

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
 )  
METROPOLITAN EDISON COMPANY, ) Docket No. 50-320  
 ET AL. )  
 )  
(Three Mile Island Nuclear Station, )  
 Unit 2) )

AFFIDAVIT OF CLARENCE R. HICKEY, JR.

Now comes Clarence R. Hickey, Jr., and being duly sworn, deposes and says as follows:

1. I am employed by the U.S. Nuclear Regulatory Commission as a fishery biologist. My professional qualifications appear in the transcript of this proceeding following Tr. 988.
2. I have prepared the attached Assessment of Revised 401 Certification, and I hereby certify that the answers given are true and correct to the best of my knowledge.

*Clarence R. Hickey, Jr.*  
Clarence R. Hickey, Jr.

Subscribed and sworn to before me  
this 12 day of December, 1977

\_\_\_\_\_  
Notary Public

My Commission expires: \_\_\_\_\_

**POOR ORIGINAL**

8002070 553

## MRC STAFF'S ASSESSMENT OF REVISED 401 CERTIFICATION

### Introduction

On November 9, 1977, the Commonwealth of Pennsylvania revised the 401 Certification previously issued on June 22, 1977 for the Three Mile Island Nuclear Station, Unit 2 (copy attached). The revised sections pertain to thermal effluent limitations, each of which is discussed below in relation to potential environmental impact and previous MRC Staff impact assessments. It should be recognized that these thermal effluent limitations are maxima which are not to be exceeded. In addition, the revised 401 Certification provides that the licensee "shall at all times maintain in good working order and operate the Mechanical Draft Cooling Towers (MDCT's) as efficiently as possible so as to minimize temperature differential between ambient river temperature and the temperature of the discharge." The analyses of the potential impacts of thermal effluent discharged at the maximum allowable limits therefore represents a conservative or worst case assessment. Operation at less than the maxima should result in reduced potential for impact.

### Assessment

#### 1. Section 1.c.2.b.

"The temperature of the discharge shall never exceed a maximum of 87°F, except when the ambient river temperature exceeds 87°F, in which case, the discharge temperature shall not exceed the ambient river temperature; the temperature of the discharge shall not change by more than 5°F during any one hour period."

**POOR ORIGINAL**

These thermal effluent limitations also appeared in the previous 401 Certification, issued July 22, 1977. The potential impacts of an 87°F (30.6°C) maximum discharge temperature have previously been reviewed by the Staff and found acceptable. See FES § V.B.2, pp. V-10 to V-12, and "NRC Staff Response to Licensing Board's Question Relating to Aquatic Impacts by Clarence R. Hickey, Jr.," following transcript page 988, at pp. 36-38.

The previous rate of temperature change assessed by the Staff was 2°F per hour (1972 FES, pages V-11 and V-12). The present limitation of 5°F (2.8°C) rate of change per hour should not impose an environmental risk upon the fish species present in the Susquehanna River near Three Mile Island. Since the maximum discharge temperature allowable during normal operation (30.6°C) is within the tolerance limits of important river species, the 2.8°C per hour rate of change should not result in an unacceptable impact. Only during periods of maximum and minimum ambient temperature and reactor cooldown would the excess temperature and rate of change possess the potential for impact, and then only to those species in the immediate vicinity of the discharge. This potential impact was reviewed previously and found not to pose an unacceptable situation. (Hickey on Aquatic Impacts at 37-38.)

**POOR ORIGINAL**

The revised 401 Certification has deleted a requirement that the temperature of the discharge shall be no more than 5°F above the ambient temperature of the receiving stream. Instead, the Commonwealth has expanded the applicability of what were previously exceptions to the 5° temperature rise limitation. The effects of these new limitations are discussed below.

4. Section 3.6.2.c.1

"During the period of November 1 through April 30, the temperature of the discharge shall not exceed 12°F above ambient river temperature."

During the period of November 1 through April 30, the range of ambient temperatures to be expected in the Susquehanna River (Hickey on Aquatic Impacts, Table 16, p. 42) and the incremental increase in 12°F (6.7°C) would be as follows:

	<u>Minimum</u>	<u>Mean Low</u>	<u>Maximum</u>	<u>Mean High</u>
Ambient	0.6	1.5	14.0	8.9
Ambient & ΔT 6.7°	7.3	8.2	20.7	15.6

These temperatures fall within the tolerance limits of the fish species in the Susquehanna River and should not result in unacceptable impact. This degree of excess temperature could result in attraction of some species to the discharge area during the cool winter months, but should not impose undue stress upon them. During a planned reactor shutdown,

**POOR ORIGINAL**

the potential for cold shock will be minimized due to the rate of change limitation. Since the discharge is common to both Units 1 and 2, thermal effluent from one unit would continue to flow during shutdown of the other unit. Any stress to fishes as a result of shutdown would be confined to the immediate discharge area.

3. Section 3.c.2.c.i

"During the period May 1 through October 31, the temperature of the discharge shall not exceed 7°F above ambient river temperature."

The potential effects of a discharge temperature of 7°F (3.9°C) above ambient were discussed in the December 1976 Final Supplement to the FES (Section 5.5.2.3, p. 5-23) and in Staff testimony (Hickey on Aquatic Impacts, p. 37) and found to be acceptable. This lower permissible discharge temperature coincides with periods of maximum fish spawning (May-June), young-of-the-year appearance (summer-fall), and low annual river flows. The low discharge temperatures of 3.9°C during this period should adequately protect the resident fishes from unacceptable environmental impact.

4. Section 3.c.2.c.ii

"During plant cooldown operations, the temperature of the discharge shall not exceed 12°F above ambient river temperature."

A temperature rise of 12°F (6.7°C) during cooldown was assessed by the Staff (Hickey on Aquatic Impacts, p. 37-38) and found to be acceptable. Other potential consequences of cooldown are discussed above in paragraph 1.

**POOR ORIGINAL**

Conclusion

The Staff has reviewed the potential environmental impacts of the thermal effluent limitations contained in revised 401 Certification, issued November 9, 1977, and finds that the changes made in previous thermal effluent limitations do not affect the Staff's original conclusions that the effects of the thermal discharge from the TMI-2 facility will not pose an unacceptable adverse impact on the aquatic ecosystem of the Susquehanna River.

**POOR ORIGINAL**

COMMONWEALTH OF PENNSYLVANIA



DEPARTMENT OF ENVIRONMENTAL RESOURCES

Room 1002 Health & Welfare Building

Harrisburg, Pennsylvania 17120

(717) 787-9665

November 9, 1977

Mr. Bruce P. Smith  
Permits Branch  
U.S. Environmental Protection Agency  
Sixth and Walnut Streets  
Philadelphia, Pennsylvania 19106

EPA Application PA000920  
Metropolitan Edison Company  
Three Mile Island Nuclear Station  
Loudonderry Township  
Dauphin County

Dear Mr. Smith:

The Commonwealth of Pennsylvania hereby certifies to the following and thus invalidates all past certifications:

1. The Amendments Nos. 1 and 2 issued 12/29/76 and 5/20/77 respectively for the National Pollutant Discharge Elimination System Permit for subject discharger were forwarded to the Commonwealth of Pennsylvania pursuant to the provisions of Section 401 of the Federal Water Pollution Control Act Amendments of 1972.
2. The effluent limitations and other limitations, and monitoring requirements as proposed in the tentative permit amendments submitted for our review:
  - a. Assure that the applicant will comply with applicable effluent limitations under Section 301 or 302, standards of performance under Section 306, or prohibition, effluent standards, or pre-treatment standards under Section 307 of the FWPCA Amendments of 1972 where they are presently applicable;
  - b. Shall become a condition of a Federal NPDES permit pursuant to Section 402 of the FWPCA Amendments.
3. This certification is subject to the following conditions:
  - a. That the Permittee complies with Pennsylvania's Clean Streams Law.
  - b. That the Permittee complies with Industrial Waste Permits 2270204 and 2272202, and Sewerage Permit 2275419 issued by the Department of Environmental Resources.

**POOR ORIGINAL**

c. The following effluent limitations should be imposed:

1. Discharge 101 - Effluent of sewage treatment facilities

Total phosphorus shall not exceed 2 mg/l on an average basis, nor 4 mg/l at any time.

2. Discharge 001 - Combined Mechanical Draft Cooling Tower Blowdown.

a. The permittee shall at all times maintain in good working order and operate the Mechanical Draft Cooling Towers (MDCT's) as efficiently as possible so as to minimize temperature differential between ambient river temperature and the temperature of the discharge; provided, however, the MDCT's may be shut down when in the judgment of the responsible TMI's personnel a combination of atmospheric conditions and river temperature may exist which causes the waste water to be heated as it passes through the MDCT's or ice formation is observed to occur within the MDCT's.

b. The temperature of the discharge shall never exceed a maximum of 87° F, except when the ambient river temperature exceeds 87° F, in which case, the discharge temperature shall not exceed the ambient river temperature; the temperature of the discharge shall not change by more than 5° F during any one hour period.

Ambient river temperature is the temperature of the river upstream of the heated waste discharge. The ambient temperature sampling point should be unaffected by any sources of waste heat. The temperature of the intake water will be considered as ambient river temperature so long as the intake water is unaffected by TMI's or any other nearby heated water discharge.

c. The following temperature limitations shall never be exceeded:

1. During the period November 1 through April 30, the temperature of the discharge shall not exceed 12° F above ambient river temperature.

2. During the period May 1 through October 31, the temperature of the discharge shall not exceed 7° F above ambient river temperature.

**POOR ORIGINAL**



November 9, 1977

3. During plant cooldown operations the temperature of the discharge shall not exceed 12° F above ambient river temperature.
  - d. At no time shall the discharge exceed the rate of 150 million gallons per day.
  - e. The Chief of the Operations Section of the Harrisburg Regional Office of the Bureau of Water Quality Management shall be advised by telephone within 24 hours when the MDCT's are shut down for reasons other than those specified in condition 2(a) above and again when tower operation is resumed; shall be notified within 24 hours when the discharge limitations specified in paragraph 2(c) above are exceeded and again when the discharge is in compliance with such limitations; and shall be notified, at least thirty (30) days in advance, whenever possible of all scheduled plant cooldown operations.
  - f. Within two years after both nuclear reactor units are in commercial operation, the Metropolitan-Edison Company will collect and submit to the Department of Environmental Resources stream data which accurately defines the thermal plume or zone of impact from the THNS heated waste discharge. As a minimum, thermal plume mapping data collected to meet the Nuclear Regulatory Commission's requirements shall be submitted to the Pennsylvania Department of Environmental Resources.
  - g. That the Permittee submit to the Pennsylvania Department of Environmental Resources within ninety (90) days of issuance of Amendment No. 1 to the NPDES permit, an application for a new Pennsylvania Water Quality Management permit for the facilities associated with the thermal component of discharge 001.
4. We certify that the final effluent limitations contained herein and in the attached NPDES permit, to the extent that they are not inconsistent with the limitations herein, are those effluent limitations which are required to achieve the federally approved water quality criteria for the receiving stream. We also certify that the compliance schedule therein is reasonable. We do not certify that the applicant for an NPDES permit is now in compliance with our effluent limitations or permit requirements established pursuant to the Clean Streams Law, Act of June 22, 1937, P.L. 1987, as amended, 35 P.S. 691.1 or that such source is discharging in compliance with the terms or conditions of a state permit. Nor do we certify that by attaining the interim standards contained in the NPDES permit that such source will be in compliance with the aforementioned Clean Streams Law and the Rules

**POOR ORIGINAL**

November 9, 1977

and Regulations thereunder. By certifying the final effluent standards and the schedule for compliance to be contained in the NPDES permit, we do not waive our right to prosecute either civilly or criminally all past, present and future violations of our Clean Streams Law and the Rules and Regulations thereunder. Nor do we waive our right to modify final effluent requirements as is necessary to comply with Pennsylvania Law.

5. This certification by the Department may be appealed to the Environmental Hearing Board, First Floor Annex, Blackstone Building, 112 Market Street, Harrisburg, PA (717) 787-3483, by any aggrieved person pursuant to the Act of December 3, 1970, P.L. 834, 71 Pa. Stat. Anno. §510-1 et seq. and the Administrative Agency Law, the Act of June 13, 1945, P.L. 1383, as amended 71 Pa. Stat. Anno. §1710.1 et seq. Appeals must be filed with the Environmental Hearing Board within thirty (30) days of service of this certification unless the appropriate statute provides a different time period. Copies of the appeal form and the Department's regulations governing practice and procedure before the Board may be obtained from the Board.

Very truly yours,

*Frederick A. Marrocco*

Frederick A. Marrocco, Chief  
Planning Section  
Harrisburg Regional Office

FAM:key

cc: Metropolitan Edison Company

**POOR ORIGINAL**