014 is not a concern with respect to spent fuel pool storage capacity. The existing TMI-1 spent fuel pool racks will lose full core reserve margin after the refueling outage in 1991. GPUN has contracted for services to design, license and install new high density, poison spent fuel racks in the TMI-1 spent fuel pools. While the design and licensing will provide for a maximum total safe capacity, the actual installation of new racks will occur in stages. The first increment of rack installation in early 1992 is planned to include sufficient rack capacity to provide storage capacity through 2008. Additional racks can be added as necessary thereafter to support continued operation up to the new licensed limit. In any event, it is anticipated that the new design using high density, poison racks will assure spent fuel storage capacity in the TMI-1 spent fuel pools to provide storage capacity substantially in excess of that required to support operation through 2014 based on current operational plans.

TMI-1 is currently operating on an 18 month cycle and is implementing 24 month cycles beginning with Cycle 9. This will result in less total spent fuel generated than previously projected even with the extended operating period.

5. Inservice Inspection (ISI) and Inservice Test (IST) Programs

The TMI-1 ongoing ISI and IST programs are maintained in accordance with 10 CFR 50.55a. The surveillance requirements for the ISI and IST programs for ASME Code Class 1, Class 2, and Class 3 components are contained in TMI-1 Technical Specification Section 4.2, Reactor Coolant System. The requirements for the IST program are specified by the Facility Operating License, No. DPR-50, Section C, license condition (6).

In addition to the ISI and IST programs, the following TMI-1 Technical Specifications also provide additional requirements for monitoring, component aging and the cumulative effects of power operation over the life of the plant.

a) Specification 4.19 - Once Through Steam Generator (OTSG) Tube Inservice Inspection.

This specification provides augmented ISI of the OTSG tube portion of the reactor coolant pressure boundary to assure continued integrity. The results of these augmented inspections are submitted by report to NRC and include:

1. Number and extent of tubes inspected
2. Location and percent of wall-thickness penetration for each indication of an imperfection.
3. Identification of tubes repaired or removed from service.

b) Specification 3.1.2 Pressurization Heatup and Cooldown Limitations

Temperature and pressure changes during heatup, cooldown and normal operation of the reactor coolant system are limited to protect against non-ductile failure of the reactor coolant system. These limits are established in accordance with the requirements of 10 CFR 50, Appendix G, and calculated utilizing the procedures defined in Regulatory Guide 1.99, Revision 2.

This specification includes a reactor vessel material surveillance program that monitors reactor vessel embrittlement over the 40-year design life in accordance with 10 CFR 50, Appendix H. Reactor vessel irradiation specimens are removed and examined at specific intervals to determine changes in material properties. The results of these examinations are then submitted for NRC review and are used to update the pressure and temperature limits.

c) Specification 4.2 Reactor Coolant System Inservice Inspection

As described above, this specification contains the ISI and IST surveillance requirements for ASME Code Class 1, Class 2, and Class 3 components that ensure the continuing integrity of the reactor coolant system throughout the life of the plant. In addition to the ISI and IST programs, this specification also contains requirements for special inspections of the reactor coolant pump motor flywheel assemblies and primary coolant system pressure isolation valves.

d) Specification 3.19.1 Containment Structural Integrity

This specification defines the inservice tendon surveillance program for the reactor building prestressing system. This surveillance program monitors potential tendon steel relaxation or concrete creep and ensures continued structural integrity of the reactor building throughout the life of the plant.

e) Specification 4.4.1 Containment Leakage Tests

This specification establishes the requirements for the performance of periodic integrated and local leakage rate tests in accordance with 10 CFR 50, Appendix J. These tests are performed during the life of the plant to ensure that reactor building leakage remains within allowable limits.

B. Environmental Impact

GPUN has reviewed the Environmental Reports (Environmental Report - Operating License Stage, October 1, 1970 revised December 10, 1971 and Amendments dated March 6, 1972 and April 30, 1973; Environmental Report - TMI-2, February 28, 1975) to determine if this license expiration extension would involve any previously unconsidered environmental impacts. Since these environmental reports were written presuming a 40 year plant life, we have identified no additional impacts associated with plant operation for a 40 year operating period. In conjunction with the effects of the accident at TMI-2 and its continuing shutdown, a final environmental impact statement was developed for TMI-2 (Programmatic Environmental Impact Statement, NUREG-0683, March 1981 Supplements 1, 2 and 3) which does not significantly affect the conclusions of the environmental report. This is substantiated further in the annual environmental reports provided in May of each year.

In addition, since the operation of TMI-2 has been curtailed, the previous environmental assessments bound the present site conditions including the recent power upgrade.

1. Radiological Impact

The region in the immediate vicinity of the plant site is primarily rural with a number of small communities located within the 10 mile

radius. The original licensing basis utilized the 1970 census data which showed a population of 139,599 in the 0-10 mile distribution and projected a population distribution of 166,295 for 1980. Recent population estimates based on 1986 census data, which is the most current available, indicated 167,210 individuals reside within 10 miles of the plant. Therefore, population growth has fairly closely approximated that anticipated in 1970. Population projections, which are based on the 1980 census data, indicate the population will decline within the 10-mile radius to 157,027 by the year 2010, whereas the existing Environmental Report estimates 281,446 by the year 2011. Therefore, the existing Environmental Report bounds the anticipated population growth in the immediate vicinity of the plant and would be expected to remain bounding to the year 2014 based on the 1980 population projection trend.

The outer boundary of the low population zone (LPZ) is at a radius of 2 miles from the plant and was also based on the 1970 census data. The 1970 census data indicated that the LPZ population was 2,380. The LPZ population was recently determined to be approximately 1805 (based on 1986 population data and house counts from aerial photographs). However, the existing Environmental Report had projected the LPZ population to be 2561 by the year 1987 and 2794 by the year 2011. The nearest population center with more than 25,000 people as defined in 10 CFR 100, was and still remains Harrisburg, PA, (estimated 1986 population = 51,530) located approximately 12 miles from the site. Therefore, the existing Environmental Report also bounds the anticipated population growth within the LPZ and would be expected to remain bounding to the year 2014 based on the 1986 population data trend.

Based on the above data, the projected population at the proposed license expiration date would not change the overall conclusion of the TMI-1 FSAR or Environmental Report consequences following postulated accidents. Therefore, the conclusions reached in the original TMI-1 FSAR and Environmental Report remain valid.

2. General Public

The original estimates of dose to the human population residing around TMI-1 was calculated for normal gaseous and liquid releases in Appendix III of the 1971 Environmental Report projected to the year 2014 which coincides with the request to extend the operating license to 40 years. As part of the 1976 Appendix I evaluation, the numbers were reviewed. In August 1981, NRC issued Technical Specifications requiring conformance with 10 CFR 50 Appendix I. Semi-Annually, TMI-1 provides a release report summarizing types and constituents of releases. Although actual source terms resulting from releases have been higher than assumed in the 1971 Environmental Report, the resulting doses based on actual realtime meteorological data at the time of release combined with actual population/farm distribution, have been lower as demonstrated in the semi-annual reports for TMI-1.

3. Occupational Exposure Impact

Occupational radiation exposure at TMI-1 is typically below the average of U.S. pressurized water reactor generating plants. It is a GPUN goal that below average occupational exposures will continue for the operating life of TMI-1.

TMI-1 maintains an aggressive commitment to as low as reasonably achievable (ALARA) exposures. Exposure goals are established for station man-rem to minimize collective doses. ALARA reviews and evaluations of workplans and plant modifications projected to exceed 5 man-rem are conducted. Additional work steps are built into the workplan, where appropriate, to reduce occupational exposure. Pre-job briefings and mockups are utilized, as well as post-job reviews. Robotics and closed circuit television are being used more extensively to perform and monitor tasks resulting in reduced exposures.

Occupational exposure since commercial operation began at TMI-1 is a total of 4,339 person-rem through September, 1989. Annual exposure in recent years has been well below the industry average. The projected dose for TMI-1 for the years 2008-2014 is also expected to be below the PWR annual average.

During this period of extension approximately 2 more refueling outages would be expected based on 24-month cycles. Annually GPUN provides person-rem exposure data during normal operating, maintenance, repair and refueling activities for all personnel monitored by dosimetry.

4. Non-Radiological Impact

Terrestrial

Specific areas of interest originally included the effects of cooling towers on vegetation due to salt stress, and bird impaction. Monitoring programs for both showed minimal impact and have been discontinued with NRC concurrence through License Amendment No. 51, dated January 28, 1980.

Aquatic

Specific areas of interest were impingement of fish into the river water systems. Based on approximately nine years of aquatic monitoring, the NRC and the Pennsylvania Department of Environmental Resources concluded that there were no adverse environmental impacts resulting from the impingement of fish. Previous aquatic monitoring programs have been discontinued.

Chemical and Thermal Discharge Effect

Chemical and thermal discharges are now controlled by the effective National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act and Pennsylvania's Clean Streams Law.

- A review of the history of the Environmental Reports provided Annually shows no adverse impact to the environment from the site. Adequate controls are provided to ensure continued monitoring of the plant discharges to the environment throughout plant life. Extension of the operating license by 5 years and 11 months would not adversely affect the environment.

5. Economic Assessment

Operation of TMI-1 beyond its current operating license period will provide a financial benefit to the customers served by GPU. TMI-1 currently provides approximately 13% of the total electric power requirements of the GPU System. The operation of TMI-1 for an additional 5 years and 11 months would defer the need to design and construct an 800 MW coal-fired replacement facility, and the environmental impacts associated with such construction. The installed cost of this facility, which is assumed to utilize Fluidized-Bed Combustion (FBC) technology, is estimated to cost \$4 billion in 2009. Present value net benefits of operating TMI-1 during the 2009-2014 time period are estimated to be \$100-200 million. These estimated net savings would reduce consumer rates compared to the coal replacement option.

IV. NO SIGNIFICANT HAZARDS CONSIDERATIONS

GPUN has determined that the proposed change to the Facility Operating License for TMI-1 involves no significant hazards consideration as defined by NRC in 10 CFR 50.92.

1. Operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated. The proposed revision to the Facility Operating License does not affect the safety analysis and does not involve any physical changes to the plant, nor any changes in the format or restraints on plant operations, and only contemplates a change to the expiration date of the current license. Therefore, this change is unrelated to the possibility of increasing the consequences of previously analyzed accidents. This change will not increase the probability of previously analyzed accidents because the plant is designed and constructed for 40 years of operation.
2. Operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any previously evaluated. The proposed revision to the Facility Operating License does not affect the safety analysis and does not involve any physical changes to the plant, nor any changes in the format or restraints on plant operations, and only contemplates a change to the expiration date of the current license. The plant is designed and constructed for 40 years of operation. Therefore, this change has no effect on the possibility of creating a new or different kind of accident from any previously evaluated.

3. Operation of the facility in accordance with the proposed amendment would not involve a significant reduction in a margin of safety. The proposed revision to the Facility Operating License does not involve any physical changes to the plant, nor any changes in the format or restraints on plant operations, and only contemplates a change to the expiration date of the current license. The safety analyses described in the FSAR are based on a 40-year operating life. Therefore, the overall margin of safety for the plant is maintained.

The Commission has provided guidelines pertaining to the application of the three standards by listing specific examples in 48 FR 14870. The proposed amendment is considered to be in the same category as example (i) of amendments that are considered not likely to involve significant hazards considerations in that the proposed change is purely an administrative change to allow operation for the design life of the plant and does not involve any physical changes to the plant or restraints on plant operations. The proposed change bearing upon duration of operations is within the range permissible by the Commission's regulations, specifically 10 CFR 50.51. Thus, operation of the facility in accordance with the proposed amendment involves no significant hazards considerations.

V. IMPLEMENTATION

It is requested that this license amendment become effective upon issuance.

ATTACHMENT

FACILITY OPERATING LICENSE CHANGE

5. GPU Nuclear Corporation shall provide routine reporting of the long-term corrosion "lead tests" test results on a quarterly basis as well as more timely notification if adverse corrosion test results are discovered.

(9) Long Range Planning Program

The "Plan for the Long Range Planning Program for the Three Mile Island Nuclear Station - Unit 1" (the Plan) submitted by GPUN letter C311-88-2030 dated March 16, 1988 is approved.

- a. The Plan shall be followed by the licensee from and after May 27, 1988.
- b. The Category A schedule shall not be changed without prior approval from the NRC. Categories B and C schedules may be changed without prior approval by NRC.

This license is effective as of the date of issuance and shall expire at midnight, April 19, 2014.

FOR THE ATOMIC ENERGY COMMISSION

Original Signed by
A. Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachment: Appendix A
Technical Specifications

Date of Issuance: April 19, 1974