ATTACHMENT A

Department of Energy
Washington, D.C. 20461

JAN 27 1981

Mr. Darrell G. Eisenhut
Director
Division of Licensing
Office of Nuclear Reactor Regulation
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Eisenhut:

This letter is provided in response to your request of January 6, 1981, and summarizes the enclosed analysis of a continuing outage of the Three Mile Island (TMI) Unit No. 1 for a six, twelve and eighteen month period beginning in April 1981. Two summer and one winter peak load periods are considered in this analysis. This analysis, as per the verbal instructions of your office, considers the reliability impacts of a continuing plant outage from a Pennsylvania-New Jersey-Maryland Interconnection (PJM) regional power system viewpoint. Economic impact data is provided for only the plant owners. The DOE staff finds that the regional power supply adequacy and system operations will be negatively impacted by a continuing outage of the Three Mile Island Unit No. 1.

Overall generating capacity in the PJM area appears to be adequate t supply the projected loads. However, approximately 7500 megawatts (18 percent) of this capacity are in combustion turbine units which have a limited number of hours of operation. Such peaking units cannot displace a baseload power plant on a one-for-one long-term basis.

Projected load levels in the PJM region were exceeded by 1000 megawatts during the 1980 summer, such that the currently projected 1981 summer peak load is only 130 megawatts above that achieved in 1980. During the 1980 summer, the PJM region was forced into two "brownout" situations due to inadequate capacity. This condition existed even though a gross reserve margin of 7721 megawatts existed. Forced generating unit outages reduced the PJM area's generation capacity below the demanded load level and only the availability of emergency power from adjoining regions prevented a greater deterioation of the system conditions.

The projected 1981 summer power system reliability conditions are very dependent on the operation of the Salem Nuclear Unit No. 2 which does not yet have a full power license. The full net output of this Salem unit is equal to approximately 3.2 percent of the 1980 PJM peak load. TMI Unit No. 1's net full output is 2.3 percent of this same 1980 summer peak. Thus, the full operation of both of these units allows for only a 5.5 percent increase in loads with no consideration for a reserve margin. Since the 1980 summer peak exceeded the projected level causing system "brownouts", the operating of the TMI Unit No. 1 will minimize the probability of a reccurrence in 1981.

The PJM region's geographical area extends from the coal mining mountain regions to the highly populated Atlantic coast areas such as Baltimore, Maryland, Philadelphia, Pennsylvania, Washington, D.C., and Trenton, New Jersey. Many coal-fired power plants currently exist in the mountain or western PJM region. Since the great majority of the load is in the eastern metropolitan areas and nearly one-half of the region's generation is in western PJM, west-to-east power transmission is extremely important in PJM. Generating plants located in eastern PJM provide significant benefits in assuring proper system voltage levels and reducing system transmission line losses. TMI Unit No. 1 is located in eastern PJM providing voltage support in the eastern load area and reducing the dependence on the west-to-east power transmission lines. Such a reduction in dependence on the west-to-east transmission lines reduces system power losses, resulting in the more optimal use of the available generating resources and the required fuels.

In conclusion, the operation of the TMI Unit No. 1 during the forthcoming peak load periods will offer some major adequacy and reliability benefits to the PJM region.

The incremental increases in cost due to a continuing outage of TMI Unit No. 1 adds over one-half million dollars per day to the operating costs of the General Public Utilities System. Some of these costs are passed directly to the utility's customers while others are absorbed by the owning electric utilities. A recent report by the General Accounting Office on the financial conditions of the involved utilities describes some significant benefits to these utilities if the TMI Unit No. 1 could be returned to operation.

This analysis is intended to provide you with the appropriate power supply adequacy and reliability review. Please be cognizant that the analysis was accomplished using the best available data. Circumstances in the PJM interconnection region's power supply situation change on a daily basis, however, we believe that this analysis recognizes the more probable variations. Also, any significant changes, such as the mandated removal of other nuclear units in the PJM region, will require further analysis.

I would appreciate notification of any NRC action regarding the TMI Unit No. 1.

Sincerely

Richard E. Weiner

Richard E. Weiner
Director,
Division of Power Supply
and Reliability
Economic Regulatory Administration

Enclosure

ANALYSIS OF SYSTEM ADEQUACY
AND RELIABILITY AS A RESULT OF A CONTINUING
OUTAGE OF THE THREE MILE ISLAND UNIT NO. 1

The Three Mile Island (TMI) nuclear generating unit No. 1 is a Babcock and Wilcox pressurized water reactor with a maximum net dependable capacity of 776 megawatts. This plant is located near the city of Harrisburg, Pennsylvania and began commercial operation in September 1974. It is operated by the Metropolitan Edison Company, a subsidiary of the General Public Utilities Corporation (GPU). Pennsylvania Electric Company and Jersey Central Power and Light Company are also subsidiary organizations of GPU and the ownership at the Three Mile Island Unit No. 1 is divided as follows:

| | |
|---|---|
| Metropolitan Edison | 50% |
| Pennsylvania Electric | 25% |
| Jersey Central Power & Light | 25% |

All three utilities operate as integral elements of the Pennsylvania, New Jersey, Maryland Interconnection (PJM), which is a large power pool with many interconnecting transmission lines. Since this power pool operates as a single power control area, the system adequacy and reliability impacts of a continuing TMI Unit No. 1 outage will be spread across the entire PJM Interconnected system. Economic impacts from required power purchases (if available) or other actions to mitigate the outage of any large unit are primarily the responsibility of the plant's owners as specified in the PJM interconnection agreement. For these reasons the adequacy and reliability analysis considers the entire PJM region while the economic evaluation relates only to the GPU system.

The TMI plant has a very important influence on the operation of the bulk power transmission system in the PJM region due to its physical location in east central Pennsylvania. This influence can be primarily identified in terms of electric power system transfer limits internal to the PJM region and system voltage support. The transfer limits also have a major impact on the Department of Energy's "Coal-by-Wire" program to displace oil in the Atlantic and New England regions.

The peak load in the overall PJM region occurs during the summer period. Growth in peak load in the PJM region was

very low for the 1976-1979 time period. However, the very hot weather in the summer of 1980 caused a large increase in the area's peak load and the regional forecast was exceeded by over 1000 megawatts. Thus, the DOE has some concern with the currently available regional load projections which were prepared in the early spring of 1980. For the purposes of this analysis, regional generation reserve reliability calculations were done for the 198' summer peak load period, the 1981-82 winter peak load period and the 1982 summer peak load period using the early spring 1980 load projections.

During the periods considered in this analysis, the Salem Nuclear Unit No. 2, Susquehanna Nuclear Unit No. 1 and the oil-fired Chalk Point Unit No. 4 are scheduled to be placed in service. Delays in the service dates of these units will have a significant impact on the data and conclusions of this analysis.

Currently the PJM Interconnection's forecasted regional peak load for the summer of 1981 is 34,550 megawatts. This load level represents only a very minimal increase over the actual 1980 summer peak load of 34,420 megawatts. The winter of 1981-82 projection is 30,980 megawatts and the 1982 summer peak load is currently projected to be 35,610 megawatts. As stated above, these projections could be well under actual load levels if weather conditions like those of summer 1980 should recur.

Current net installed generation capability in PJM, excluding the two TMI units and other units not in an operable state, is approximately 42,905 megawatts in the summer and 45,414 megawatts in the winter. The components of this capacity are:

| | Summer Ratings | Winter Ratings |
|---|---|---|
| Coal-Fired Units | 15,510 megawatts | 15,900 megawatts |
| Nuclear Units | 5,420 megawatts | 5,510 megawatts |
| Oil-Fired Steam Units | 11,786 megawatts | 12,145 megawatts |
| Hydro-electric: (Run-of-River units) | 956 megawatts | 956 megawatts |
| Hydro-electric: (Pumped Storage Units) | 1,280 megawatts | 1,280 megawatts |
| Combustion Turbine Units | 7,493 megawatts | 9,218 megawatts |
| Other | 460 megawatts | 405 megawatts |
| Total | 42,905 megawatts | 45,414 megawatts |

When bulk power system generator reserve margins are determined on an overall PJM basis, the results are as follows:

1. Summer 1981

| | |
|---|---|
| Capability | 44,020 megawatts (includes Salem 2) |
| Peak Load | 34,550 megawatts |
| Gross Reserve Margin | 9,470 megawatts or 27.4 percent |

(Note: A 1000 megawatt error in the load forecast such as occurred in summer 1980 would reduce this reserve margin to 23.8 percent.)

2. Winter 1981-82

| | |
|---|---|
| Capability | 47,064 megawatts (Susquehanna 1 and Chalk Point 4 added) |
| Peak Load | 30,980 megawatts |
| Gross Reserve Margin | 16,084 megawatts or 51.9 percent |

3. Summer 1982

| | |
|---|---|
| Capability | 45,670 megawatts |
| Peak Load | 35,610 megawatts |
| Gross Reserve Margin | 10,060 megawatts or 28.3 percent |

It is evident from the above tabulations that the more critical periods occur in the summer. PJM, with a gross reserve margin of 7,721 megawatts or 22.4 percent was the only region of the country to initiate area wide "brownouts" (reductions in system voltage levels) during the summer of 1980. Historical data for forced generator outages in PJM during the summer indicate that 4,959 megawatts of capacity are unavailable on an average basis. During the 1980 brownouts a much larger quantity of generation was unavailable. Since the installed capacity of the PJM region includes 7,493 megawatts of combustion turbines which are designed for peaking use only, the extended daily summer load periods create a stress on these units. Higher levels of forced outages are more probable under these conditions. High forced outage levels coupled with the uncertainty concerning PJM's load forecasts increase the probability of brownouts during the 1981 and 1982 summer peak load periods.

Particular concern exists in the PJM region for electricity transfers from the coal-burning power plants in western PJM to the dense load areas in eastern Pennsylvania and New Jersey. Currently, the existing transmission lines provide about 6000 megawatts of power transfer capability between western and eastern PJM. Generator outages in eastern PJM sometimes cannot be supported by available generation in western PJM due to this power transfer constraint. When this occurs, voltage levels decline in the eastern portion of the system resulting in brownouts. An important 500 kilovolt transmission line (Housensack-Elroy) has been delayed for several years and is currently the subject of a court imposed injunction. This facility will increase the power transfer capability and mitigate the probability for power supply problems in PJM. However there is no specific date for the lifting of that injunction.

The Three Mile Island plant is located on the western edge of eastern PJM and could supply power without any west-east transmission constraints. The location of the TMI plant in PJM causes it to have the potential to provide significant voltage support for eastern PJM such that the probability of "brownout" situations is minimized. Also, the operation of TMI Unit No. 1 would cause the system power losses to be reduced and more efficient use of the limited capacity and fuels would result.

Finally, the physical location of TMI in the PJM area will cause it to displace oil equivalent to 100 percent of its output. This is estimated to average 19,041 barrels of oil per day if the historical capacity factor (56.8 percent) of the TMI unit No. 1 can be maintained. If the replacement residual oil is priced at $30.00 per barrel and the output of TMI was priced at 0.45 cents per kilowatt-hour (the current cost at Peach Bottom Unit No. 1), there is an average incremental increased cost of $523,627 dollars per day. These costs are solely the responsibility of the plant owners and are at least, in part, subsequently passed on to customers of the GPU subsidiaries.