

July 11, 1988

Docket No. 50-289

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Mr. Henry D. Hukill, Vice President  
and Director - TMI-1  
GPU Nuclear Corporation  
P. O. Box 480  
Middletown, Pennsylvania 17057

Dear Mr. Hukill:

SUBJECT: ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT  
RELATING TO UPGRADE OF RATED CORE POWER (TAC NO. 67903)

Enclosed is a copy of an "Environmental Assessment and Finding of No Significant Impact" for your information. This environmental assessment relates to your letter dated April 18, 1988, regarding your application for a license amendment to increase the presently rated core power level of 2535 megawatts thermal (Mwt) to 2568 Mwt.

The environmental assessment has been forwarded to the Office of the Federal Register for publication.

Sincerely,

*S/R. HERNAN*

Ronald W. Hernan, Senior Project Manager  
Project Directorate I-4  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosure:  
As stated

cc w/enclosure:  
See next page

LA:PDI-4  
SMNorris  
06/15/88

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DIR:PDI-4  
JFStolz  
06/16/88

OGC-~~74~~  
*SH Lewis*  
06/17/88 No legal objection, subject  
to resolution of matters set  
forth in attached note.

*DFOL*  
*11*

Mr. Henry D. Hukill  
GPU Nuclear Corporation

Three Mile Island Nuclear Station,  
Unit No. 1

cc:

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Docketing and Service Section  
Office of the Secretary  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

UNITED STATES NUCLEAR REGULATORY COMMISSIONMETROPOLITAN EDISON COMPANYJERSEY CENTRAL POWER & LIGHT COMPANYPENNSYLVANIA ELECTRIC COMPANYGPU NUCLEAR CORPORATIONDOCKET NO. 50-289ENVIRONMENTAL ASSESSMENT ANDFINDING OF NO SIGNIFICANT IMPACT

The U. S. Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating License No. DPR-50 issued to GPU Nuclear Corporation (the licensee), for operation of the Three Mile Island Nuclear Station, Unit 1 (TMI-1), located in Dauphin County, Pennsylvania.

ENVIRONMENTAL ASSESSMENTIdentification of Proposed Action:

This Environmental Assessment is written in connection with the proposed core uprate for TMI-1 in response to the licensee's application for a license amendment dated April 18, 1988. The proposed action would upgrade the rated core power level for TMI-1 from the current level of 2535 megawatts-thermal (MWt) to 2568 MWt. This uprate would represent an increase of approximately 1.3 percent over the current rated core power and Nuclear Steam Supply System (NSSS) thermal power.

The Need for the Proposed Action:

The proposed action would increase the TMI-1 electrical output by approximately 10 megawatts-electrical (MWe) and thus provide additional electric power to the electrical power grid which serves industrial, commercial and residential customers in the Commonwealth of Pennsylvania.

Environmental Impacts of the Proposed Action:

In December 1972 the U. S. Atomic Energy Commission issued the "Final Environmental Statement Related to Operation of Three Mile Island Nuclear Station, Units 1 and 2" (NUREG-0552). This document evaluates the environmental impact associated with the operation of Three Mile Island Units 1 and 2. The Final Environmental Statement (FES) assumed a 30-year operating lifetime for each unit and was based upon a design thermal rating of 2535 MWt for Unit 1 and 2772 MWt for Unit 2. The staff has reviewed the FES to determine if any significant environmental impacts, other than those previously considered, would result from raising the licensed thermal power level for TMI-1 from 2535 MWt to 2568 MWt.

Radiological Impacts

The FES discussed population growth or decline by municipality between 1960 and 1970 but did not project population growth for the operating lifetime of TMI-1. However, the FES implied an overall population growth in the area primarily related

to growth of Harrisburg International Airport. The trend of population in this area has generally increased very little between 1970 and 1980. In fact, the population of Harrisburg (nine miles northwest of TMI-1) has declined from 68,061 in 1970 to about 53,000 in 1980. The population within a 20 mile radius of TMI-1 was 621,000 in 1970. In 1980, the population within a 30 kilometer radius (18.9 miles) had increased to about 643,000. Using the methodology of NUREG-0017, "Calculations of Releases of Radioactive Materials in Gaseous and Liquid Effluents from PWRs," raising the authorized core thermal power level for TMI-1 as requested could result in a maximum increase of 1.3% in total core fission product inventory. Therefore, off-site dose rates from plant radiological effluents (i.e., indirect exposure) would be expected to increase no more than 1.3%. When converted to actual off-site dose commitments, this incremental potential increase in off-site releases is insignificant and is more than offset by the conservatism in the FES. The "1987 Radiological Environmental Monitoring Report for the Three Mile Island Nuclear Station," submitted to the staff on April 29, 1988, indicates that radiation doses to the public from TMI-1 operation continue to be well below all regulatory limits and well within the assumptions used in the staff's FES. For example, the FES calculated the maximum exposure to an individual due to liquid and airborne effluents would be 0.72 mrem per year. The 1987 environmental monitoring report estimated this maximum dose to be 0.16 mrem for the year 1987, or less than 25% of the FES assumption. By comparison, a typical individual living in the Harrisburg area in 1987 would be expected to receive an annual dose of approximately 288 mrem from natural causes, including radon. The lower observed levels in radioactive effluents from the plant results in a substantially lower

radiological impact than assumed in the FES. Therefore, the staff concludes a 1.3% increase in these effluents, and therefore a 1.3% increase in the off-site radiological impact due to liquid and airborne effluents is insignificant and is bounded by the FES. A similar comparison can be shown for direct radiation exposure (i.e. irradiation directly from the reactor itself rather than from effluents released from the reactor systems) to members of the public at the site boundary and for potential exposure due to postulated reactor plant accidents. These exposures were conservatively calculated in the FES and were shown to be low. Therefore an increase of 1.3% is insignificant.

The staff considered the incremental increase in occupational (on-site) exposure as part of its assessment of the proposed 1.3% power increase. The 1972 FES did not address occupational exposure for TMI-1. A supplement to the FES for Three Mile Island Unit 2 (TMI-2) only, issued in December 1976 as NUREG-0112, noted that the licensee committed to assure that individual radiation doses and plant population doses would be maintained as low as reasonably achievable (ALARA). Based on experience by the nuclear industry at that time, an estimate of 500 man-rem per year per reactor unit was made for expected occupational exposure at TMI-2. Actual personnel exposures since restart of TMI-1 in late 1985 indicates that exposures are well below the estimates for TMI-2 and declining each year. Total exposure at TMI-1 for 1986 was 246 person-rem and for 1987 was 174 person-rem, as documented in the licensee's annual reports to the NRC. This compares favorably to the current five-year average of 569 person-rem per unit per year for operating pressurized water reactors (PWRs) in the United States. Since most of this exposure is received during maintenance and refueling periods, and not while the reactor is operating, an increase in operating power level of 1.3% would be expected to have an insignificant effect on occupational exposures at TMI-1, particularly with the licensee's commitment to an ALARA program.

The staff reviewed the environmental impacts attributable to the transportation of fuel and waste to and from the TMI-1 site. With respect to the normal conditions of transport and possible accidents in transport, the staff concludes that the environmental impacts are bounded by those identified in Table S-4, "Environmental Impact of Transportation of Fuel and Waste To and From One Light Water-Cooled Nuclear Power Reactor" of 10 CFR 51.52. The bases for this conclusion are that: 1) Table S-4 is based on an annual refueling and an assumption of 60 spent-fuel shipments per reactor year. Presently, TMI-1 is on an 18-month refueling cycle which would, by itself, require fewer spent fuel shipments per reactor year. Reducing the number of fuel shipments would reduce the overall impacts related to population exposure and accidents discussed in Table S-4. However, GPU Nuclear has not shipped any TMI-1 irradiated fuel off-site to date and has no plans to do so in the near future. 2) Table S-4 represents the contribution of such transportation to annual radiation dose per reactor year to exposed transportation workers and to the general public. Presently, TMI-1 is authorized to slightly exceed the fuel enrichment and average fuel irradiation levels that are specified in 10 CFR 51.52(a)(2) and (3) as the bases for Table S-4. The radiation levels of the transport fuel casks are limited by the Department of Transportation and are not dependent on fuel enrichment and/or irradiation levels. Therefore, the estimated doses to exposed individuals per reactor year will not increase over that specified in Table S-4. In terms of transportation of solid radioactive waste (other than

fuel) from TMI-1, the number of shipments has been well within the assumptions of the FES. The FES stated that from 50 to 200 truckloads of solid radioactive waste would be shipped per year from the TMI site. In 1987, TMI-1 shipped only 36 truckloads of solid radioactive waste.

#### Non-Radiological Impacts

Reexamination of the staff's FES of December 1972 reveals that the assessments of non-radiological impacts were based on several considerations depending on the type of impact being addressed. For some types of impact, the assessments were based on a design power level; for other types, the assessments were based on plant design features, on relative loss of renewable resources, or on relative loss or degradation of available habitat. The staff considered those types of impacts that may be influenced by plant power level and also considered the fact that the FES assumed both Units 1 and 2 to be operating. TMI-2 has not operated since the March 1979 accident and it is very unlikely to resume operation in the future. Future operation would require a new environmental impact statement. The following topics were considered for a 1.3% increase in power level at TMI-1:

Consumptive Water Use - Water usage would be expected to increase between 1.5% and 1.7% at the higher power level of 3568 MWt. For the worst case atmospheric conditions, the increase would be about 180 gallons per minute (gpm).

Cooling Tower Effects/Salt Drift - Cooling tower evaporation rates would be equal to the consumptive water use rates, or a maximum of 180 gpm. This incremental increase would not be expected to significantly increase fogging effects as related to operations at Harrisburg International Airport. Studies conducted in 1977, 1978 and 1980 indicated that no cooling tower drift-related impact to the surrounding biota had occurred. Therefore, this incremental power level increase would not be expected to have any impact.

Meteorology - Plume dispersion from the cooling towers will not change because of this incremental power increase since this increase is so small and other factors are more controlling. Increased buoyancy of gaseous releases from increased stack temperatures will not occur because the stack temperature increase will be insignificant.

Impingement/Entrainment of Fish - Impingement and entrainment of adult, juvenile and larval fish were studied from 1974 through 1982. These studies concluded that no significant impact resulted from operation of the TMI units. The proposed power increase is not expected to significantly increase the impingement and entrainment of fish.

Chemical Impact from Liquid Discharge - The additional use of river water at TMI-1, due to the power increase, will not result in the discharge of concentrations of chemicals in excess of that evaluated in the FES because the additional water is lost to evaporation. Therefore, the proposed power increase will not have any significant adverse effects on the aquatic environment or impact the water quality of the Susquehanna River.

Thermal Impact from Liquid Discharges - Computer modeling predicts an increase in temperature of 0.4°F in the liquid effluent as a result of the proposed power increase. This increase will not violate the limits of the National Pollutant Discharge Elimination System (NPDES) issued by the Commonwealth of Pennsylvania. Slight variations in the temperature of effluents released to the environment may affect the composition of macroinvertebrate populations in the vicinity of the discharge. However, such population shifts, if any, are very localized and do not affect the overall quality of the aquatic environment.

The staff therefore concludes that the proposed power level increase will have negligible non-radiological impacts.

Alternatives to the Proposed Action:

The principal alternative to the proposed action would be to deny the licensee's request to raise licensed power level for TMI-1 to 2568 MWt. In

this case, TMI-1 would continue to operate with a maximum power level of 2535 Mwt. In Chapter XI of the FES, the staff presented a cost-benefit analysis of the environmental impacts of operation of TMI-1 compared to alternate methods of generating electricity (e.g., burning of coal or oil). In the FES, the staff concluded that the environmental benefit of generating electricity by nuclear fission (as compared to coal or oil) greatly outweigh the environmental cost. Even considering significant changes in the economics of the alternatives since 1972, operation of TMI-1 at 2568 Mwt would require only incremental additional yearly costs. These costs would be substantially less than the purchase of replacement power or the installation of new electrical generating capacity. Therefore, the staff concludes at this time that generation of an additional 10 MWe of electricity at TMI-1 is more cost beneficial from an environmental standpoint than generating 10 MWe by other means.

Alternative Use of Resources:

This action does not involve the use of resources not previously considered and evaluated in the TMI FES.

Agencies and Persons Consulted:

The NRC staff reviewed the licensee's request and did not consult other agencies or persons.

FINDING OF NO SIGNIFICANT IMPACT:

The Commission has determined not to prepare an environmental impact statement for the proposed amendment. Based upon the foregoing environmental assessment, the NRC staff concludes that the proposed action will not have a significant effect on the quality of the human environment.

For further details with respect to this action, see the request for amendment dated April 18, 1988, which is available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., and at the Government Publications Section, State Library of Pennsylvania, Walnut Street and Commonwealth Avenue, Box 1601, Harrisburg, Pennsylvania 17105.

Dated at Rockville, Maryland, this 11<sup>th</sup> day of July, 1988.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in cursive script that reads "John F. Stolz". The signature is written in dark ink and is positioned above the typed name and title.

John F. Stolz, Director  
Project Directorate I-4  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation