ASSESSMENT OF BIOLOGICAL IMPACTS OF INCREASING THE ΔT LIMITATION AT NINE MILE POINT UNIT 1

for

NIAGARA MOHAWK POWER CORP.

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1.0 PROPOSED CHANGE IN DISCHARGE CONDITIONS

1.1 PROPOSED IN-PLANT CHANGE

It is proposed that the limitation on the heat rejection rate for the plant be increased from 4.20 BBtu/hr (billion Btu/hr) to 4.38 BBtu/hr, representing a 4.3% increase. The condenser temperature rise limitation is also proposed to increase from 32 to 36 F (17.8 to 20.0 C), a 12.5% increase as a result of the increased heat rejection rate and the possibility of cooling water flow rate below the design value. Since the service water discharges down stream of the condenser outlet, the corresponding station cooling water temperature rise across the plant would not exceed 35 F (19.4 C) under the proposed condition. The effect of this heat rate and ΔT modification on the discharge plume characteristics is described below.

1.2 RESULTANT CHANGES IN THERMAL PLUME

Analyses of the existing NMP-1 thermal plume are summarized in the 316(a) demonstration. That report concluded that the surface discharge zone bounded by the 2 C isotherm is larger than 160 acres 30% of the time, and that the volume of the 2 C isotherm plume exceeds 350 acre-ft 30% of the time with a calculated mean depth of the discharge zone of 2.19 ft. Due to the stochastic nature of the plume, however, on any date the plume may be larger, smaller, or different in shape from the plumes measured during historical surveys.

Since the proposed changes in heat rejection and temperature rise are small when compared with the existing discharge conditions, the plume dynamics and shape will be similar to those observed and documented for the existing discharge but temperatures will be slightly warmer.

Thermodynamic principles of heat dissipation to the atmosphere dictate that, on the average, plume temperatures will be 4.3% warmer under the proposed operating limitations. The temperature rise near the discharge, however, where dilution determines the plume temperature, will be approximately 12.5% warmer than with the present limitation. Farfield temperature rises will be less than 4.3% warmer under the proposed limitations. The historical 2 C discharge zone will be less then 12.5% warmer under the proposed discharge limitations resulting in extended areas within all isotherms. The 2 C plume will be less than 50% larger than the existing 2 C plume. Thus, the present 160 acre discharge zone is predicted to be less than 240 acres at the proposed limitation.

2.0 THERMAL EFFECTS ON REPRESENTATIVE IMPORTANT SPECIES

The material in this section provides information on each species and an assessment of expected effects of the proposed temperature rise condition. Lethal thermal thresholds and thermal preferenda are discussed and data summaries are provided in Appendix A. It is recognized that many of the thermal studies were conducted under laboratory conditions, and the data gathered may not precisely reflect responses in the field. Furthermore, definitive studies have not yet been carried out for all species of concern. Nevertheless, sufficient thermal data are available so that inferences can be drawn regarding effects of the proposed temperature rise limitation.

The previously submitted 316(a) demonstration for the station describes the biological community near the existing discharge and utilizes these data to demonstrate an "absence of prior appreciable harm" due to operation of the discharge. The purpose of the present document is to evaluate the increased temperature limitation impacts due to entrainment of plankton through the plant and potential exposure to the thermal plume.

Plant entrainment impacts for the adjacent James A. FitzPatrick Nuclear Power Plant were evaluated in the 316(b) demonstration submitted for that plant. Since that station is within a mile of NMP-1 and uses a similar circulating water system, those results may be applied to the NMP-1. For those evaluations entrained ichthyoplankton survival was assumed to be zero; an increase in the plant temperature limitation has no effect on that estimated impact. Gammarus fasciatus survival was derived from existing data and was shown to range from 0 to 100% for existing plant operating conditions. The typical rate is near 70%. Under the proposed new

temperature limitation some decrease in the survival rate should be anticipated when the plant is operating at its maximum temperature rise and during the summer period. Since G. fasciatus are primarily benthic and epibenthic, and the estimated impacts of the present operation are on the order of one-half of a percent of the adjacent population, a decrease in Gammarus survival does not represent a substantive concern.

Thermal data for the representative important species are given in Appendix A and summarized in Table 2.0-1. Depending on data availability, lethal thresholds and preferenda are provided for a range of acclimation temperatures to encompass the spectrum of ambient temperatures found in Lake Ontario. In the lake, winter water temperatures often range from 0 to 4 C, while during the period of warmest water temperatures (June - September) the ambient temperature of 23.3 C is exceeded 10% of the time at Nine Mile Point. The mean summer ambient temperature is 19.4 C.

It is important to note here, referring to Section 2.2, that a 2.2 C (4 F) increase in the temperature rise across the plant cannot be translated to an equivalent temperature rise in the lake. Dilution, turbulence, and entrainment of lake water all result in rapid cooling of the discharge water. Plume isotherms in the nearfield will be no more than 12.5% warmer under the proposed limitation, and in the farfield will be less than 4.3% warmer. Based on initial dilution, the maximum surface temperature rise above ambient temperature will be about 7.8 C (14.0 F) at capacity operation; at mean summer ambient temperature (19.4 C) the maximum surface plume temperature will be 27.2 C.

The available lethal thresholds for representative important species are listed in Table 2.0-1. Since many of these thresholds were measured with acclimation temperatures below the normal summer

Lake Ontario ambient temperature, the thresholds listed may, in some cases, be conservatively low when applied to the NMP-1 plume.

In the turbulent, high velocity nearfield region where the buoyant effluent is rising through the water column, temperatures will be 7.8 to 20.0 C above the ambient temperature for full capacity plant operation. During mean summer ambient conditions, the maximum temperature to which fish will be exposed outside of this region will be 27.2 C. Table 2.0-1 illustrates that the upper lethal threshold may be exceeded in the thermal plume downstream from the initial jet portion of the discharge for only three species: coho salmon (Oncorhynchus kisutch), brown trout (Salmo trutta), and rainbow smelt (Osmerus mordax).

These three species are the same taxa for which the existing plume exceeds upper thermal thresholds. Thus, the proposed plume would not affect any additional species. Furthermore, as in the existing plume, rapid effluent dilution minimizes the plume area where thresholds are exceeded. Thermal preferenda indicate that these species may avoid all lethal areas of the plume. This would result in movement away from the central portion of the plume. Also, these three species are normally associated with cold water habitats and their natural thermal preference would limit the number of each species in the warmer nearshore zone during the summer months.

Interestingly, summer lethal temperatures reported for rainbow smelt range from 21.5 to 28.5 C, the lower portion of the range exceeding periodic ambient summer thermal regimes. This observation is consistent with the qualification to be applied to some laboratory results: where no temperature gradient is provided in the laboratory, the preferenda data may not be directly comparable to the field situation and should perhaps be considered as a "worst case" situation. Thus, under field conditions, the summer lethal

temperatures that should be used are probably those nearer to the highest acclimation temperatures presented in Table 2.0-1.

Thermal tolerence data compiled for larvae and juveniles (Appendix A) are incomplete, but agree with the conclusions of de Sylva (1969) and Brown (1974) who found higher lethal tolerances for the younger lifestages as compared to the adults. The literature suggests that thermal tolerance data based on adult organisms are generally adequate to protect the younger members of the population.

A final impact of the thermal plume is the potential that during the winter the plume will sink and 4 C water will contact the eggs of previously indigenous winter spawning species (e.g., lake trout and lake whitefish). This elevation in temperature would induce premature hatching and increase prehatch mortality. However, the Nine Mile Point vicinity has never been reported as a spawning habitat for these species, presumably because of the lack of cobble-boulder reef-like structures which these species utilize. Therefore, it is unlikely that this impact will occur.

Table 2.0-1

THERMAL DATA SUMMARY FOR ADULT
LIFESTAGE OF REPRESENTATIVE IMPORTANT SPECIES

Species	Upper Lethal Threshold (°C) Acclimation	Threshold	Preferred Temperature (°C) Acclimation	Preferendum
Alosa pseudoharengus	5	24.7	1- 4	11.0
	10	20.0	5- 9	16.0
	15	23.0	10-12	16.0
	20	23.0	15-18	16.0
	25	32.8	Spring	21.2
Gasterosteus aculeatus	19	25.8	-	16.0
	20	27.2		
	-	31.7-33.0		
Micropterus dolomieui		35	Winter	12-13
			Spring	15-16
			Summer	30.0, 21-27
			Fall	21-23, 26.6
Morone americana	1.1	6.6		
	24.8	34.7		
Notropis hudsonius	11	30.8	-	14.0
	7	30.3	Winter	10.2
			Spring	14.5
Oncorhynchus kisutch	-	21	Winter	13
			-	16.6
Osmerus mordax	-	21.5-28.5	-	7.2
			-	6.6-8.3
Perca flavescens	5	21.3	Winter	7-12, 14.1
	10	25	Spring	13-16
	9-18	13-28	Summer	27.0
	22-24	29-30	10	17.0
	25	29.7	20	20.5
Salmo trutta	-	23.5		
	14-18	25		
	-	25-27		
Gammarus fasciatus	1- 3	27.9		
	10-11	31.0-32.0		
	19.8	34		
	25	37		

3.0 SUMMARY

Niagara Mohawk Power Corporation has determined that additional electrical generating capacity is possible from NMP-1 if the plant's heat rejection rate limitation and cooling water temperature limitation are increased. It is proposed that the maximum heat rejection rate be increased from 4.20 to 4.38 billion Btu/hr and that the condenser temperature rise limitation be increased from 32 to 36 F (17.8 to 20.0 C). This amounts to heat rejection rate and condenser temperature rise increases of 4.3 and 12.5%, respectively. The existing discharge zone (as defined by the area heated more than 2 C more than 30% of the time) encompasses approximately 160 acres of suface area and a volume of 350 acre-ft.

Since the proposed changes in heat rejection and temperature rise are small in comparison with the existing discharge conditions, the plume dynamics and shape under the proposed condition will be similar to those documented and observed for the existing discharge. The plume temperatures will, on the average, be 4.3% warmer; in the nearfield, temperatures may be as much as 12.5% warmer where dilution determines the plume temperature. The present 160 acre discharge zone is predicted to be less than 240 acres at the proposed limitation. Under the proposed temperature rise conditions the plume area includes local temperatures which exceed the lethal threshold for only the same three species whose thresholds are locally exceeded by the existing plume.

Baseline aquatic ecological studies (dating as far back as 1963) have demonstrated that the aquatic populations in the vicinity of NMP-1 are similar to the littoral zone populations of Lake

Ontario. The previously submitted 316(a) demonstration for NMP-1 shows that, as a whole, the aquatic community is intact, and hence, that no appreciable harm has resulted from station operation.

During mean summer ambient conditions, the maximum temperature to which fish will be exposed outside of the turbulent, high velocity nearfield region will be 27.2 C. The upper lethal threshold may be exceeded in the thermal plume downstream from the initial jet portion of the discharge for only three species: coho salmon (Oncorhynchus kisutch), brown trout (Salmo trutta), and rainbow smelt (Osmerus mordax). The three species are the same taxa for which the existing plume potentially exceeds upper thermal thresholds. Thus, the proposed plume would not affect any additional species. Furthermore, thermal preferenda indicate that these species may avoid all lethal areas of the plume.

APPENDIX A

FISH TEMPERATURE DATA SHEET

SPECIES: Alewife (Alosa pseudoharengus)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper	10		26.5	20	3,9
	15			23	5
	20		30.3	23	3,9
	25			32.8	9
	5			24.7	9
	Summer			26.7-32.2	6
	Summer		23		3
Lower	17			7	4

II. Growth[a/]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b/]]				

III. Reproduction:	Optimum	Range	Months	Data Source
Migration				
Spawning		15.6-27.7		4
		13-16		2
Incubation and hatch		15.5-22 for 6 to 2 days		1
	17.7			7

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
	1-4		19.0	11.0	9
	Spring			21.2	8
	15-18		25.0	16.0	9
	10-12		24.0	16.0	9
	5-9		21.0	16.0	9

[a] As reported or net growth (growth in weight minus weight of mortality).
[b] As reported or to 50% of optimum if data permit.
[c] Data sources:

1. Rounsefell and Stringer 1943
2. Threinen 1958
3. Graham 1956
4. U.S. Dept. of Interior 1970
5. Altman and Dittmer 1966
6. Trembley 1960 for LD 50
7. Edsall 1970
8. Reutter and Herdendorf 1974
9. Otto et al. 1976

FISH TEMPERATURE DATA SHEET

SPECIES: Brown trout (Salmo trutta)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper				23.5	5
	14-18			25	3
				25-27	9
Lower					

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b]]			18.3-23.9	2
			8-17	4
			12	6
			12.4-17.6	7

III. Reproduction:	Optimum	Range	Months	Data Source
Migration				
Spawning		6.7-8.9	Oct-Nov	1
Incubation and hatch	7.3 for 64 days 10.0 for 41 days	1.9-11.2		8,10

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source

[a]As reported or net growth (growth in weight minus weight of mortality).
[b]As reported or to 50% of optimum if data permit.
[c]Data sources:

1. Mansell 1966
2. Brynildson et al. 1963
3. Klein 1962
4. Brett 1970
5. Bishai 1960
6. Swift 1961
7. Ferguson 1958
8. Bardach et al. 1972
9. Fry 1947
10. Embody 1934

FISH TEMPERATURE DATA SHEET

SPECIES: Coho salmon (*Oncorhynchus kisutch*)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper	5		23		1
	10		24	21*(3)	1,3
	15		24		1
	20		25		1
	23		25		1
Lower	5		0.2		1
	10		2		1
	15		3		1
	20		5		1
	23		6		1

*Acclimation temp. unknown

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and		15*		2
[range[b]]		(5-17)		6

*unlimited food

III. Reproduction:	Optimum	Range	Months	Data Source
Migration		7-16(5)		5
Spawning		7-13(3)	Fall	3
Incubation and hatch			Winter-Spring	

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
	Winter			13	4
	Spring		11.4		7
				16.6	8

[a] As reported or net growth (growth in weight minus weight of mortality).
[b] As reported or to 50% of optimum if data permit.
[c] Data sources:

1. Brett 1952
2. Great Lakes Research Laboratory 1973
3. Anonomous 1971
4. Edsall 1970
5. Burrows 1963
6. Averett 1968
7. Reutter and Herdendorf 1974
8. Spigarelli 1975

FISH TEMPERATURE DATA SHEET

SPECIES: Rainbow smelt (*Osmerus mordax*)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper				21.5-28.5	1
Lower					

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b]]				

III. Reproduction:	Optimum	Range	Months	Data Source
Migration			March-April	5
Spawning	8.9			2
Incubation		11-15	June	4
and hatch		6-10 for 29 to 19 days		3

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
				7.2	6
				6.6-8.3	7

[a] As reported or net growth (growth in weight minus weight of mortality).
[b] As reported or to 50% of optimum if data permit.
[c] Data sources:

1. Altman and Dittmer 1966
2. Scott and Crossman 1973
3. McKenzie 1964
4. Sheri and Power 1968
5. QLM 1975
6. Hart and Ferguson 1966
7. Galligan 1951

FI[illegible] TEMPERATURE DATA SHEET

SPECIES: Smallmouth bass (*Micropterus dolomieui*)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper		38* (9)	35 (3)		9,3
Lower	15(3)	4(9)*	2(3)		3,9
	18		4		3
	22		7		3
	26		10		3

*Acclimation temperature not given

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b]]	28-29(2)	26(3)		2,3

III. Reproduction:	Optimum	Range	Months	Data Source
Migration				
Spawning	17-18(5)	13(8)-21(7)	May-July(8)	5,7,8
	16.1-18.3	12.8-20.0		11
Incubation and hatch			May-July	

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
	Summer			21-27	6
	Winter			>8*(1)-28(4)	1,4
	21			20.3-21.3	4
				20-30**	10
	Winter		18.0	12-13	12
	Spring		19-24	15-16	12
	Summer		31.0	30.0	12
	Fall		24-27	21-23	12
	Fall			26.6	13

*Life stage unknown
**Avoidance

[a] As reported or net growth (growth in weight minus weight of mortality).
[b] As reported or to 50% of optimum if data permit.
[c] Data sources:

1. Munther 1968
2. Peek 1965
3. Horning and Pearson 1973
4. Ferguson 1958
5. Breder and Rosen 1966
6. Emig 1966
7. Hubbs and Baily 1938
8. Surber 1943
9. Larimore and Duever 1968
10. Cherry et al. 1975
11. Scott and Crossman 1973
12. Barans and Tubb 1973
13. Reutter and Herdendorf 1974

FISH TEMPERATURE DATA SHEET

SPECIES: Spottail shiner (*Notropis hudsonius*)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper	11			30.8	1
	7			30.3	1
Lower					

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b]]				

III. Reproduction:	Optimum	Range	Months	Data Source
Migration				
Spawning	20			3,4
Incubation and hatch				

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
				14	2
	Winter			10.2	5
	Spring			14.5	5

[a]As reported or net growth (growth in weight minus weight of mortality).
[b]As reported or to 50% of optimum if data permit.
[c]Data sources:
1. Trembley 1961 for LD 50
2. Meldrim and Gift 1971
3. Peer 1961
4. Carlander 1969
5. Reutter and Herdendorf 1974

[illegible]H TEMPERATURE DATA SHEET

SPECIES: Threespine stickleback (Gasterosteus aculeatus)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper	19			25.8	1
	20			27.2	2
				31.7-33	3
Lower					

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b]]			<37.1	3

III. Reproduction:	Optimum	Range	Months	Data Source
Migration				
Spawning				
Incubation and hatch		19 for 7 days		4

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
				16	5

[a] As reported or net growth (growth in weight minus weight of mortality).
[b] As reported or to 50% of optimum if data permit.
[c] Data sources:

1. Blahm and Parente 1970
2. Jordon and Garside 1972
3. Altman and Dittmer 1966
4. Breder and Rosen 1966
5. Garside et al. 1977

FISH TEMPERATURE DATA SHEET

SPECIES: White perch (*Morone americana*)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper	1.1			6.6	1*
	24.8			34.7	1*
Lower					

*Minimum avoidance temperature

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b]].			23.9	1

III. Reproduction:	Optimum	Range	Months	Data Source
Migration				
Spawning		11-15	May-June	3
Incubation and hatch		15-20 for 4.5-1.2 days		2

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
			32		1

[a] As reported or net growth (growth in weight minus weight of mortality).
[b] As reported or to 50% of optimum if data permit.
[c] Data sources:

1. Meldrim and Gift 1971
2. Scott and Crossman 1973
3. Sheri and Power 1968

FISH TEMPERATURE DATA SHEET

SPECIES: Yellow perch (*Perca flavescens*)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper	5			21.3	1
	9-18			13-22	12
	10			25	1
	22-24			29-30	2
	25			29.7	3,1
Lower	25		4		1

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b]]			13-20	5,6

III. Reproduction:	Optimum	Range	Months	Data Source
Migration				
Spawning	12(11),8-10	7.2-12.8 (9)		9,11,14
Incubation and hatch		5-10 (10)	March-June(11)	10,11

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
				21-24	4,15
				19.7 (field)	4,15
	20	24.3	19.3	17.0	4,15
	23	24.2	23.0	20.0	4
	25	21.7	23.1	20.5	4
				10-29	7
	24		20.23		8
	Winter		10-13	7-12	7
	Winter			14.1	13
	Spring		18.0	13-16	7
	Summer		25-27	27.0	7

[a]As reported or net growth (growth in weight minus weight of mortality).
[b]As reported or to 50% of optimum if data permit.
[c]Data sources:

1. Hart 1947
2. Black 1953
3. Brett 1956
4. Ferguson 1958
5. Coble 1966
6. Weatherley 1963
7. Barans and Tubb
8. McCauley and Read 1973
9. Breder and Rosen 1966
10 QLM 1975
11. Jones et al. 1973
12. Everest 1973
13. Reutter and Herdendorf 1974
14. Sztramko and Teleki 1977
15. Ross et al. 1977

FISH TEMPERATURE DATA SHEET

SPECIES: Gammarus fasciatus (Amphipoda)

I. Lethal threshold:	Acclimation Temperature (C)	Larvae	Juvenile	Adult	Data Source[c]
Upper	1-3			27.9	5
	2.5 C			28 C*	1
	11 C			31 C*	1
	19.8 C			34 C	1
	25 C			37 C*	1
	10			31.0	5
	11			32.0	5
Lower					

*30 minute TLm for Gammarus sp. in Hudson

II. Growth[a]	Larvae	Juvenile	Adult	Data Source
Optimum and [range[b]]	interval between moults	6-11 days (18 C) 4-11 days (21 C) 3-6 days (25 C)	8-15 days	(21 C) 2

III. Reproduction:	Optimum	Range[d]	Months	Data Source
Spawning	Summer	lower limit = 10 C(fall) lower limit = 4 C(spring)		2
Incubation and hatch	7 days at 24 C; 9 days at 20 C; 14 days at 18 C; 22 days at 15 C			2

IV. Preferred:	Acclimation Temperature	Larvae	Juvenile	Adult	Data Source
	prefers cool waters				

[a]As reported or net growth (growth in weight minus weight of mortality).
[b]As reported or to 50% of optimum if data permit.
[c]Data sources:

1. Lauer et al. 1974
2. Clemens 1950
3. Pentland 1930
4. Embody 1912
5. Burton et al. 1976

[d]Reproduction at 30 C.

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ATTACHMENT 2

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233
Division of Water

Robert F. Flacke
~~Peter A. A. Berle~~,
Commissioner

July 3, 1980

Mr. John M. Toennies
Environmental Affairs Director
Niagara Mohawk Power Corp.
300 Erie Boulevard West
Syracuse, NY 13202

Re: Request for SPDES Permit Mofification
Niagara Mohawk Power Corporation
Nine Mile Point Unit 1 and Unit 2
SPDES #NY-000 1015
Scriba (T), Oswego

Dear Mr. Toennies:

This is to acknowledge receipt of your request for the modification of the cooling water discharge temperature limits in the Nine-Mile Point SPDES permit. The material consists of engineering calculations and an "Assessment of Biological Impacts of Increasing the ΔT Limitation at Nine-Mile Point Unit 1." Specifically, your request to modify states that: the discharge temperature shall not exceed 46.1°C (115°F); the discharge - intake temperature difference shall not exceed 19.4°C (35°F); the net rate of addition of heat to the receiving water shall not exceed 1.11 billion kilocalories/hr (4.38 billion BTU/hr).

After review of the engineering calculations, it appears that this request is reasonable and will not violate either the thermal criteria or the water quality standards.

If the Company has an excursion and proceeds to the requested limits, both physical and biological monitoring shall be performed to verify that the thermal criteria and standards are not violated. The monitoring results shall be submitted to this Department for consideration along with your existing 316 (a) and (b) requests.

The formal SPDES permit modifications will be processed as rapidly as possible under the rules and regulations as outlined under the law.

Very truly yours,

George K. Hansen

George K. Hansen, P.E.
Chief, PDES Permit Section
Division of Water

GKH/fd