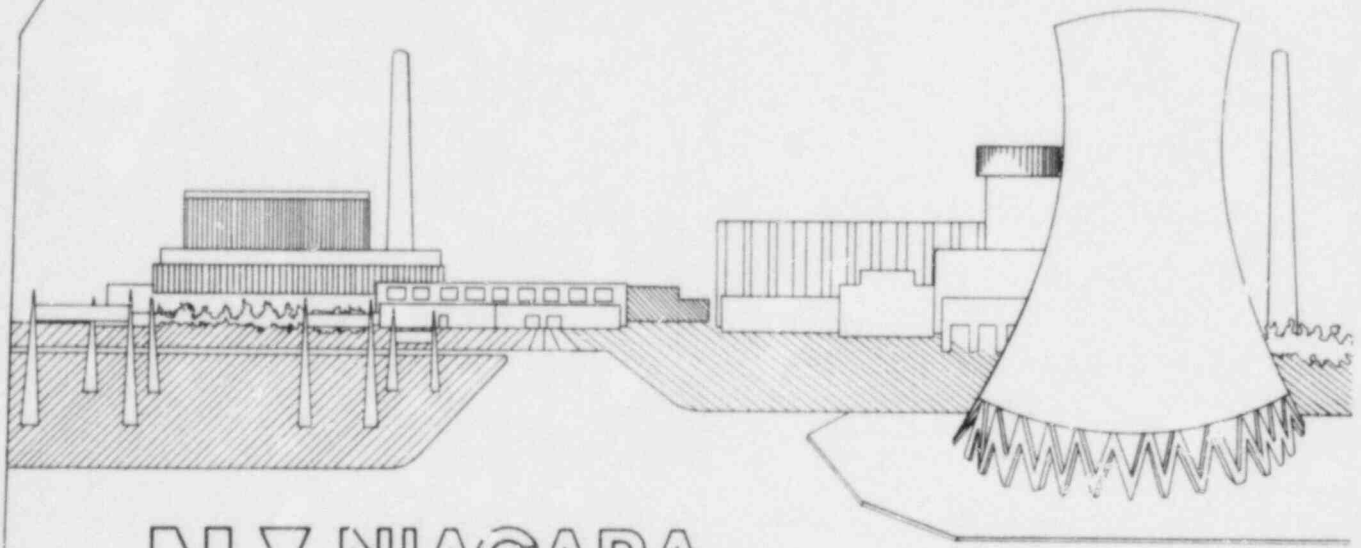
ENVIRONMENTAL REPORT

OPERATING LICENSE STAGE

NINE MILE POINT NUCLEAR STATION — UNIT 2



NIAGARA MOHAWK

SUPPLEMENT 3

NINE MILE POINT NUCLEAR STATION UNIT 2
NIAGARA MOHAWK POWER CORPORATION

FSAR AMENDMENT/ER-OLS SUPPLEMENT
RECEIPT ACKNOWLEDGMENT

Name of set holder _____ Set No. _____

I acknowledge receipt of:

Amendment 4
Supplement 3

My copy has been updated, and superseded pages have been removed and destroyed.

Set Reassignment and/or Set Holder Change of Address
(if necessary)

Please reassign this manual to, and/or change my address as follows:

_____

_____

_____

_____

Please sign, date, and return to:

A. L. Monahan
Stone & Webster Engineering Corporation
3 Executive Campus
P.O. Box 5200
Cherry Hill, NJ 08034

Signature _____ Date _____

SUPPLEMENT 3

INSERTION INSTRUCTIONS

The following instructions are for the insertion of Supplement 3 into the Unit 2 ER-OLS. Remove pages, tables, and/or figures listed in the REMOVE column and replace them with the pages, tables, and/or figures listed in the INSERT column. Dashes (---) in either column indicate no action required.

Vertical bars have been placed in the margins of inserted pages and tables to indicate revision locations.

Volume 1

Remove	Insert
1.2-1/1.2-2	1.2-1/1.2-2
Table 1.2-1 (1 of 2)	Table 1.2-1 (1 of 2)
Appendix 1A (title page)	Appendix 1A (title page)
1A-1/1A-2 through 1A-18	1A-1/1A-2 through 1A-17/-
2.3-9/2.3-10	2.3-9/2.3-10
2.3-23/2.3-24	2.3-23/2.3-24
2.3-25/2.3-26	2.3-25/2.3-26
Table 2.3-7 (1 and 2 of 2)	Table 2.3-7 (1 and 2 of 2)
Table 2.3-9 (1 and 2 of 2)	Table 2.3-9 (1 and 2 of 2)
Table 2.3-10	Table 2.3-10
---	Table 2.3-16
---	Figure 2.3-15

Nine Mile Point Unit 2 ER-OLS

Volume 2

Remove	Insert
2.10-5/2.10-6,	2.10-5/2.10-6
2.10-7/-	---
3.1-1/3.1-2	3.1-1/3.1-2
3.1-2/3.1-3	3.1-3/-
Figure 3.1-9	Figure 3.1-9
3.3-1/3.3-2	3.3-1/3.3-2
3.3-3/3.3-4	3.3-3/3.3-4
Figure 3.4-1	Figure 3.4-1
3.6-3/3.6-4	3.6-3/3.6-4
3.6-5/3.6-6	3.6-5/3.6-6
5.2-3/5.2-4	5.2-3/5.2-4
Figure 5.3-6	Figure 5.3-6
Figure 5.3-7	Figure 5.3-7
Figure 5.3-8	Figure 5.3-8

Volume 3

Remove	Insert
Table 6.8-1 (2 of 5)	Table 6.8-1 (2 of 5)
Table 6.8-2 (2 of 2)	Table 6.8-2 (2 of 2)
7A.6-3/7A.6-4	7A.6-3/7A.6-4

Nine Mile Point Unit 2 ER-OLS

ER-OLS Questions and Responses Volume

Remove	Insert
Q&R E240.5-1	Q&R E240.5-1
Q&R E291.1-1	Q&R E291.1-1
Q&R E291.9-1	Q&R E291.9-1
Q&R E291.13-1	Q&R E291.13-1
Q&R E291.14-1	Q&R E291.14-1
Q&R E320.1-1	Q&R E320.1-1
Q&R E320.2-1	Q&R E320.2-1
Q&R E451.1-1	Q&R E451.1-1

1.2 STATUS OF REVIEWS AND APPROVALS

Licenses, permits, and other approvals required for the operation and maintenance of Unit 2 are listed in Table 1.2-1, which also identifies:

1. Activity/plant component for which approval was required.
2. Name of agency responsible for issuing approval.
3. Date that the approval was requested.
4. Status of each approval.

The status of approvals that entailed major environmental review (except for the NRC licenses) is discussed in the following paragraphs.

National/State Pollutant Discharge Elimination System (NPDES/SPDES) Permits

Section 402 of the federal Water Pollution Control Act amendments (1972) established a permit program to regulate the discharge of pollutants into navigable waters. Accordingly, the U.S. Environmental Protection Agency (EPA) is authorized to issue permits and establish effluent limitations, monitoring, reporting, and other requirements consistent with national water quality goals. Section 402 also provides that states may administer their own permit programs upon approval by the EPA.

On October 14, 1975, the EPA issued a combined NPDES permit for Niagara Mohawk Power Corporation's (NMPC) Nine Mile Point Nuclear Station, Units 1 and 2; whereby, specific effluent limitations, monitoring and reporting requirements, and compliance schedules for various waste streams at Unit 1 and at Unit 2 when it becomes operational are set forth.

In 1978, the New York State Department of Environmental Conservation (NYSDEC) was given the authority and responsibility for administering the Section 402 permit program. On June 6, 1983, NYSDEC issued a combined SPDES permit (Appendix 1A) for Units 1 and 2. The SPDES permit sets forth specific effluent limitations, monitoring and reporting requirements, and compliance schedules for various nonradiological waste streams at Unit 1 and at Unit 2 when it becomes operational. Sections 3.3, 3.4, and 3.6 describe the various wastewater discharges that are regulated by the Unit 2 SPDES permit. The

anticipated impact of these discharges on water quality and aquatic ecology is discussed in Sections 5.2.2, 5.3.2, and 5.5.

Water Quality Certification

Section 401 of the federal Water Pollution Control Act amendments (1972) requires applicants for a federal license to construct or operate facilities that may result in a discharge into navigable waters to obtain a certification from the state that the discharge will comply with applicable water quality standards. NMPC applied to NYSDEC and received on February 23, 1977, a water quality certification for Unit 2 (Appendix 1B).

This certification identifies the water quality standards that must be met at the facility and establishes requirements for monitoring, assessing, and reporting compliance with these standards. Sections 3.6, 5.3, and 5.5 address Unit 2 compliance with water quality standards.

Transmission Line Certification

In the state of New York, before constructing a major transmission facility, an applicant must obtain a Certificate of Environmental Compatibility and Public Need from the New York State Public Service Commission, in accordance with Article VII of the New York State Public Service Law. During Article VII proceedings, a detailed examination of the proposed facility design, construction, cost, need, and environmental impact is undertaken. Alternative routes, lines, facility designs, and construction procedures are evaluated. The environmental impact assessment must consider such factors as topography, soils, hydrology, natural constraints, biota, land use, cultural resources, and visual impact. Before reaching a decision on a transmission line proposal, the Public Service Commission conducts a hearing to obtain input from all concerned parties.

On March 15, 1978, NMPC submitted an Article VII application to the Public Service Commission for a proposed double-circuit, 765-kV line extending from Unit 2 to a new substation (East Volney Substation), to be located adjacent to NMPC's existing 345-kV Volney Substation[1]. Public hearings on the proposed line were held between November 1978 and January 1979. However, NMPC subsequently reevaluated the need for a 765-kV line linking Unit 2 and the proposed 765-kV East Volney Substation. In 1981, NMPC revised its transmission line proposal to consist of a 345-kV line extending from Unit 2 to a new substation

TABLE 1.2-1

PERMITS AND APPROVALS

Agency	Type of Approval	Authorized Activity/ Plant Component	Application Date	Status	
Nuclear Regulatory Commission	Special nuclear material license	Storage of neutron detectors	7/6/81	Granted 4/19/82	3
	Special nuclear material license	Fuel receipts	3/1/85	Approval anticipated by 7/1/85	
	By-product material license	Radiation monitors/ calibration sources	1/1/84	Approval anticipated by 6/1/84	
	Reactor operating license	Fuel loading	1/31/83	Approval anticipated by 1/1/86	
Federal Aviation Administration	Navigational interference approval	Cooling tower	4/25/77	Granted 8/8/77 Extended 5/29/79 and 10/8/80	
	Navigational interference approval	Stack	6/6/83	Granted 8/17/83	3
American Society of Mechanical Engineers	Owner certificate of authorization	Nuclear power plant components	4/17/76	Granted 8/23/76 Extended 7/5/79 and 8/23/82	3
New York State Department of Environmental Conservation	Emission source environmental rating	Operation of cooling tower	1/1/84	Approval anticipated by 8/1/84	
	Section 401 water quality certification	Discharge of wastewater effluents	2/24/76	Granted 2/23/77	
	SPDES permit	Discharge of wastewater effluents	9/28/79	Granted 6/6/83	3
New York State Public Service Commission	Certificate of environmental compatibility and public need	Transmission line	3/15/78 Amended application filed 4/82	Granted 8/12/83	3

APPENDIX 1A

SPDES PERMIT
NINE MILE POINT NUCLEAR STATION UNITS 1 AND 2
NIAGARA MOHAWK POWER CORPORATION

Copies: R7 - K. DelPrete
B. Garvey
R. Baker
R. Spear
Oswego County Hlth. Dept.
Niagara Mohawk - Lycoming
DRA - R7 Mr. Geisendorfer, Rm. 308, BWFD

Facility ID No. : NY- 000 1015

Effective Date (EDP) : July 1, 1983

Expiration Date (ExDP) : July 1, 1988

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES)
DISCHARGE PERMIT

Special Conditions
(Part I)

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et. seq.) (hereinafter referred to as "the Act").

Permittee Name: Niagara Mohawk Power Corp. Attn: Mr. J. M. Toennies, Env. Affairs Director

Permittee Street: 300 Erie Boulevard West

Permittee City: Syracuse State: N.Y. Zip Code: 13202

is authorized to discharge from the facility described below:

Facility Name: Nine Mile Pt. Nuclear Generating Station Units #1 and 2

Facility Location (C,T,V): Scriba (T) County: Oswego

Facility Mailing Address (Street): Lake Road

Facility Mailing Address (City): Lycoming (T) State: N.Y. Zip Code: 13093

into receiving waters known as:

Lake Ontario Class A Special

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal as prescribed by Sections 17-0803 and 17-0804 of the Environmental Conservation Law and Parts 621, 752, and 755 of the Departments' rules and regulations.

By Authority of Alternate Permit Administrator
Designated Representative of Commissioner of the Department of Environmental Conservation

6-6-83
Date

Robert C. Porter
Signature

91-20-2(6/80)Pg.1

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning July 1, 1983
and lasting until July 1, 1988
the discharges from the permitted facility shall be limited and monitored by the permittee as specified below:

Outfall Number & Effluent Parameter	Discharge Limitations Daily Avg.	Daily Max.	Units	Monitoring Reqmts. Measurement Frequency	Sample Type
010 Condenser Cooling Water Unit #1					
Flow*				Continuous	Calculated
Discharge Temperature		115	°F	Continuous	Metered
Intake - Discharge Temperature Difference [a]		35	°F	Continuous	Metered
Net Rate of addition of heat [a]		1.11	10^9kcal/hr.	Hourly	Calculated
Cyanide [d]		0.1	mg/l	Monthly	12.-hr. Composi
011 Unit #1 Wastewater					
Flow*				Batch	Calculated
Oil and Grease		15	mg/l	Batch before discharge	Grab
Suspended Solids	30	50	mg/l	"	"
pH	6.0 - 9.0 (Range)[e]		SU	"	"
Cyanide [d]	0.4		mg/l	"	"
020 Storm Drainage (No Monitoring Required) Unit #1					
021 Filter Backwash & Makeup Demineralizer Water Supply					
Flow*				Batch	Calculated
Oil & Grease		15	mg/l	Batch each	Grab
Suspended Solids	30	50	mg/l	" discharge	"
pH	6.0 - 9.0 (Range)		SU	"	"
022 Security Building Air Conditioning [b]					
Oil and Grease		15	mg/l	Bimonthly	Grab
Suspended Solids	30	50	mg/l	"	"
pH	6.0 - 9.0 (Range)		SU	"	"

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning with initiation of preoperational testing (Unit #2) **and lasting until** EDP + 5 Years **the discharges from the permitted facility shall be limited and monitored by the permittee as specified below:**

Outfall Number & Effluent Parameter	Discharge Limitations Daily Avg.	Daily Max.	Units	Monitoring Reqmts. Measurement Frequency	Sample Type
001-006 Storm Drainage (No Monitoring Required)					
007 Floor and Equipment Drains					
Oil and Grease		15	mg/1	2/Month	Grab
Suspended Solids	30	50	mg/1	"	"
pH	6.0 - 9.0 (Range)		SU	"	"
008 Screen Well Fish Diversion System (No Monitoring Required)					
040 Cooling Tower Blowdown (Unit #2)[c]					
Flow*				Continuous	Recorder
Discharge Temperature		110(43.3)	°F(°C)	"	"
Intake - Discharge Temperature Difference		30(16.7)	"	"	"
Net Addition of Heat		0.12×10^9	kcal/hr.	Daily	Calculated
Total Residual Chlorine	0.2	0.5	mg/1	Continuous	Recorder
pH	6.0 - 9.0 (Range)		SU	2/Week	Grab
041 Unit #2 Wastewater (Including Demineralizer Regeneration Wastes, Filter Backwash, Floor Drains, & Treated Radioactive Wastes[e].)					
Flow*				Batch	Calculated
Oil and Grease		15	mg/1	" Grab	(once before discharge)
Suspended Solids	30	50	mg/1	"	"
pH	6.0 - 9.0 (Range)		SU	"	"

FOOTNOTES

*Monitoring Requirement Only

[a]The intake temperature shall be considered that temperature existing after intake water tempering.

[b]These limits and monitoring requirements shall not apply if this wastewater is discharged upstream of the sewage treatment facility.

[c]There shall be no discharge of heat from the main condensers except heat may be discharged in blowdown from recirculated cooling water systems provided the temperature at which the blowdown is discharged does not exceed at any time the lowest temperature of recirculated cooling water prior to the addition of the makeup water.

[d]Monitoring and limits may be deleted following DEC evaluation of monitoring data.

91-20-2(5/80)Pg. 4

[e]pH range of 4.0 - 9.0 is allowable for wastewater having a conductivity of less than 10 μmho/cm

EFFLUENT LIMITATIONS

During the period beginning EDP and lasting until EDP + 5 Years discharges from the permitted facility shall be limited and monitored by the permittee as specified below:

TABLE I

Outfall Number	Effluent Limitations (Maximum Limits except where otherwise indicated)			
030	(X) Flow	30 day arithmetic mean	65,000 ( )MGD	(X)GPD
	(X) BOD_5	30 day arithmetic mean	25 mg/l and _____	lbs/day (1)
	( ) BOD_5	7 day arithmetic mean	_____ mg/l and _____	lbs/day
	(X) BOD_5	Daily	45 mg/l and _____	lbs/day
	( ) UOD (2)	Daily	_____ mg/l and _____	lbs/day
	(X) Suspended Solids	30 day arithmetic mean	25 mg/l and _____	lbs/day (1)
	( ) Suspended Solids	7 day arithmetic mean	_____ mg/l and _____	lbs/day
	(X) Suspended Solids	Daily	45 mg/l and _____	lbs/day
	(X) Effluent disinfection required: (X) all year			
	( ) Seasonal from _____ to _____			
	Fecal Coliform	30 day geometric mean shall not exceed 200/100 ml		
	Fecal Coliform	7 day geometric mean shall not exceed 400/100 ml		
	Fecal Coliform	6 hour geometric mean shall not exceed 800/100 ml (3)		
	Fecal Coliform	No individual sample may exceed 2400/100 ml (3)		

The chlorine residual in the final discharge shall not exceed 0.5 mg/l.

( ) Total Coliform	Daily	_____/100 ml
( ) Total Kjeldahl Nitrogen	Daily	_____/mg/l as N
( ) Ammonia	Daily	_____/mg/l as NH_3
( ) Dissolved Oxygen	Minimum	greater than _____ mg/l
(X) pH	Range	6.0 to 9.0
(X) Settleable Solids	Daily	0.1 ml/l
( ) Phosphorus	Daily	_____ mg/l as P
( ) Total Nitrogen	Daily	_____ mg/l as N
( ) _____		

TABLE 2

Monitoring Requirements Parameter	Frequency	Sample Type	Sample Location Influent	Effluent
(X) Total Flow, MGD	2/Month	Grab		
(X) BOD_5, mg/l	"	"		
(X) Suspended Solids, mg/l	"	"		
(X) Fecal Coliform, No./100 ml	"	"		
( ) Total Coliform, No./100 ml				
( ) Total Kjeldahl Nitrogen, mg/l as N				
( ) Ammonia, mg/l as NH_3				
( ) Dissolved Oxygen, mg/l				
(X) pH	2/Month	Grab		
(X) Settleable Solids, ml/l	"	"		
(X) Residual Chlorine, mg/l	"	"		X
( ) Phosphorus, mg/l as P				
( ) Temperature, °C				
( ) Total Nitrogen, mg/l as N				
( ) Visual Observation				
( ) _____				

(1) and effluent values shall not exceed _____% of influent values.

(2) UOD (Ultimate Oxygen Demand) shall be computed and reported as follows:
UOD = $1\frac{1}{2}$ x BOD_5 + $4\frac{1}{2}$ x TKN (Total Kjeldahl Nitrogen).

(3) applicable only in the Interstate Sanitation District.

(4) sample contact chamber effluent and final effluent if limits are specified for both.

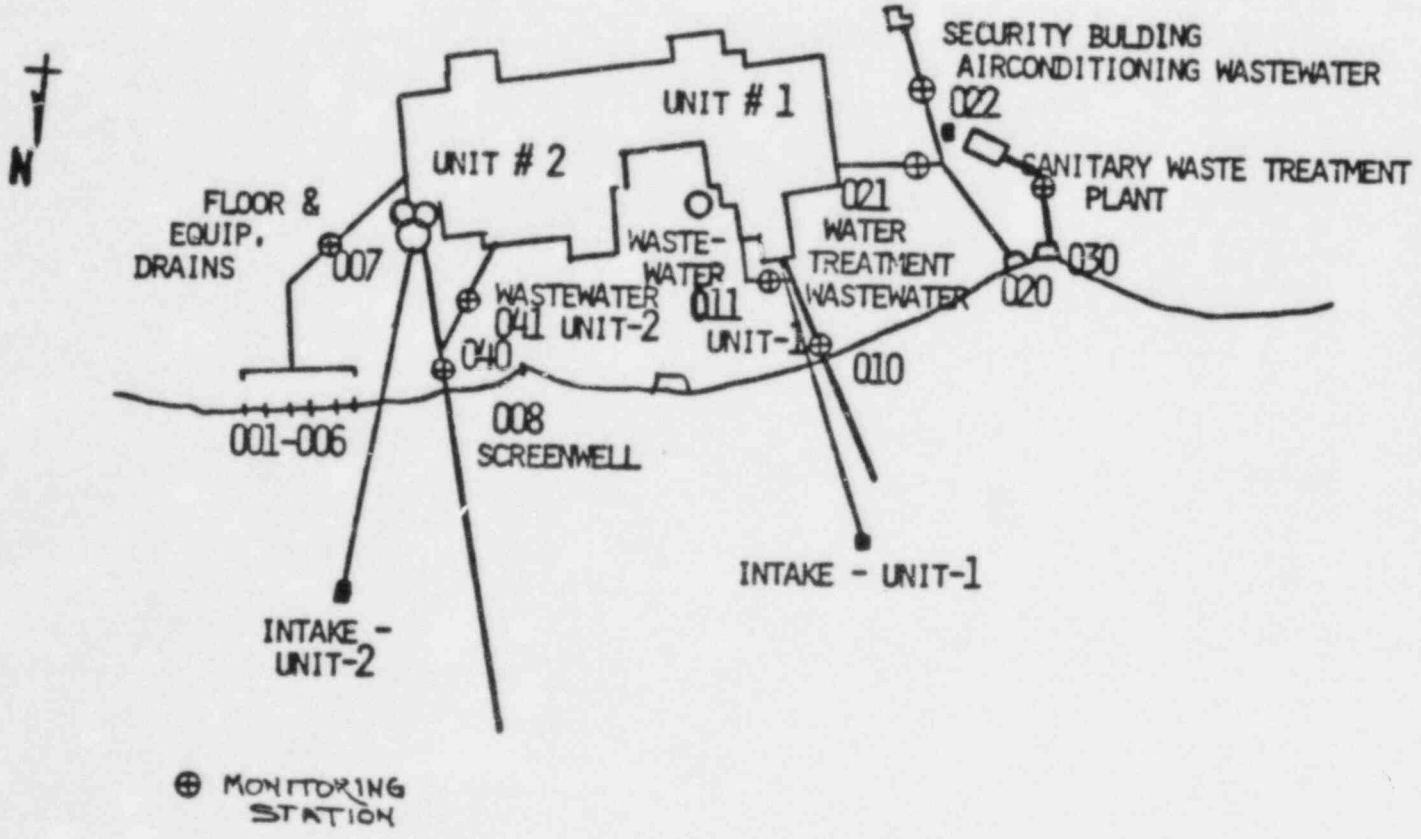
Definition of Daily Average and Daily Maximum

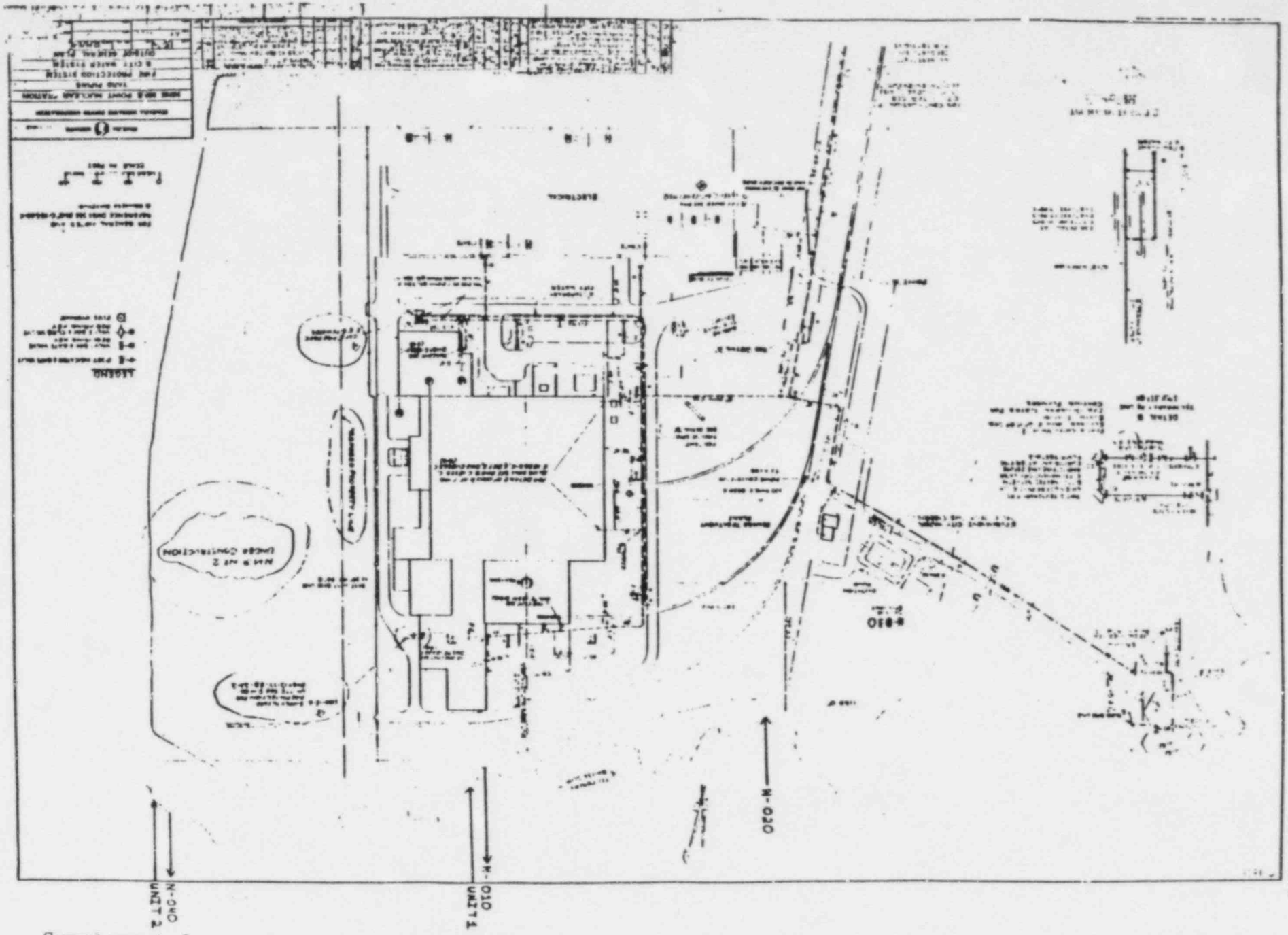
The daily average discharge is the total discharge by weight or in other appropriate units as specified herein, during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges in appropriate units as specified herein divided by the number of days during the calendar month when the measurements were made.

The daily maximum discharge means the total discharge by weight or in other appropriate units as specified herein, during any calendar day.

Monitoring Locations

Permittee shall take samples and measurements to meet the monitoring requirements at the location(s) indicated below: (Show locations of outfalls with sketch or flow diagram as appropriate).




N-020
N-010
UNIT 1
N-040
UNIT 2

ADDITIONAL REQUIREMENTS:

I. The following requirements are applicable to Units #1 and #2.

1. There shall be no discharge of PCB's from this facility.

2. In regard to general conditions 11.5, items #3 and #4 shall be reported semi-annually to NYSDEC offices in Cortland and Albany.

3. There shall be no discharge of boiler chemical cleaning compounds, metal cleaning wastewater, or boiler blowdown from this facility.

4. Radioactivity

   a. Gross Beta - Shall not exceed 1,000 picocuries per liter in the absence of Sr^{90} and alpha emitters.

   b. Radium 226 - Shall not exceed 3 picocuries per liter.

   c. Strontium 90 - Shall not exceed 10 picocuries per liter.

5. The permittee shall submit on a trimesterly basis a report to the Department's offices in Cortland and Albany by the 28th of the month following the end of the period. Submission of reports for Unit #2 shall commence with the initiation of reactor low power testing.

   a. Daily minimum, average, and maximum station electrical output shall be determined and logged.

   b. Daily minimum, average, and maximum water use shall be directly or indirectly measured or calculated and logged.

   c. Daily minimum, average, and maximum intake and discharge temperatures shall be logged.

   d. Measurements in a, b, and c shall be taken on an hourly basis.

6. The location, design, construction, and capacity of cooling water intake structures, in connection with point source thermal discharges, shall reflect the best technology available for minimizing adverse environmental impact.

7. All thermal discharges to the waters of the state shall assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on the body of water.

8. Niagara Mohawk shall notify the Department within one week from the time of submission to the Nuclear Regulatory Commission of any requested changes to the Environmental Technical Specifications requirements which could in any way affect the requirements of this permit.

9. Niagara Mohawk shall also submit concurrently to the Department any water-related report on the environment it submits to any federal, state, or local agency.

10. Niagara Mohawk shall provide access to the Nine Mile Point Site at any time to representatives of the Department subject to site security regulations to assess the environmental impact of the operation of the Nine Mile Point Nuclear Facility and to review any sampling program, methodology, and the gathering and reporting of any data.

11. No biocides, slimicides, or corrosion control chemicals are authorized for use, except for those listed by parameter in the permit. Prior Department approval is required for any additional use of these chemicals as well as for the use of any new water treatment chemicals.

II. <u>The following requirements are applicable to Unit #1.</u>

1. By August 1, 1983, the permittee shall submit final plans, signed and sealed by an engineer licensed to practice in New York State, describing the addition of storage capacity for discharges 011 and 021. Construction to be initiated by October 1, 1983.

2. The Department has approved the applicant's request pursuant to Section 316(a) of the Clean Water Act (CWA) for alternative effluent limitations at this facility. The thermal effluent limitations on page 2 of this permit reflect this approval.

3. The water temperature at the surface of Lake Ontario shall not be raised more than three Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin except in a mixing zone consisting of an area of 425 acres from the point of discharge, this temperature may be exceeded.

4. The Department has contingently approved the applicant's consideration of intake impacts submitted pursuant to Section 316(b) of the CWA. Completion of the biological monitoring program described in Additional Requirement Section IV and demonstration of impacts similar to previous studies is required to obtain final approval of the 316(b) request.

III. The following requirements are applicable to Unit #2.

1. By initiation of reactor lower power testing, the company shall file for approval with the Department at its offices in Albany and Syracuse an updated report on all Unit #2 water treatment, corrosion inhibitor, anti-fouling, slimicide, biocide, and boiler cleaning chemicals or compounds. Such report shall identify each product by chemical formula and/or composition, annual consumption, frequency of use, maximum use per incident, effluent concentration, bioassay and toxicity limits, and procedures for use. Approval shall only be granted for those circumstances and uses which do not contravene New York State Water Quality Standards. No substitutions will be allowed without prior approval. Wastewaters containing chemicals and oil shall be collected and treated prior to dilution with non-contact cooling water in facilities which shall be approved by the Department.

2. No discharge from this facility shall cause violation of the New York State Department of Health regulations contained in 10 NYCRR Part 170 at the source of intake of any water supply used for drinking, culinary or food processing purposes.

3. Pursuant to Part 704 Criteria Governing Thermal Discharges, Section 704.3-Mixing Zone Criteria, upon the presentation of a final design for the discharge, the Department shall specify, as appropriate, definable numerical limits for the mixing zone, including linear distances from the point of discharge, surface area involvement, and volume of receiving water entrained in the thermal plume.

4. Not less than 180 days prior to the initiation of discharge from the Nine Mile Point Nuclear Generating Station Unit #2, Niagara Mohawk shall submit for approval to the Department of Environmental Conservation a plan of study for:

   Verification of the extent of the thermal plume in the receiving waters by conducting thermal surveys in alternate months except for December through March during the first two years of operation.

5. Existing biological studies in Lake Ontario as required by regulatory agencies shall continue. Such study programs shall be adjusted as required by regulatory agencies to assess the operating impact of Unit #2. Requirements to submit reports, frequency of submission, and content shall be established at the time of approval of the study programs.

6. Not less than 180 days prior to the initiation of discharges from the Nine Mile Point Nuclear Generating Station Unit #2, Niagara Mohawk shall submit to the NYSDEC office in Albany three copies of the following plans and specifications. Plans shall be stamped by an engineer licensed in New York State.

   a. Plans of proposed structures, including intake structure, diffuser, tunnel cross section, cooling tower, screenwell building, and equipment (including pumps).

   b. Plans of all on-site treatment facilities including oil/water separators.

   c. Piping and/or flow diagrams for all facility waste streams, including any piping to or from Nine Mile Point Unit #1 and contaminated plant and site drainage.

   d. Flow diagram of circulating cooling water system from the intake to the diffuser.

IV. Biological Monitoring and Related Matters - Unit #1

A. Previous Biological Monitoring Data - EDP + 3 Months, the permittee shall file with the Chief, Bureau of Environmental Protection in Albany; Fishery Section head in Cape Vincent; and with the Regional Supervisor of Fish and Wildlife in Syracuse a report containing and/or identifying all previous reports regarding this facility which contain biological data relating to the ecological effects of plant operation from March 31, 1975 to the present. Previously submitted reports need not be duplicated, but title, date, and data location must be completely identified. A copy of all unsubmitte reports and data shall be sent to the above offices by EDP + 3 Months. Data to be reported should include, but is not necessarily limited to cooling water flows, dates, times, available operating and meteorological conditions, and species, numbers and other available biological information.

B. Impingement Monitoring - The permittee shall conduct a program to determine the numbers and total weights by species of fish impinged on all intake traveling screens.

   1. Collections shall be made seventy-eight (78) days each year, provided that the circulating water pumps are in operation. When collection days coincide with shut down of the main circulating water pumps, collections need not be taken. Collections shall be obtained at the following intensity on days randomly selected within each month. Should the randomly selected dates result in a period in excess of 10 days during any month in which sampling does not occur,

additional sampling is required so that periods in excess of 10 days without a sample do not occur.

Month	Number of Sample Days
January	4
February	4
March	4
April	16
May	20
June	4
July	4
August	6
September	4
October	4
November	4
December	4

2. Collections shall be conducted for a minimum period of 24 hours. The beginning of the 24-hour period shall be selected and held constant by the permittee for all collections. A collection period shall be no longer than 26 hours. Impingement collection shall be calculated and reported on a 24-hour basis.

3. Travelling screens shall be washed until they are clean prior to the start of the 24-hour collection period.

4. Individual length (cm) and weight (g) measurements shall be made on white perch, smallmouth bass, yellow perch, alewife, rainbow smelt, and each species of salmonid in order to characterize the size distribution for each 24-hour collection. No less than 25 organisms of each species shall be measured unless fewer than 25 individuals occur in the collection.

   If more than 25 individuals of a single species are collected, except for smallmouth bass, yellow perch and each species of salmonid which are to be processed separately, a representative subsample of 25 fish shall be removed and lengths and weights recorded for the subsample. In the event of high impingement numbers, an estimate of the numbers and total weights by species fish shall be calculated as follows:

$$\text{Estimated No. of Fish} = \frac{(\text{Volume of Total Sample}) \times (\text{No. of Fish in Subsample})}{\text{Volume of Subsample}}$$

   The total sample volume shall be determined by repeatedly filling a volumetrically graduated 20-gallon plastic container and then recording and summing the values. The total volume is then thoroughly mixed by hand or with a shovel and spread

out evenly over a flat surface. An aliquot of the total sample is randomly selected and this sample portion is removed from the flat surface and measured in the graduated container to determine its approximate volume. The total number of fish in the subsample is then determined.

In the event of extremely large impingement loads, the permittee may request regional staff to make adjustments to or suspend the above subsampling procedures.

5. Electrical output and operation of the condenser cooling water system including intake and discharge temperature and total flow shall be recorded on a daily basis and tabulated as required in the following section on reporting.

6. By EDP + 3 Months, the permittee shall file for approval at the office in Section IV.A. above, a plan which will determine the collection efficiency of the following impinged organisms: white perch, smallmouth bass, yellow perch, alewife, and rainbow smelt. Prior collection efficiency data specific to this plant may be substituted for the above plan provided that it is submitted by EDP + 3 Months, to the NYSDEC and approved by the NYSDEC.

C. Reporting

1. All data required by Section IV or incorporated by reference in Section IV shall be included in an annual biological monitoring report.

2. The annual report shall be submitted by six months from the last month of data collection.

3. The following shall be included in the annual report in addition to (1) above:

   a. Monthly and annual totals of impingement by species and grand total over all species. The calculations to be done are as follows:

      - Monthly "mean" is equal to the total number of fish impinged by species on the sampling days in the month divided by the total number of sampling days.

      - Annual "mean" is equal to the total number of fish impinged by species on the sampling days in the year divided by the total number of sampling days.

Similar calculations shall be made for grand total over species. The total number of fish and sampling days shall be clearly indicated in any table reporting the "totals".

b. An estimate of the collection efficiencies to be determined pursuant to Section IV.B.6. above. If sufficient time is not available to include these estimates in the first annual report, the permittee may, upon written request and substantiation and with NYSDEC approval, extend this reporting requirement into an annual report other than the initial.

c. Estimates shall be developed of the average monthly impingement rate based on the number of sampling days and total volume of water pumped during these days, and also of the total monthly impingement based on the average monthly rate and the volume of water pumped during the month, for each species impinged.

4. All measurements shall use the metric system, e.g., flows should be in cubic meters/sec. (m^3/s).

5. Copies of all reports regarding water and biological parameters related to intake and discharge considerations, whether generated for this permit or otherwise, shall be sent to the offices in Section IV.A. above.

6. Report(s) submitted in fulfillment of permit conditions shall clearly identify on the title page the permit number and the specific section(s) by character and number that the report(s) fulfill. Each section of the text of such report(s) shall identify the section(s) of the permit that it fulfills.

7. NYSDEC reserves the right to have more frequent submittal of the data required to be reported, provided that the permittee is given at least one (1) month prior notice of such more frequent reporting requirements.

8. The measures the permittee instituted, if any, in the reporting year to accomplish minimization of facility impacts on aquatic biota shall be sent to the offices in Section IV.A. above.

9. The formats for reporting the following data are included in Appendix A. Data sheets and formats for reporting the following data:

   a. Flow
   b. Temperature
   c. Circulator operation
   d. Electrical output

are available from the office of Environmental Protection.

D. Biological specimens may be required to be submitted to the NYSDEC upon request.

E. The facility shall be operated in such a manner as to minimize facility impacts on aquatic biota.

F. As a result of the NYSDEC's review of the biological monitoring program, the permittee may be required to implement appropriate methods and procedures to reduce to the fullest extent possible the effects of facility operation on aquatic organisms.

SCHEDULE OF COMPLIANCE FOR EFFLUENT LIMITATIONS

(a) Permittee shall achieve compliance with the effluent limitations specified in this permit for the permitted discharge(s) in accordance with the following schedule:

Action Code	Outfall Number(s)	Compliance Action	Due Date
02	011 & 021	Approvable Final Plans-Waste Storage Tanks (Additional Requirement # II.1.)	8/1/83
04	011 & 021	Commencement of Construction (Additional Requirement #II.1)	10/1/83
01	All	Chemical Use Report-Unit #2 (Additional Requirement #III.1)	Initiation of reactor low power testing.
44	040	Plan of Study-Thermal Plume Verification (Additional Requirement #III.4).	180 days prior to initiation of discharge.
02	040	Final Plans-Circulating Cooling Water & Waste Treatment (Additional Requirement #III.6)	180 days prior to initiation of discharge.
39	NA	Compliation of Reports containing Biological Data (Additional Requirement #IV.1.a)	EDP + 3 Months
44	NA	Plan of Study-Collection Efficiency (Additional Requirement #IV.6)	EDP + 3 Months

(b) The permittee shall submit to the Department of Environmental Conservation the required document(s) where a specific action is required in (a) above to be taken by a certain date, and a written notice of compliance or noncompliance with each of the above schedule dates, postmarked no later than 14 days following each elapsed date. Each notice of noncompliance shall include the following information:

1. A short description of the noncompliance;

2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirement without further delay;

3. A description of any factors which tend to explain or mitigate the noncompliance; and

4. An estimate of the date permittee will comply with the elapsed schedule requirement and an assessment of the probability that permittee will meet the next scheduled requirement on time.

91-18-1 (9/78)

MONITORING, RECORDING AND REPORTING

a) The permittee shall also refer to the General Conditions (Part II) of this permit for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized and reported by submitting a completed and signed Discharge Monitoring Report form once every months to the Department of Environmental Conservation and other appropriate regulatory agencies at the offices specified below. The first report will be due no later than Thereafter, reports shall be submitted no later than the 28th of the following month(s):

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

New York State Department of Environmental Conservation
Regional Engineer
7481 Henry Clay Blvd.
Liverpool, New York 13088

Oswego County Dept. of Health
70 Bunner Street
Oswego, New York 13126

[X] (Applicable only if checked):

Dr. Richard Baker, Chief - Permits Administration Branch
Planning & Management Division
USEPA Region II
26 Federal Plaza
New York, New York 10278

c) If so directed by this permit or by previous request, Monthly Wastewater Treatment Plant Operator's Reports shall be submitted to the DEC Regional Office and county health department or county environmental control agency specified above.

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR 136 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Reports.

f) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in the permit.

g) Unless otherwise specified, all information submitted on the Discharge Monitoring Form shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) Blank Discharge Monitoring Report Forms are available at the above addresses.

SCHEDULE OF COMPLIANCE FOR EFFLUENT LIMITATIONS
(Continued)

c) The permittee shall submit copies of the written notice of compliance or noncompliance required herein to the following offices:

Chief, Compliance Section
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

Regional Engineer #7
New York State Department of Environmental Conservation
7481 Henry Clay Boulevard
Liverpool, NY 13088

Oswego County Dept. of Health
70 Bunner Street
Oswego, New York 13126

USEPA Region II
Planning and Management Division
26 Federal Plaza
New York, New York 10278

The permittee shall submit copies of any engineering reports, plans of study, final plans, as-built plans, infiltration-inflow studies, etc. required herein to the New York State Department of Environmental Conservation Regional Office specified above unless otherwise specified in this permit or in writing by the Department or its designated field office.
91-18-2 (9/76)

The Ontario Ministry of the Environment permits a total of approximately 24,200 cu m/day (6.4 mgd) to be withdrawn from Lake Ontario for irrigation (Table 2.3-6).

2.3.2.2 Groundwater

Since general groundwater gradient in the site vicinity is toward the lake, no groundwater supplies are expected to be affected by station effluents. All onsite wells are owned by Niagara Mohawk Power Corporation (NMPC) and are no longer in use. No offsite effects are expected from station dewatering. Groundwater is further discussed in FSAR Section 2.4.13.

2.3.2.3 Lake Ontario Fisheries

2.3.2.3.1 Commercial Fish Harvest

United States commercial fish harvests for the years 1976 through 1980 are listed by species in Table 2.3-7. Commercial fish harvest data for Canadian statistical districts located partially or entirely within an 80-km radius of Unit 2 are listed by weight in Table 2.3-10. Figure 2.3-15 shows Canadian statistical district boundaries. Canadian commercial fisheries are predominantly located along the eastern third of the northern Lake Ontario shoreline. Most of the U.S. commercial fish harvest is caught in the Eastern Basin of Lake Ontario, with more than half the catch coming from the Chaumont Bay region. Major U.S. ports of landing are Chaumont and Oswego. 3 3

2.3.2.3.2 Sport Fish Catches

Sport fish catches on Lake Ontario in U.S. waters are given in Table 2.3-8 by major species groups. Within Canadian waters of Lake Ontario, approximately 6,330,000 fish were caught by anglers in 1980. Approximately 80 percent of these fish were kept and 56 percent were eaten. Table 2.3-9 presents data regarding fish caught, kept, and eaten by anglers in the Canadian waters of Lake Ontario between Salmon Point and Kingston, an area which roughly corresponds to the Canadian waters within the 80-km (50-mi) radius. Data on total fish caught in Canadian waters of Lake Ontario are provided in Table 2.3-10[48].

2.3.2.4 Recreation

Recreational use of Lake Ontario includes boating, swimming, and fishing. Recreational opportunities in the site vicinity are discussed in Section 2.5.2.

2.3.2.5 Navigation

Oswego Harbor serves as both the easternmost port on Lake Ontario and a terminus of the New York State barge canal system. Tonnage handled by the New York State Barge Canal is provided in Table 2.3-11. The location of Unit 2 on the south shore of Lake Ontario is well outside any normal ship traffic lanes.

2.3.3 Water Quality

2.3.3.1 Introduction

Lake Ontario is the only makeup water source and receiving water body for Unit 2. All other surface water and groundwater in the site vicinity are upgradient from the station and are not affected by station operation. Water quality analysis is thus limited to Lake Ontario in this report.

2.3.3.2 Historical Review of Water Quality Data for the Site and Vicinity

Comprehensive water quality studies have been conducted by state, federal, and international agencies mostly after 1960. In addition, several investor-owned utilities have studied water quality near their existing or planned facilities[49].

The International Joint Commission (IJC) reported lakewide water chemistry data collected during 1965 by the Federal Water Pollution Control Administration (FWPCA). The IJC report also included data from other investigations, including the 1966-1967 studies conducted by the Canadian Department of National Health and Welfare (CDNHW)[49,50].

Allen summarized the chemical characteristics of Lake Ontario prior to 1972 and included historical trends from the late 1800s[51].

The EPA summarized data from water quality surveys in their STORET system[52]. Data from 1965 to 1976 for eastern Lake Ontario were accessed. STORET system data included results from studies by the U.S. Geological Survey (USGS), the New York State Department of Environmental Conservation (NYSDEC), the EPA (Rochester Field Office), the Canadian Center for Inland Waters (CCIW), and the International Field Year for the Great Lakes (IFYGL). A survey of Mexico Bay, located approximately 5.6 km (3.5 mi) east of the Nine Mile Point study area, was conducted by the FWPCA-Rochester Office in 1965[49].

35. Personal communication between R. Walvoord, Williamson Water District, Williamson, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, August 11, 1981.

36. Personal communication between D. White, Sodus Village, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, August 11, 1981.

37. Personal communication between B. DeVinney, Wolcott Village, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, August 12, 1981.

38. Personal communication between Mr. Wilkinson, City of Oswego Water Supply, Oswego, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, August 11, 1981.

39. Personal communication between D. Rengert, Niagara Mohawk Power Corporation, Oswego, NY, and C.S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, June 2, 1982.

40. Personal communication between V. Constance, Cape Vincent Village, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, August 10, 1981.

41. Personal communication between R. Duford, Chaumont Village, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, August 10, 1981.

42. Personal communication between B. Goodrich, Sackets Harbor Village, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, August 11, 1981.

43. Personal communication between W. Huff, Sodus Point Village, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, August 11, 1981.

44. National Marine Fisheries Service. Fishery Statistics of the United States 1976. U.S. Department of Commerce. Washington, DC, October 1980.

45. National Marine Fisheries Service. General Canvass Catch by Year, State, and Species 1977-1980. U.S. Department of Commerce, Washington, DC.

46. Letter from Nilam Bedi, Economist, Ontario Ministry of Natural Resources to Carolyn Ellis, Stone & Webster Engineering Corporation concerning Lake Ontario Commercial Fish Harvest by Statistical District for January to December 1976 through 1981, March 25, 1983. 3

47. Ontario Ministry of Natural Resources. Background Information: Napanee District Land Use Strategy. Napanee, Ontario, 1980.

48. Government of Canada, Fisheries and Oceans, Economic Policy Branch. Data from 1980 Survey of Sportfishing - Ontario. October 14, 1981.

49. New York State Electric and Gas Corporation. New Haven Nuclear Station, ER-CPS. Docket No. STN 50-596 and STN 50-597, March 1979.

50. International Lake Erie Water Pollution Board and International Lake Ontario - St. Lawrence River Water Pollution Board. Report to the International Joint Commission on the Pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River, Vol. 3, 1969, p 329. [cited in Reference 49]

51. Allen, E. R. Lake Ontario Atlas: Chemistry. New York State Sea Grant Institute, State University of New York, Albany, NY, 1977, p 101. [cited in Reference 49]

52. U.S. Environmental Protection Agency, STORET. Data Summary for Eastern Lake Ontario. EPA Office of Water and Hazardous Materials Monitoring and Data Support Division, Washington, DC, 1978. [cited in Reference 49]

53. Rochester Gas and Electric Company. Sterling Site Project, Environmental Report, Vol. V, Section 80.2, Rochester, NY, 1973. [cited in Reference 49]

54. Texas Instruments, Inc. 1979 Nine Mile Point Aquatic Ecology Studies. Prepared for Niagara Mohawk Power Corporation, Dallas, TX, 1980.

55. Texas Instruments, Inc. 1980 Nine Mile Point Aquatic Ecology Studies. Prepared for Niagara Mohawk Power Corporation, Dallas, TX, 1981.

56. New York State Department of Environmental Conservation. Conservation Law Title 6, Part 702.1, Class A - Special Waters, Standards.

57. U.S. Environmental Protection Agency. Quality Criteria for Water, 1976, p 501.

58. A.P.M.A., A.W.W.A., and W.P.C.F. Standard Methods for the Examination of Water and Wastewater, 14th Edition, American Public Health Association, Washington, DC, 1975, p 1193.

59. Casey, D. J.; Fisher, W.; and Kleveno, C. O. Lake Ontario Environmental Summary 1965. EPA, Region II, Rochester Field Office, Rochester, NY, 1973.

60. Great Lakes Water Quality Board. 1981 Report on Great Lakes Water Quality, Appendix, Great Lakes Surveillance, Report to the IJC, November 1981.

61. Beeton, A. M. Indices of Great Lakes Eutrophication. Great Lakes Research Publication No. 15, Great Lakes Research Division, University of Michigan, 1966, p 1-8.

62. Sweeney, R. A. Proceedings of the Conference on Changes in the Chemistry of Lakes Erie and Ontario. Bulletin of Buffalo Society of Natural Sciences, Vol. 25, No. 2, 1971. [cited in Reference 49]

63. McKee, J. E. and Wolf, H. W. Water Quality Criteria, Second Edition, California State Water Resources Control Board, Publication No. 3-A, 1971, p 548. [cited in Reference 49]

64. Pasansky, D.F. Winter Circulation in Lake Ontario. In: Proceedings of the 14th Conference of Great Lakes Research, International Association of Great Lakes Research, Windsor, Ontario, 1971, p 593-606. [cited in Reference 49]

65. U.S. Environmental Protection Agency. The Aquatic Environment; Microbial Transformations and Water Management Implications. Symposium sponsored by EPA Office of Water Programs Operation, EPA 430/6-73-008, 1972, p 244. [cited in Reference 49]

66. Wetzel, R. G. Limnology. W. B. Saunders Co., Philadelphia, PA, 1975, p 743.

67. U.S. Environmental Protection Agency. National Interim Primary Drinking Water Regulations, 40CFR141, 1975.

68. Geldrich, E. E. Fecal Coliform and Fecal Streptococcus Density Relationships in Waste Discharge and Receiving Waters. CRC Critical Review of Environmental Control, October 1976. [cited in Reference 49]

69. Personal communication between J. Simplaar, Mexico, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, June 10, 1981.

70. Personal communication between L. Hurlbutt, Mexico, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, June 9, 1981.

71. Personal communication between D. Ouellette, Sterling, NY, and C. S. Ellis, Stone & Webster Engineering Corporation, Boston, MA, June 15, 1981.

72. New York State Department of Environmental Conservation, Bureau of Fisheries. 1976-1977 New York Angler Survey Final Report. Raybrook, NY, May 1981.

73. Oswego County Planning Board. Oswego County Data, 1977.

TABLE 2.3-7

TOTAL COMMERCIAL FISH BY SPECIES IN KILOGRAMS
(AND POUNDS) HARVESTED FROM LAKE ONTARIO (U.S. WATERS)

Species	1976 U.S.(1)	1977 U.S.(2)	1978 U.S.(2)	1979 U.S.(2)	1980 U.S.(2)
Bowfin				136	
Bullhead & Catfish	9,707 (21,404)	21,455 (47,308)	17,237 (38,008)	12,292 (27,104)	15,332 (33,807)
Carp	2,268 (5,001)	862 (1,901)	363 (800)		454 (1,001)
Common Eel	16,103 (35,507)		19,142 (42,208)	18,144 (40,008)	29,847 (65,813)
Crappie	1,406 (3,100)	1,179 (2,600)	544 (1,200)	590 (1,301)	726 (1,601)
Freshwater Drum	136 (300)			136 (300)	227 (501)
Rock Bass	3,266 (7,202)	5,489 (12,103)	4,672 (10,302)	1,633 (3,601)	2,676 (5,901)
Smelt	5,579 (12,302)	5,988 (13,204)	20,185 (44,508)	4,717 (10,401)	
Suckers	1,860 (4,101)	1,043 (2,300)	1,905 (4,201)	590 (1,301)	227 (501)
Sunfishes	3,084 (6,800)	4,128 (9,102)	2,812 (6,200)	2,313 (5,100)	
Walleye	136 (300)	318 (701)	1,905 (4,201)	91 (201)	272 (600)
White Bass	91 (201)	91 (201)		45 (99)	45 (99)
White Perch	20,503 (45,209)	31,026 (68,412)	9,888 (21,803)	7,439 (16,403)	16,602 (36,607)

TABLE 2.3-7 (Cont)

Species	1976 U.S.[1]	1977 U.S.[2]	1978 U.S.[2]	1979 U.S.[2]	1980 U.S.[2]
Yellow Perch	23,814 (52,510)	22,181 (48,909)	6,260 (13,803)	10,161 (22,405)	6,487 (14,304)
Others					
Total	87,953 (193,936)	93,760 (206,741)	84,913 (187,233)	58,287 (128,523)	72,895 (160,733)

SOURCES: [1] Reference 44
[2] Reference 45

TABLE 2.3-9

ESTIMATED FISH HARVEST BY ANGLERS IN CANADIAN WATERS OF LAKE ONTARIO BETWEEN SALMON POINT AND KINGSTON, ONTARIO, IN 1980

	Number and Weight of Fish*					
	Caught		Kept		Eaten	
Species	Number	kg	Number	kg	Number	kg
Bass (General)	25,300 (25.3)	22,952	19,754 (49.9)	17,921	7,626 (19.7)	6,918
Bass (Largemouth)	13,784 (20.6)	12,505	12,173 (27.5)	11,043	9,432 (23.0)	8,557
Bass (Rock)	15,713 (9.4)	4,101	-	-	-	-
Bass (Smallmouth)	24,730 (28.5)	22,435	20,830 (37.0)	18,897	20,830 (39.5)	18,897
Bullhead	15,891 (17.8)	5,406	15,891 (54.9)	5,406	15,891 (54.9)	5,406
Lake Whitefish	23,116 (72.5)	41,942	-	-	-	-
Muskellunge (Maskimonge)	2,210 (79.2)	20,049	-	-	-	-
Northern Pike	23,676 (22.7)	42,958	12,225 (23.7)	22,181	10,761 (22.6)	19,525
Perch	76,154 (22.3)	17,272	43,262 (21.4)	9,812	39,794 (21.0)	9,025
Pickerel	27,313 (18.9)	61,946	15,787 (13.9)	35,805	14,444 (13.0)	32,759
Sunfish	4,043 (4.8)	458	-	-	-	-

3

TABLE 2.3-9 (Cont)

Species	Number and Weight of Fish*					
	Caught		Kept		Eaten	
	Number	kg	Number	kg	Number	kg
Trout (General)	5,779 (55.7)	18,349	1,444 (54.4)	4,585	1,444 (54.4)	4,585
Salmon (Chinook)	242 (1.0)	2,195	242 (2.3)	2,195	-	-
All Species	257,951	272,568	141,608	127,845	120,222	105,672

*Numbers in parentheses indicate percentage of all Lake Ontario species (Table 2.3-10) in each category which were caught in lake region between Salmon Point and Kingston. Dashes indicate data not available.

SOURCE: Reference 48

TABLE 2.3-10

ESTIMATED TOTAL FISH HARVEST BY ANGLERS
IN CANADIAN WATERS OF LAKE ONTARIO IN 1980

Species	Number and Weight of Fish					
	Caught		Kept		Eaten	
	Number	kg	Number	kg	Number	kg
Bass (General)	99,779	90,520	39,570	35,898	38,360	34,800
Bass (Largemouth)	66,867	60,662	44,527	40,395	41,018	37,212
Bass (Rock)	166,216	43,382	63,182	16,491	63,182	16,491
Bass (Smallmouth)	86,703	78,657	56,245	51,025	52,786	47,887
Bass (Striped)	-	-	-	-	-	-
Bass (White)	17,572	7,971	6,514	2,955	6,514	2,955
Black Eel	1,741	592	288	98	288	98
Bullhead	89,043	30,292	28,897	9,831	28,897	9,831
Carp	38,497	261,934	2,984	20,303	2,742	18,657
Catfish	40,422	128,348	2,945	9,351	2,945	9,351
Channel Catfish	1,258	856	-	-	-	-
Chub	2,906	165	1,211	69	1,211	69
Lake Whitefish	31,883	57,849	726	1,317	726	1,317
Muskellunge	2,788	25,293	578	5,244	578	5,244
Suckers	15,741	28,560	726	1,317	726	1,317
Northern Pike	104,475	189,559	51,607	93,636	47,513	86,208
Pan Fish	6,053	1,030	6,053	1,030	6,053	1,030
Perch	341,387	77,427	201,590	45,721	189,404	42,957
Pickerel	144,903	328,640	113,166	256,660	111,004	251,757
Sunfish	84,236	9,552	31,871	3,614	31,871	3,614
Shad	4,813	3,874	-	-	-	-
Sheepshead	17,972	8,152	1,061	481	-	-
Smelt	4,694,032	234,702	4,218,685	210,934	2,815,819	140,791
Crappies	264	120	264	120	264	120
Trout (General)	10,379	32,955	2,655	8,430	2,655	8,430
Trout (Brook)	1,351	369	1,351	369	1,351	369
Trout (Brown)	10,116	32,120	6,483	20,585	4,545	14,431
Trout (Lake)	13,042	29,579	5,786	13,123	5,302	12,025
Trout (Rainbow)	32,229	102,334	21,970	69,759	16,643	52,845
Trout (Splake)	242	768	242	768	242	768
Salmon (General)	24,758	112,302	21,367	96,921	18,703	84,837
Salmon (Chinook)	22,467	203,821	10,222	92,734	6,108	55,412
Salmon (Coho)	121,365	550,512	81,610	370,183	57,213	259,518
Multi Species	34,291	NA*	6,372	NA*	6,372	NA*
All Species	6,329,821	2,732,897	5,030,748	1,479,362	3,561,035	1,200,341

SOURCE: Reference 48

*Not applicable - species and weight are not known.

TABLE 2.3-16

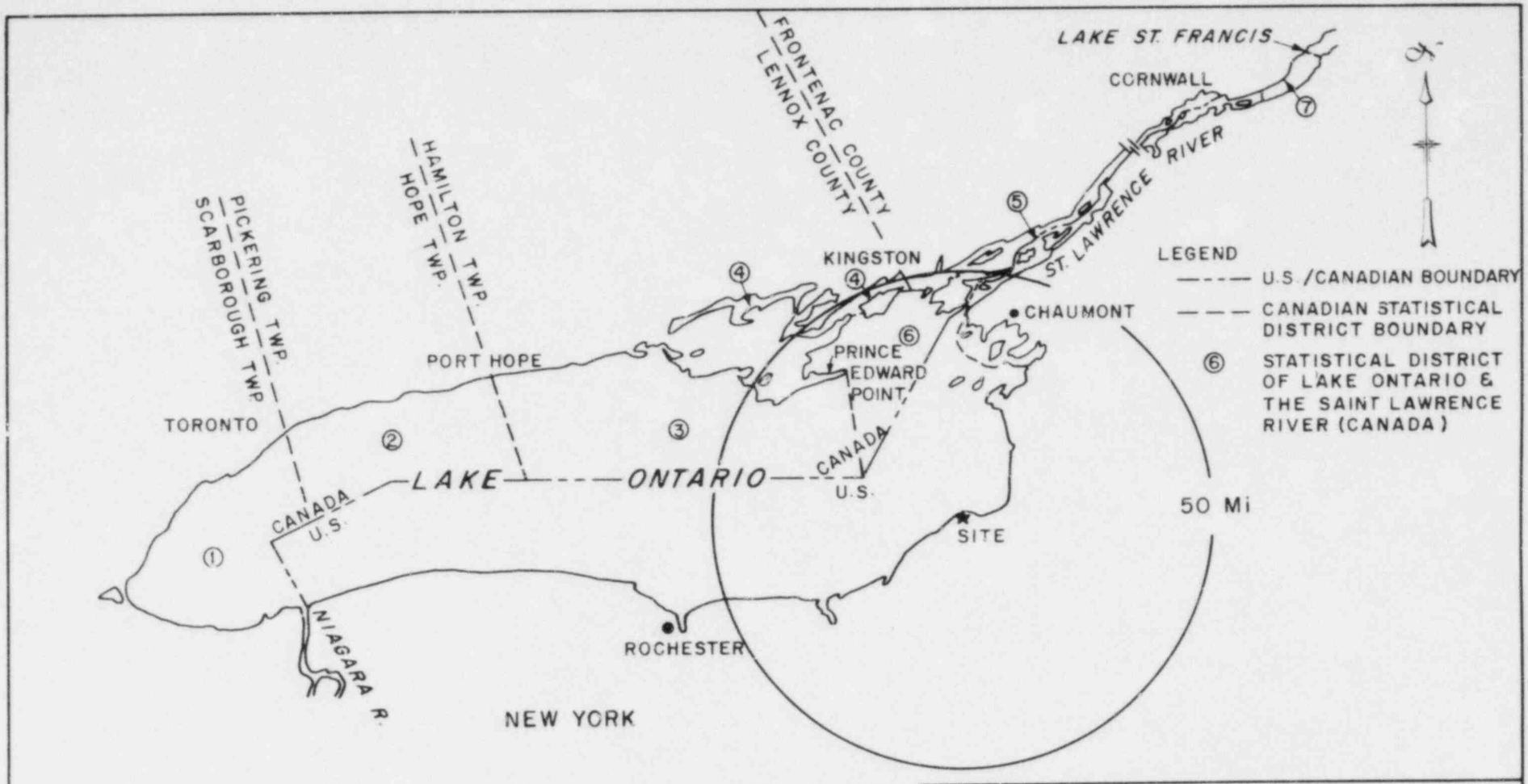
COMMERCIAL LAKE ONTARIO FISH HARVEST
IN CANADIAN DISTRICTS 3, 4, 5, AND 6
1976 - 1981

Species	Total Landings (kg)					
	1976	1977	1978	1979	1980	1981
Bowfin	770	1,952	4,655	984	54	27
Bullhead	134,061	153,344	154,198	144,741	152,129	127,171
Carp	192,247	99,841	3,880	3,791	-	69,136
Catfish	363	3,203	1,688	117	10,817	13,955
Crappie	-*	2,773	5,922	6,081	7,656	12,101
Eel	144,591	173,882	221,964	211,041	156,560	99,347
Freshwater Drum	1,340	2,200	92	28	-	373
Lake Herring	6,975	5,318	5,515	13,494	5,311	2,412
Lake Trout	1,074	35	35	-	-	45
Lake Whitefish	1,637	4,285	2,120	1,268	4,133	769
Northern Pike	9,856	6,815	11,623	18,890	19,827	16,200
Pacific Salmon	-	-	-	-	-	-
Rock Bass	35,750*	26,357	16,491	10,264	5,940	8,602
Shad	-	680	1,315	-	-	282
Smelt	27,009	20,871	27,126	24,942	22,169	24,955
Sturgeon	250	1,953	353	12	369	300
Sunfish	81,263	67,177	60,373	62,024	62,864	52,728
Sucker	4,058	5,144	4,255	7,606	4,913	4,516
White Bass	1,285	3,022	2,500	1,331	3,290	1,933
White Perch	330,579	192,791	227,432	46,520	55,336	44,257
Yellow Perch	259,673	260,517	319,345	297,754	266,439	553,078
Yellow Pickerel	607	1,502	7,347	23,917	57,383	1,432
Total	1,233,388	1,033,662	1,078,229	874,805	835,190	1,033,619

SOURCE: 46

*Combined total - rock bass and crappies.

3



SOURCE: Ontario Ministry of Natural Resources, 1983

FIGURE 2.3-15

COMMERCIAL FISHING AREAS - LAKE ONTARIO UNITED STATES & CANADA

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
ENVIRONMENTAL REPORT-OLS

A comparison of the L_{eq} and L_{10} levels with the L_{90} level can be used to determine the level of activity at each site. The statistical hourly noise data obtained at Site 1, located in a relatively quiet area (the Ontario Bible Conference Camp), show very little additional noise impact above the measured ambient (L_{90}) noise levels. The same is true at Site 3, between 1800 and 0700 hr. However, the increase in the L_{eq} and L_{10} levels obtained during the other times of the day correspond with the increased levels of activity expected during the daylight hours. Sites 3 and 4 show a much larger impact in the measured ambient (L_{10}) noise levels. However, this impact is primarily due to the effect of relatively light traffic which tends to be the dominant manmade noise source in the Nine Mile Point area.

2.10.3 Federal and State Standards

There are currently no environmental noise regulations applicable to the operation of nuclear generating facilities. However, community noise guidelines have been established by such agencies as the Environmental Protection Agency (EPA) and the Department of Housing and Urban Development (HUD).

The Joint Working Paper for the Preparation of Environmental Reports for Generating Facilities in New York State[1], prepared by the NRC and the New York State Public Service Commission, does not specify allowable noise emission levels, but references the EPA's document on noise levels[2] and HUD's Circular 1390.2[3], which has since been superseded by 24CFR, Part 51, Subpart B. These documents provide suggested levels that should be used as a guideline for license review and environmental impact assessment. The HUD acceptability criteria were established as a departmental guideline for review of publicly funded housing projects to ensure that the acoustical environment of the proposed site is adequately addressed. This guideline recommends an L_{dn} level that does not exceed 65 dBA. 3

In its 1974 publication of the Levels Document[2], the EPA identifies an L_{dn} of 55 dBA as "adequate to protect the public against hearing loss, activity interference, and annoyance outdoors in residential areas, farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use." The L_{dn} (day/night) level is the A-weighted energy average sound level with a 10 dBA correction added to the nighttime levels. A 55-dBA L_{dn} level is equivalent to a constant 24-hr sound level of 49 dBA. 3

2.10.4 References

1. Nuclear Regulatory Commission and New York State Public Service Commission. Joint Working Paper for the Preparation of Environmental Reports for Generating Facilities in New York State, August 1977.

2. Environmental Protection Agency, Office of Noise Abatement and Control. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, 550/9-74-004, Washington, DC, March 1974.

3. Department of Housing and Urban Development. Noise Abatement and Control: Departmental Policy, Implementation Responsibilities, and Standards, Department Circular 1390.2, Washington, DC, September 1971.

4. Code of Federal Regulations, Title 24, Housing and Urban Development (HUD), Part 51, Subpart B, Noise Abatement and Control, August 1979.

CHAPTER 3

PLANT DESCRIPTION

3.1 EXTERNAL APPEARANCE AND PLANT LAYOUT

3.1.1 Description of the Project

Unit 2 is located between Nine Mile Point Unit 1 (Unit 1) and the James A. FitzPatrick (JAF) plant. The major station structures of Unit 2 are connected to the Unit 1 station structures by a passageway. Unit 2 follows the basic visual character of Unit 1 through the use of compatible color treatment and similar materials, including concrete and metal siding.

The reactor building, natural-draft cooling tower, and main stack dominate the skyline. The reactor building has a drum-like cap sheathed in fluted metal siding that contrasts with the lower concrete portion. The exposed surface of the lower portion of the reactor building, the cooling tower, and the stack are cast-in-place concrete that is untextured and natural in color. Tanks and open metal frame structures, such as transmission towers and switchyards, are protected with corrosion-resistant coatings.

Permanent station roads and parking areas are asphalt paved. An existing railroad line extends to the Unit 2 reactor building and turbine building (Figure 3.1-1) to provide rail freight access.

The site is landscaped to blend with the surrounding natural topography, consistent with security requirements. Land previously cleared and excavated during construction of adjacent power stations has been utilized during construction of Unit 2 for temporary office facilities, laydown area, switchyard and parking areas, thus minimizing the additional excavation around the station structures. At the conclusion of construction activities, the majority of this area, except for some office facilities and portions of parking areas, will be graded and seeded to promote the return of vegetative cover. To control erosion in areas not planted with trees or shrubs, ground cover of either lawn or crushed stone is provided.

The Energy Information Center, located in the northwest portion of the site, is a contemporary stone and glass ranch-style structure used for public education and is a tourist attraction. Here, a three-part show is offered on

nuclear electric power, the growth of energy in upstate New York, the story of Niagara Mohawk Power Corporation (NMPC) and the Power Authority of the State of New York (PASNY), and the operation of Unit 1. This show includes a working scale model of the plant and a nuclear fission display. There are also energy exhibits, nature trails, and picnic areas on the bluffs overlooking Lake Ontario.

Figure 3.1-1 presents the station layout, including major structures, buildings, and important roads. The baseline site topography, including baseline and proposed contours and landscaping around the structures, is shown on Figure 3.1-2. Figure 3.1-3 shows the location and elevation of release points for gaseous wastes. Figures 3.1-4 through 3.1-7 present ground-level photographs of the site from different locations. Figure 3.1-8 shows an architectural rendering of the plant.

3.1.2 Ground-Level Photographs of Site

To assess visual impact, visually sensitive and intensive land uses (e.g., residential concentrations, major transportation routes, state and local historic sites, and recreational attractions) within 10 km (6.2 mi) of Unit 2 were identified. Properties listed in the National Register of Historic Places were identified within 16 km (10 mi) of the Unit 2 site. Visually sensitive locations were visited in late October, when foliage density was lower than at other times of the year. Sites surveyed for potential visual impact are identified and described in Table 3.1-1 and shown on Figure 3.1-9.

Surveys began with reconnaissance of all viewing locations. Photographs were taken in the direction of Unit 2 at locations from which distant views were possible. Where plant structures would be clearly visible within 10 km (6.2 mi), plant perspectives, based on distance and direction from photograph locations, were provided by computer and superimposed on the photographs. These visual perspectives are presented on Figures 3.1-4 through 3.1-7.

As discussed in Section 2.2.1, Unit 2 is located in a region of predominantly rural residential, agricultural, and forest land uses. The potential for visual impact of the plant is minimized by the remoteness of the site. Vegetation and topography screen or block views of the plant at most visually sensitive areas. In addition, since the industrial character of the area has already been established by Unit 1 and the JAF plant, the change in visual quality associated with Unit 2 is marginal. Unit 2 will not significantly im-

pact the overall visual quality of the area. The view of the cooling tower will be the only noticeable change.

The cooling tower is 165 m (541 ft) above ground level and is visible at some locations, as shown for selected locations on Figures 3.1-4 through 3.1-7. Depending on meteorological conditions, the natural-draft cooling tower will emit evaporative plumes that may be visible from locations within the 16-km (10-mi) area. Expected visible plume occurrences are described in Section 5.3.3.1, and predicted frequency of plume occurrences are shown in FSAR Figures 2.3-1 through 2.3-25. The anticipated plumes for 5-percent, 1-percent, and 0.1-percent occurrences at selected locations are shown on Figures 3.1-4 through 3.1-7, and an analysis of their visual impacts is presented in Section 5.8.1.1. The plume occurrence denotes the maximum extent of plume that is visible for a certain percent of time, as shown on the figures. 1

Starting in April and continuing through September, when recreational activities on the lake and along the shoreline are frequent, the cooling tower will be visible from the shoreside by fishermen, recreational users, and others at facilities such as the Ontario Bible Conference Association Camp (a lakefront facility bordering the site on the west).

Cooling tower plumes are not expected to have a significant visual impact. Most visually sensitive sites, listed in Table 3.1-1, are located in vegetated or developed areas, specifically within the city of Oswego. Therefore, distant views that might include the plume are not possible from these sites. However, at locations along the shoreline at elevated grades, such as Fort Ontario (Figure 3.1-5), plumes may be visible. 1

The visual impact of Unit 2 is minimal due to the limited number of locations from which the plant is visible, the lack of visibility from many visually sensitive or intensive land use areas, and the small portion of plant structures that can be seen above the surrounding vegetation.

3.1.3 Architectural Rendering of the Plant

Figure 3.1-8 shows an architectural rendering of the Unit 2 facility, including all major station features and landscaping whether actually completed or planned.

DOCUMENT/ PAGE PULLED

ANO. 8309190217

NO. OF PAGES 1

REASON

☐ PAGE ILLEGIBLE

☐ HARD COPY FILED AT. PDR CF

OTHER _____

☐ BETTER COPY REQUESTED ON __/__/__

☒ PAGE TOO LARGE TO FILM

☒ HARD COPY FILED AT: PDR (CF)

OTHER _____

☒ FILMED ON APERTURE CARD NO 8309190217-01

3.3 PLANT WATER USE

3.3.1 Water Consumption and Use

During normal operation, an average of 3,380 l/s (53,600 gpm) of lake water is withdrawn from Lake Ontario and utilized mostly as cooling water. Figure 3.3-1 schematically illustrates the water flow and use at Unit 2. As illustrated, the water from Lake Ontario enters the system via the screenwell and is circulated throughout the system by the service water pumps. Table 3.3-1 lists the calculated cooling water flows and associated temperatures for Unit 2 over a 12-month period. Data presented in Table 3.3-1 represent the maximum, minimum, and average flows expected. The total flow is significantly reduced during a shutdown condition. The following discussion describes the pattern of flow for normal operation.

Upon entering the screenwell, 940 l/s (14,925 gpm) of flow are directed to the fish diversion system, which discharges to Lake Ontario. The remaining 2,440 l/s (38,675 gpm) of flow passes through the screenwell to the service water system.

The main flow path from the service water system is to the circulating water system and the service water bypass. Approximately 1,580 l/s (25,000 gpm) are utilized as makeup to the circulating water system, and an average of 860 l/s (13,675 gpm) are returned to the lake. Of the 1,580 l/s (25,000 gpm) entering the circulating water system, an average of 625 l/s (9,920 gpm) is lost by evaporation and drift from the cooling tower. The remaining outflow from the circulating water system is 955 l/s (15,080 gpm), which returns to the lake via the discharge tunnel.

Minimal flow is anticipated for the makeup demineralizer, chemical waste treatment, reactor building usage, turbine building usage, and radwaste system. Initially, these systems would require filling (approximately 3.4×10^6 l [900,000 gal]) at a rate of 13 l/s (200 gpm). These systems are shown on Figure 3.3-1 as the dashed-block section, because these systems require minimal flow (closed circuit area). Minimal losses are anticipated and only makeup water is required.

Table 3.3-2 lists the estimated water use outflows for the various systems, which vary depending on the mode or condition of the system. Therefore, the various flows for minimum, maximum, and refueling conditions are tabulated.

As indicated, the discharge rate under a maximum condition is low, once the system is online.

Flows for various water uses are listed in Table 3.3-2. During normal plant operation, the reactor building systems utilize a minimum of 0 to 1.3 l/s (20 gpm) and a maximum of 57 l/s (910 gpm) for the durations noted. Collectively, the turbine building users and the radwaste building users consume a minimum of 0 to 27 l/s (425 gpm) and 0 to 2.8 l/s (45 gpm), respectively, under normal plant operation.

The water treatment system is designed for a maximum flow of 16 l/s (250 gpm), of which 3 l/s (40 gpm) are used as seal water for the circulating water pumps. The remaining 13 l/s (210 gpm) are for makeup water system use, as needed.

The Oswego City Water Supply is the water source for the sanitary system. Other uses of the Oswego City Water Supply are as shown on Figure 3.3-1.

In summary, the station water use is extremely small. The Unit 2 withdrawal rate is approximately 0.03 percent of the average flow through Lake Ontario, as discussed in Section 5.2.1.

3.3.2 Water Treatment

3.3.2.1 Circulating Water System

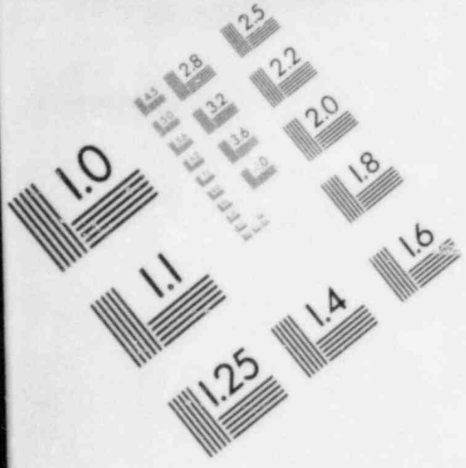
Sulfuric acid and sodium hypochlorite are added to the circulating water system to maintain scale-free and clean heat exchange surfaces. Descriptions of both the sulfuric acid and sodium hypochlorite subsystems follow. A schematic flow diagram of sulfuric acid and hypochlorite addition systems is shown on Figure 3.3-2. Neither pretreatment of the makeup water nor treatment of the cooling tower blowdown is necessary.

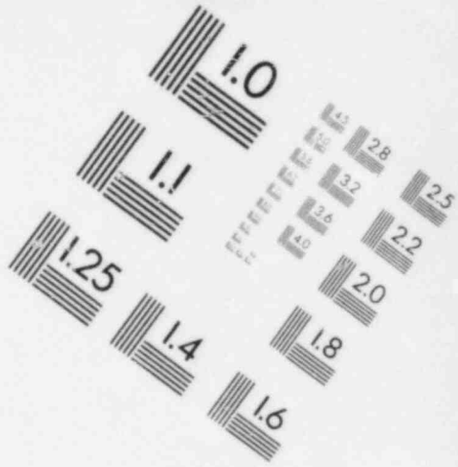
Sulfuric Acid Addition

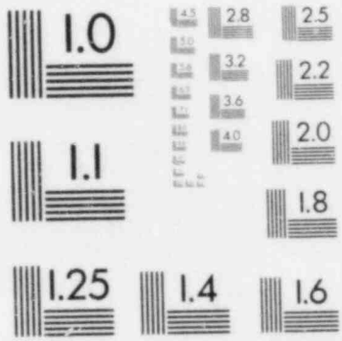
Calcium carbonate scaling in piping, in the tower, and in the condenser is controlled by converting calcium carbonate, a natural constituent of the lake water, to calcium sulfate via sulfuric acid addition. Sulfuric acid is added to reduce, but not completely remove, the alkalinity of the circulating water, thereby controlling calcium carbonate scaling by shifting the carbonate/bicarbonate equilibrium.

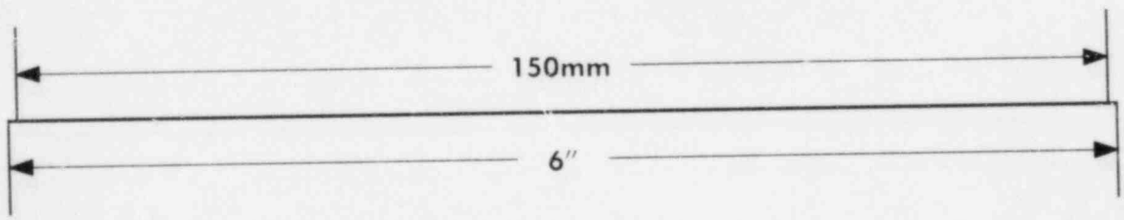
3 When Unit 2 is operating at full load, dilution water for the acid feed system is taken from the discharge side of the

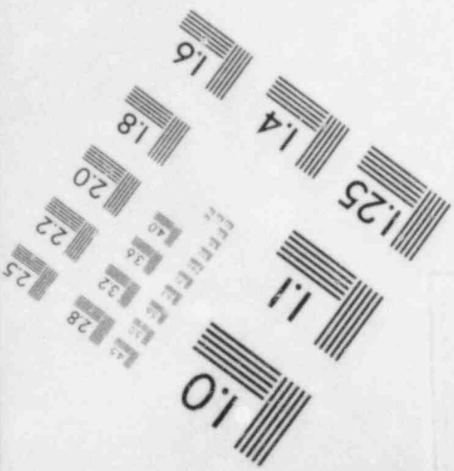
IMAGE EVALUATION TEST TARGET (MT-3)











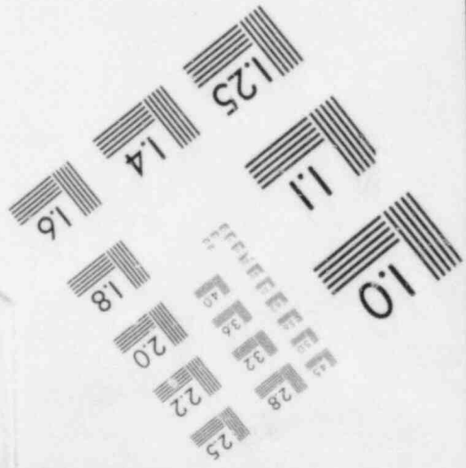
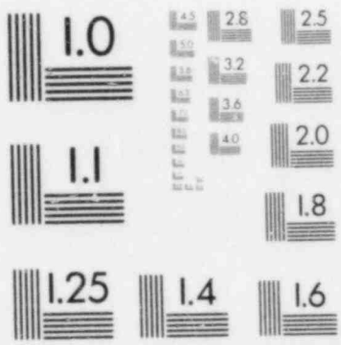


IMAGE EVALUATION
TEST TARGET (MT-3)



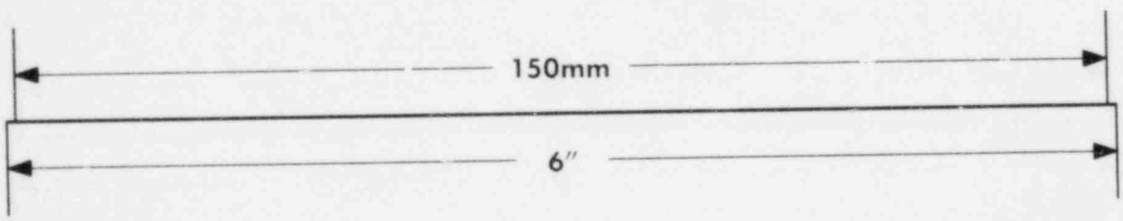
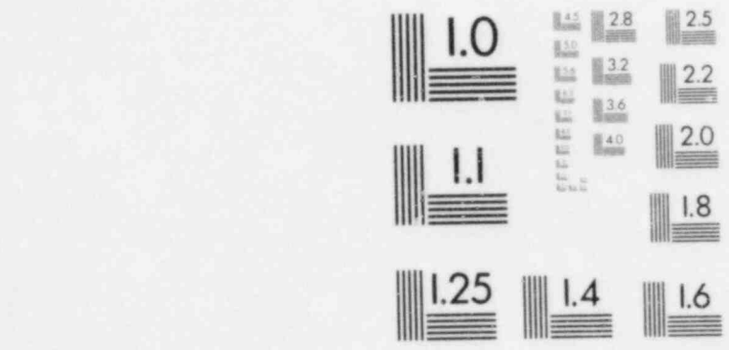
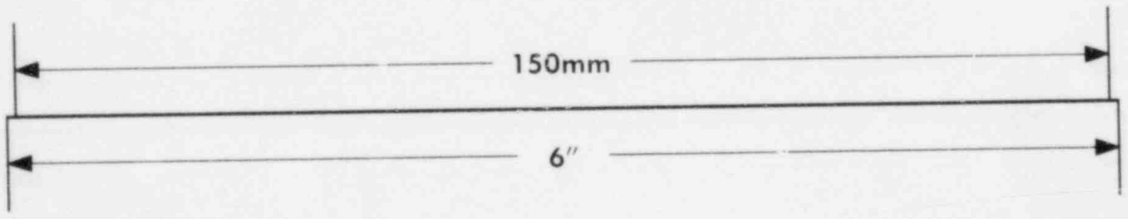


IMAGE EVALUATION TEST TARGET (MT-3)





condenser at two points. Approximately 0.06 l/s (1 gpm) of 93 percent sulfuric acid is added to the circulating water system at the discharge side of each condenser. Acid addition is continuous and manually controlled. 3

The sulfuric acid storage tanks are installed in an acid-resistant building and have inherent design features that contain any spillage due to rupture or leakage of a tank.

Sodium Hypochlorite Addition

Biofouling in the circulating water system is controlled by using sodium hypochlorite, which acts essentially the same as chlorine, but is safer to handle. Sodium hypochlorite reduces reproduction of algae, fungi, and bacteria. The condenser and cooling tower will be treated daily with sodium hypochlorite within the limits prescribed by the EPA[1]. These limits are 2 hr/day of chemical treatment, not to exceed a total residual chlorine level of 0.2 mg/l (average) and 0.5 mg/l (maximum) in accordance with SPDES permit requirements.

Sodium hypochlorite is produced onsite by the reaction of salt and water in an electrolytic cell. The equipment has the capacity to generate sodium hypochlorite at a maximum rate of 907 kg (2,000 lb) of chlorine equivalent per day. The hypochlorite produced is stored in a hypochlorite storage tank from which it is fed into the circulating water system as needed. Similar to the acid storage tanks, the hypochlorite storage tank is also designed to contain any spillage. Sodium hypochlorite solution is injected into the circulating water system directly ahead of the condenser. The amount of hypochlorite added depends on the chlorine demand of the circulating water as well as the frequency and duration of chlorination. The rate of chlorine addition is controlled automatically by a continuous chlorine analyzer, located immediately downstream of the condenser, to ensure that the concentration of free available chlorine is below 0.5 mg/l at the outlet of the condenser, in conformance with EPA standards. Automatic feedback control is performed by the free chlorine analyzer. The circulating water system is expected to be chlorinated once a day for a 30-min period. Based on the preceding chlorination characteristics and the EPA Residual Model[2], calculations indicate that both free available and total residual chlorine concentrations comply with applicable federal effluent regulations specified in 40CFR423[1].

3.3.2.2 Makeup Water Treatment System

The makeup water treatment system is designed to remove dissolved and suspended solids from raw lake water to produce high-quality filtered demineralized water. Demineralized water is necessary for use during plant operation as makeup or washdown by various systems in the turbine, reactor, and radwaste buildings. The makeup water system is composed of:

1. Pretreatment process - an anthracite and an activated carbon filter.

2. Demineralizer process - degasifer, weak and strong cation, weak and strong anion, and mixed-bed ion exchange units.

The demineralized water product is pumped to the makeup water system and distributed as required or stored for subsequent use.

The expected makeup water system product water quality is as listed in Table 3.3-3.

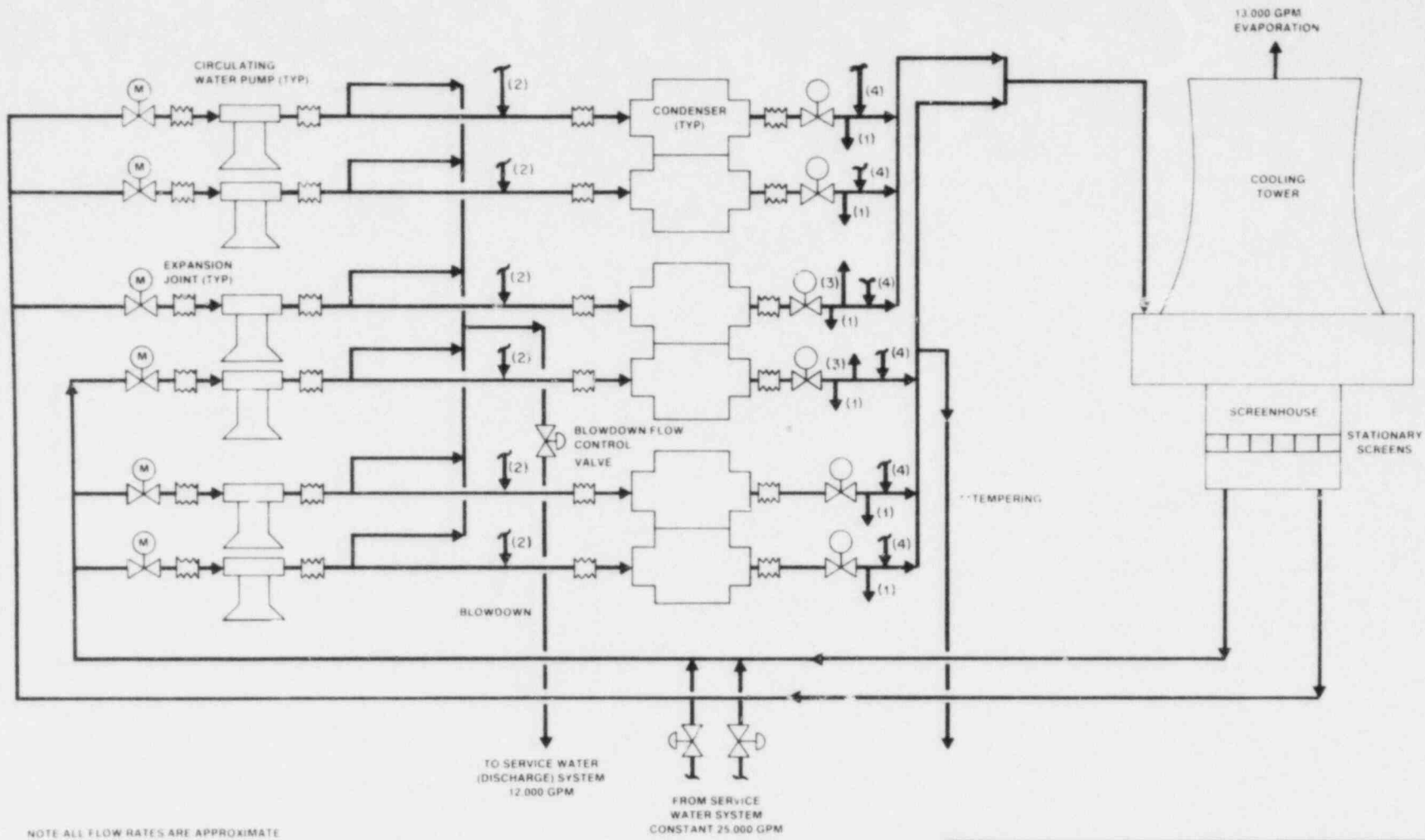
Essentially, all dissolved constituents present in water are removed by the cation and anion demineralizers. The mixed-bed demineralizers serve as a polishing unit to remove trace quantities of dissolved solids that may pass through the cation or anion demineralizers.

The cation-anion and mixed-bed demineralizers require periodic regeneration using sulfuric acid and sodium hydroxide to restore resins to the hydrogen and hydroxyl form. During normal operation, it is expected that the makeup demineralizer system will require regeneration approximately twice a month. During startup, the demineralizers may be regenerated as frequently as once a day to provide sufficient demineralized water to the steam generator. The approximate quantities of chemicals expected to be used per regeneration are as follows:

1. Sulfuric acid (489 kg [1,079 lb] as 93% H_2SO_4).
2. Sodium hydroxide (267 kg [589 lb] as 50% NaOH).

3.3.2.3 Condensate Demineralizer System

The condensate demineralizer system demineralizes and polishes water from the condensate system. The expected condensate demineralizer system product water quality is as listed in Table 3.3-4.



NOTE ALL FLOW RATES ARE APPROXIMATE

TEMPERING WILL BE PROVIDED DURING WINTER WHEN INTAKE WATER TEMPERATURE IS BELOW 38 F

(1) TO HYPOCHLORITE SYSTEM
(2) FROM HYPOCHLORITE SYSTEM
(3) TO ACID FEED SYSTEM
(4) FROM ACID FEED SYSTEM

FIGURE 3.4-1

CIRCULATING WATER SYSTEM

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
ENVIRONMENTAL REPORT-OLS

as follows: for the January-March period, 1.48; April-June, 1.76; July-September, 1.85; and October-December, 1.60.

3.6.1.1.5 Operating Cycles for Each Waste Treatment System or Discharge

The cooling tower blowdown represents a continuous and relatively constant flow waste stream during normal Unit 2 operation. The average blowdown rate is 950 l/s (15,068 gpm); the minimum blowdown rate, which dictates the maximum chemical concentrations, is 706 l/s (11,188 gpm). Sodium hypochlorite addition is not constant and depends on the chlorine demand of the circulating water. In addition, the duration and frequency of sodium hypochlorite addition are altered to ensure compliance with SPDES permit requirements of 0.2 mg/l (average) and 0.5 mg/l (maximum) total residual chlorine for no longer than 2 hr/day. 3

Sulfuric acid additions to the circulating water system are likewise controlled by demand, in this case, alkalinity. Quantities are not likely to fluctuate to any great degree, due to the rather narrow range of alkalinity values reported for Lake Ontario's Nine Mile Point region (Section 2.3.3).

Makeup demineralization wastewaters are generated approximately once per month. During startup, the large additional demand of high-quality water necessitates regeneration once a day. The quantities of sodium hydroxide and sulfuric acid per regeneration are listed in Section 3.3.2.

3.6.1.2 Discharges to Land: Characteristics and Quantities of Sludges and Proposed Methods of Ultimate Disposal

Sludge and sediment accumulated in the cooling tower basin are projected to be removed at 5-yr intervals. These materials consist of solids including chemicals and biocides, concentrated through the evaporative cooling process and collected in the cooling tower basin. The 5-yr estimated volume is 1,668 cu m (58,900 cu ft). The sludge will be chemically analyzed, removed, and disposed of offsite in a New York State-licensed disposal facility suitable for wastes of this nature. With the exception of the sanitary waste sludge and miscellaneous solid waste, there are no other planned discharges to land.

3.6.1.3 Discharges to Air

The natural-draft cooling tower requires 19 to 38 million l/s (40 to 80 million cfm) of ambient air to dissipate the waste heat from the main condenser in the circulating water system. The airflow rate is dependent on ambient atmospheric conditions and therefore varies throughout the year, reaching a maximum in the winter. The effluents are commonly described as cooling tower drift and visible plumes.

3.6.1.3.1 Cooling Tower Drift

As the circulating water flows through the fill section of a cooling tower, the action of the falling water over the splash bars creates small water droplets, some of which are entrained in the air flowing through the tower. The size distribution of these droplets is given in Section 5.3.3.1.1.2. Most droplets are between 10 and 600 microns. Those droplets which leave the tower in the exit airflow are referred to as drift. The drift rate for natural-draft cooling towers varies with the exit airflow. Based on manufacturers' standard designs for natural-draft cooling towers, a maximum drift rate of 0.005 percent of the circulating water flow is assumed. This results in a maximum drift emission rate of about 0.76 l/s (12 gpm).

3.6.1.3.2 Evaporation

Ambient air induced through a cooling tower becomes heated and moisture-laden as a result of the evaporative cooling process, and a visible plume is formed when the air is discharged from the tower. The frequency of occurrence and extent of the visible plume depend upon meteorological conditions existing at the time and upon the design and physical parameters of the cooling tower. A detailed evaluation of visible plume occurrences is presented in Section 5.3.3.1.1.1.

For a given ambient wet-bulb temperature, an increase in relative humidity of ambient air results in a decrease in total moisture removed by cooling tower exit air and a decrease in the evaporative cooling. Conversely, a decrease in ambient relative humidity results in an increase in cooling tower exit air moisture content and an increase in the evaporative cooling. At the design wet-bulb temperature of 23°C (74°F) and a relative humidity of 50 percent, the increase in moisture content of air in the tower is 0.018 kg (0.039 lb) of water per 0.454 kg (1 lb) of dry air. With ambient relative humidities of 25 and 100 percent, the

increases in moisture content are 0.024 and 0.012 kg (0.053 and 0.026 lb) of water per 0.454 kg (1 lb) of dry air, respectively. The effects of these additional amounts of moisture added to the atmosphere on ground-level ambient relative humidity are discussed in Section 5.3.3.1.1.5.

3.6.2 Sanitary Waste Treatment

The normal sanitary waste flow from Unit 2, based on a normal operating force of 300 people and an estimated 124 l/day/person (33 gpd/person), is 37,472 l/day (9,900 gpd). The maximum flow, based on an estimated maintenance outage work force of 1,500 people, is 187,358 l/day (49,500 gpd).

Sanitary wastes from Unit 2 will be treated along with sanitary wastes generated at Unit 1. The combined sanitary waste flows will be treated and monitored to comply with the following State Pollutant Discharge Elimination System (SPDES) permit effluent limitations:

Parameter	Limits
Settleable solids	0.1 mg/l maximum daily
Total suspended solids	25 mg/l average daily(1) 45 mg/l maximum daily(2)
5-day biochemical oxygen demand (BOD_5)	25 mg/l average daily(1) 45 mg/l maximum daily(2)
Chlorine residual	0.5 ppm maximum daily
pH	6.0-9.0
Fecal coliforms	200 MPN/100 ml - 30-day geometric mean 400 MPN/100 ml - 7-day geometric mean

Sanitary waste sludge will be disposed of by a contractor in accordance with NYCRR, Title 6, Chapter 360.

---

(1) Daily average calculated by dividing monthly discharge by number of days in month.
(2) Daily maximum is maximum discharged in one day.

3

3.6.3 Other Wastes

3.6.3.1 Descriptions of Miscellaneous Wastes

Waste streams discussed in this section include filter backwash, storm water, roof drains, nonradioactive plant drains, treated radioactive wastewater, transfer pit drain, and cooling tower sludge. Filter backwash consists of resuspended filtered lake water solids. The quality and quantity of storm water and roof drains are essentially that of incident precipitation. The nonradioactive plant drains consist of administration building, service building, and water treatment and demineralizer building floor drains. (Turbine and reactor building drains go to the radwaste treatment system.) Treated radioactive wastewater is composed of drains and reject waters treated for removal of radioactive substances (Section 3.5). The floor drain for the diesel generator building and the transfer pit drain have the potential for contamination with oil. Cooling tower sludge consists of suspended solids retained in the cooling basin.

3.6.3.2 Estimates of Waste Quantities to be Disposed and Their Pollutant Concentration at Points of Release

The filter backwash generates 0.032 cu m/sec (50 gpm) of wastewater for a 15-min period once every 3 weeks. The suspended solids concentration will vary as a function of the quantity of suspended matter in the lake water filtered to supply the makeup water system.

The quantities of storm water and roof drainage vary and are directly dependent upon the storm event that generates them. The design flow is based on a maximum daily (24-hr) rainfall of 12.7 cm (5 in), with a return frequency of 100 yr. Nonradioactive floor drains are discharged to the storm drain system at variable flow rates, dependent upon maintenance and cleaning schedules for the facility. The combined nonradioactive floor drains, storm water, and transfer pit and roof drains are estimated to generate a flow not greater than 14,000 cu m/day (3.7 mgd). Treated radioactive wastewaters are quantified in Section 3.5. The volume of cooling tower sludge generated in 5 yr is estimated to be approximately 1,668 cu m (58,900 cu ft). The cooling tower sludge removal frequency from the cooling tower basin is anticipated to be once every 5 yr.

fraction of the station water use. Table 3.3-1 details the evaporative losses associated with plant cooling water use (a maximum of 0.871 cu m/sec [13,800 gpm], a minimum of 0.246 cu m/sec [3,900 gpm]) and lists service water and fish diversion system maximum, average, and minimum monthly flow rates.

Lake Ontario water is used for drinking water supply, industrial water supply, agricultural water supply, commercial fishing, sportfishing, swimming, boating, and commercial shipping, as discussed in Section 2.3.2. Unit 2 operation will not impact the availability of drinking, agricultural, and industrial water supplies, considering the low rate of consumption of Lake Ontario water (Section 5.2.1).

No impact on swimming, recreational boating, or commercial shipping will occur as a result of Unit 2 operation. The facility intake structures, located approximately 290 and 320 m (950 and 1,050 ft) offshore and approximately 167 and 137 m (550 and 450 ft) closer to shore than the discharge structure, are well removed from any swimming recreational use (Section 2.5.2). The intake structures (located at a lesser depth than the discharge structure) are submerged 3.05 m (10 ft) below the mean low surface water elevation. Station operation will not change surface water elevations, and no significant alteration of circulation patterns is expected (Section 5.2.1); thus recreational boating will not be affected by station operation. Commercial shipping vessels pass no closer than 11.3 km (7 mi) from the intake and discharge structures and will not be affected by station operation (Section 2.3.2). 3

Commercial and sportfishing water uses will be minimally affected by hydrologic alterations resulting from Unit 2 operation, with impacts restricted to the dilution zone of the thermal plume and localized regions of the intake structures. Standing stocks of commercially and recreationally important species will be subject to insignificant alterations, as discussed in detail in Sections 5.3.1 and 5.3.2.

Groundwater

Groundwater is used for public and private water supplies by several communities in Oswego County (Section 2.3.2). No other groundwater use has been identified. Unit 2 operation will not affect this water use. No station effluents will be discharged to groundwater. An ongoing groundwater dewatering program for the reactor containment foundation will produce a minor cone of depression (Section 5.2.1).

Since all groundwater use occurs upgradient of the site and groundwater discharge onsite is toward the lake, no present or anticipated groundwater uses will be affected by station operation.

5.2.2.2 Analysis of Water Quality Changes and Potential Impacts to Water Use

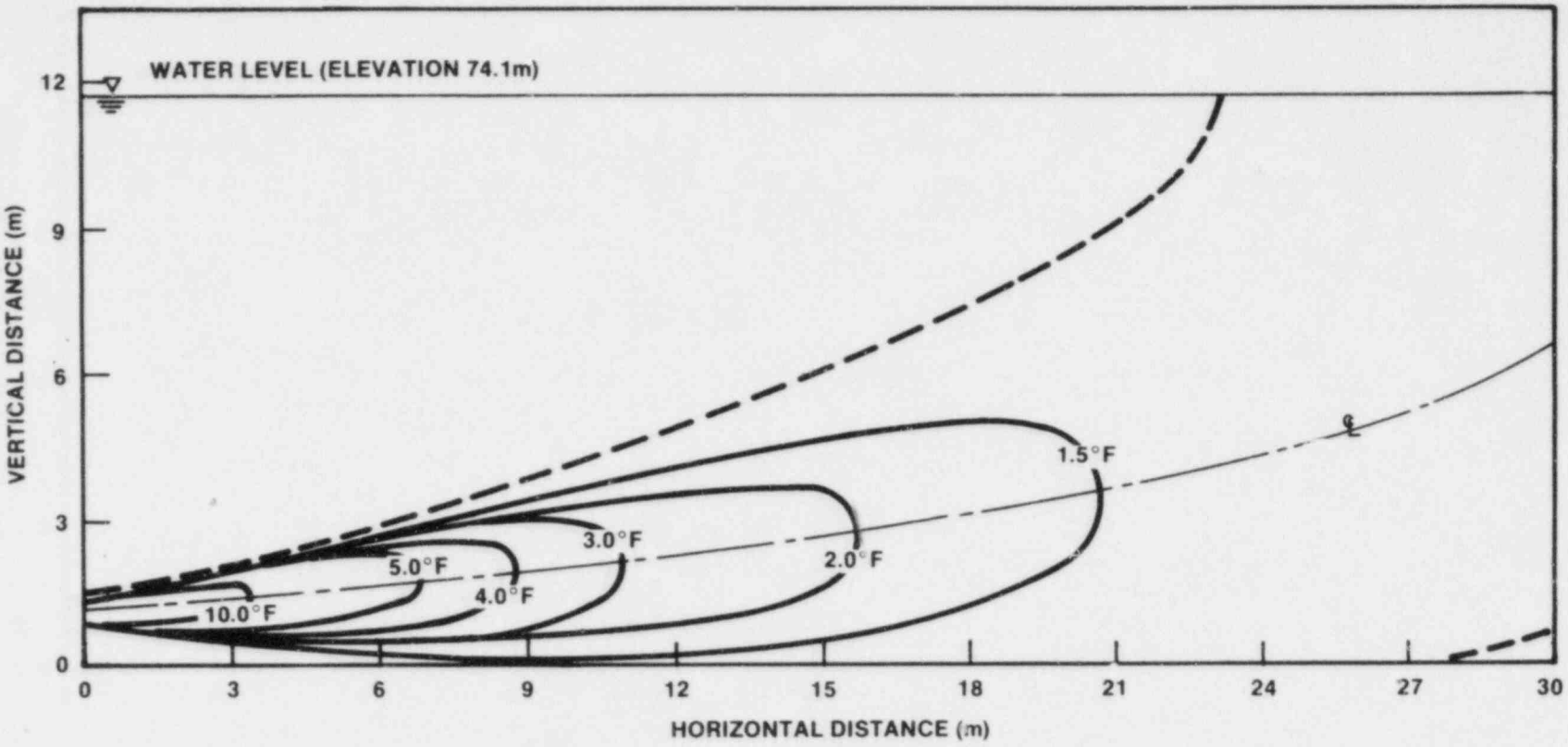
Lake Ontario water uses that are susceptible to impacts resulting from station operation, due to changes in water quality, include swimming, drinking, agricultural and industrial water consumption, commercial fishing, and sportfishing. As discussed in Sections 5.3 and 5.5, thermal and chemical releases from Unit 2 become significantly diluted within a defined region, well before the point of withdrawal or use for drinking water, agricultural or industrial water supplies, or swimming.

Effluent chemical constituents from Unit 2 are largely natural lake constituents concentrated in the circulating water system by a maximum factor of 2.33 and an average factor of 1.67 (Section 3.6.1). Table 3.6-1 lists the concentrations of important water quality parameters at the edge of the dilution zone of the thermal plume and the average concentration in Nine Mile Point regional waters. There is a minor increase of these concentrations at the edge of the dilution zone as a result of station operation. Extensive additional dilution prior to withdrawal or in situ use will result in a negligible impact of plant operation on swimming, drinking, agricultural, and industrial water uses.

Aquatic biota will be subject to impacts of heat, induced flow patterns, and elevated concentrations of water quality constituents in the dilution zone (Sections 5.3.2 and 5.5). However, as discussed in Section 5.3.2, the dilution zone is an extremely small volume fraction of the receiving water body, and wastes discharged to this volume will not produce a significant impact on the average standing stock of commercially and recreationally important fish species. Consequently, there will be no significant impacts to commercial or recreational fishing.

5.2.2.3 Mitigating Measures

Impacts to Lake Ontario water use resulting from the operation of the facility are minimal. Impacts to aquatic biota are mitigated by the fish diversion system (Section 5.3.1). Further mitigation of the minor impacts associated with the water use of Unit 2 is, therefore, unwarranted.



PARAMETERS

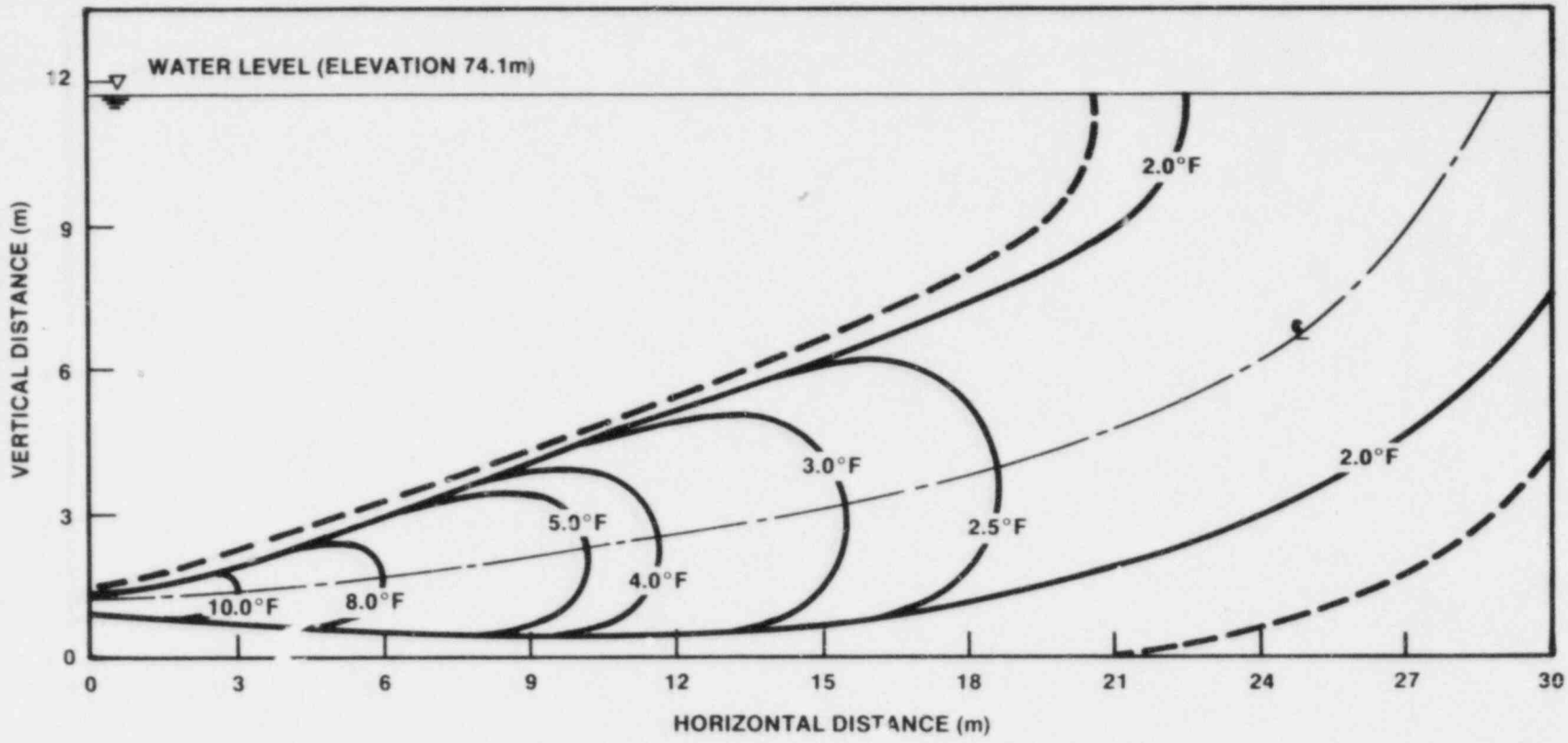
NOZZLE DIAMETER: 0.5m (1.5ft)
NOZZLE ANGLE: 5°up
NUMBER OF NOZZLES: 2

DISCHARGE FLOW: 1.81m 3/s (28,752 gpm)
DISCHARGE ΔT: 9.8°C (17.64°F)
DISCHARGE VELOCITY: 5.51m/s (18.1 fps)

FIGURE 5.3-6

PREDICTED TEMPERATURE DISTRIBUTION—
VERTICAL SECTION ALONG CENTERLINE
ANNUAL AVERAGE CONDITION

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
ENVIRONMENTAL REPORT-OLS



PARAMETERS

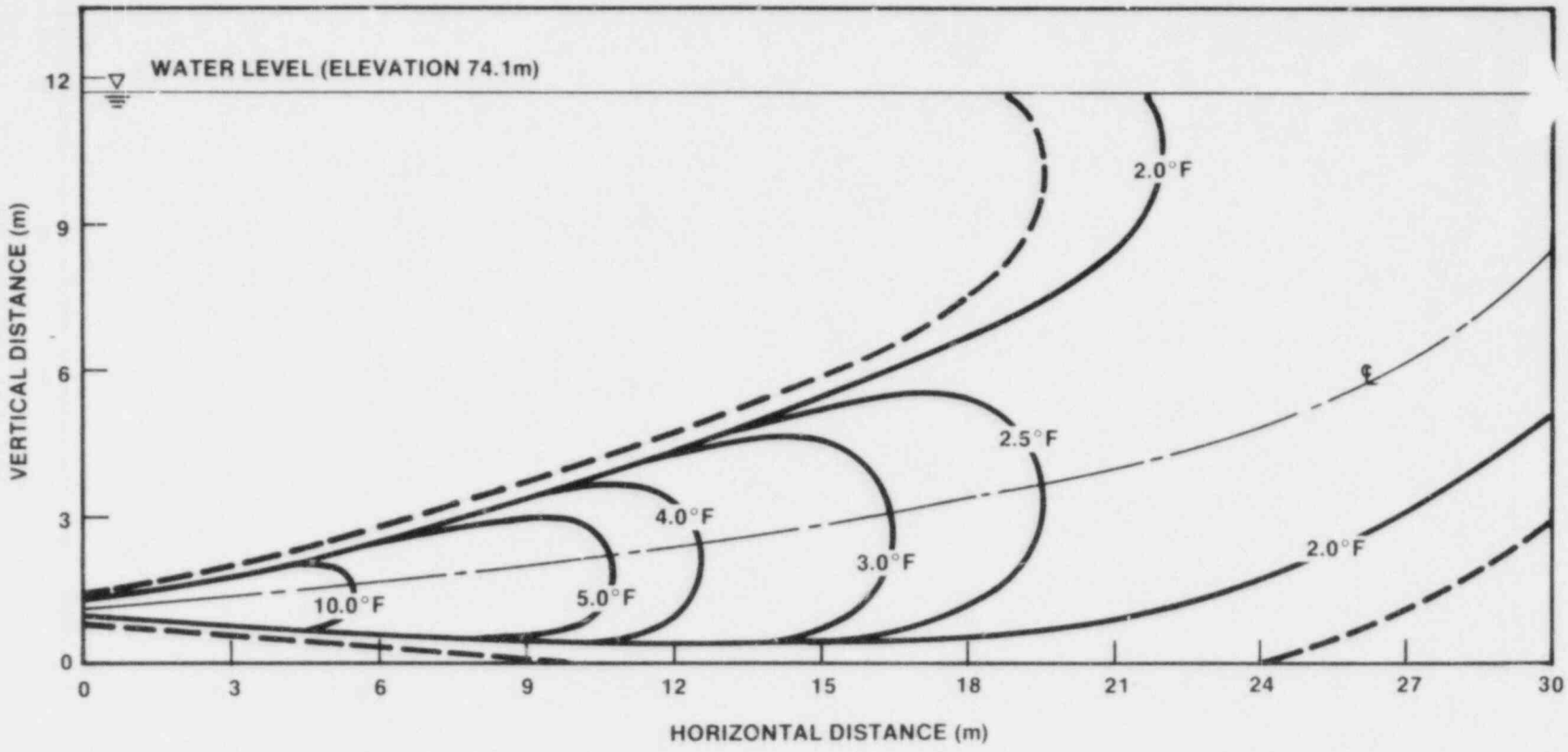
NOZZLE DIAMETER: 0.5 (1.5ft)
NOZZLE ANGLE: 5° up
NUMBER OF NOZZLES

DISCHARGE FLOW: 1.64m 3/s (25,984 gpm)
DISCHARGE ΔT: 14.4°C (25.83°F)
DISCHARGE VELOCITY: 4.99m/s (16.38 fps)

FIGURE 5.3-7

PREDICTED TEMPERATURE DISTRIBUTION—
VERTICAL SECTION ALONG CENTERLINE
SUMMER WORST CONDITION

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
ENVIRONMENTAL REPORT-OLS



PARAMETERS

NOZZLE DIAMETER: 0.5m (1.5ft)
NOZZLE ANGLE: 5°up
NUMBER OF NOZZLES: 2

DISCHARGE FLOW: 1.45m 3/s (23,055 gpm)
DISCHARGE ΔT: 15.5°C (27.99°F)
DISCHARGE VELOCITY: 4.42m/s (14.5 fps)

FIGURE 5.3-8

PREDICTED TEMPERATURE DISTRIBUTION—
VERTICAL SECTION ALONG CENTERLINE
WINTER WORST CONDITION

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
ENVIRONMENTAL REPORT-OLS

TABLE 6.8-1 (Cont)

Section Reference	Description	Frequency	Location	Method
6.4.1 (Cont)	Relative humidity	Continuous 1974-1978	9 m (30 ft), 61 m (200 ft)	Xeritron humidity sensors.
	Dew point	Continuous since 1978	8 m (25 ft)	EG&G 220 dew point sensor.
	Precipitation	Continuous since 1974	Near base of tower	Weathermeasure P511E rain gauge.
	Barometric pressure	Continucus since 1974	Near base of tower	Climatronics sensor.
6.5.1	Terrestrial Ecology	August and September 1979	1.6 km (1 mi) radius of Unit 2	Literature survey, aerial photography, onsite field study
6.5.2	Aquatic Ecology			
6.5.2.1	Preoperational Monitoring			
6.5.2.1.2.1	Phytoplankton Lake studies	Bimonthly or monthly depending upon year and season 1973 through 1978	NMPE, NMPP, NMPW, FITZ at 3,6,12, and 18-m (10,20,40, and 60-ft) depth contours	Whole water samples; Palmer-Maloney cell 1973-1974 and 1977-1978 Utermohl 1975-1976 Chlorophyll 1973-1978 C-14 1974-1978
	Entrainment	Bimonthly or monthly depending upon year and season 1973-1974, 1976-1979	Unit 1 intake and discharge 1973-1975 JAF intake and discharge 1976-1979	Whole water, 1974, 1976; Chlorophyll, 1973-1974, 1976-1979; Productivity, 1973-1979
6.5.2.1.2.3	Microzooplankton Lake studies	Bimonthly or monthly depending upon year and season 1973-1978	NMPE, NMPP, NMPW, FITZ at 3,6,12, and 18-m (10,20,40, and 60-ft) depth contours	76-um mesh vertical tows 1973-1974 Clarke-Bumpus oblique tow 1975-1976, Wisconsin net oblique 1977-1978; Sedgewick-Rafter counting cell 1973-1978

TABLE 6.8-2 (Cont)

Section Reference	Description	Frequency	Location	Method
6.4.2 (Cont)	Barometric pressure	Continuous	Ground level	Teledyne Geotech 40.61 Barometric Pressure Processor BP-100 Aneroid Pressure Sensor
6.5.1	Vegetative stress study	First two years of project operation	1.6-km (1 mi) radius of Unit 2	Aerial infrared photography
6.5.2	Aquatic ecology	As required by SPDES permit	As required by SPDES permit	As required by SPDES permit
6.6.2.2	Chemical	As required by SPDES permit	As required by SPDES permit	As required by SPDES permit

KEY: SPDES = State pollutant discharge elimination system.

The final results of the CRAC2 consequence model are displayed as a set of complementary cumulative distribution functions (CCDFs). A CCDF is defined as the probability that the consequences will exceed a given magnitude. CRAC2 determines the final CCDFs by accounting for all consequences produced for each trial and the associated probability of occurrence. A trial is defined as one combination of accident release parameters, weather conditions, and downwind population. The curves produced from the CRAC2 CCDF output may be then used to evaluate the health and economic risks to the public from a large scale core melt accident in a given region surrounding the plant.

Figure 7A.6.1 provides an overall view of the site region. Figure 7A.6-2 shows a schematic of the CRAC2 consequence model.

Table 7A.6-2 provides identification of the sources for the input parameters to CRAC2 for Unit 2. 3

Tables 7A.6-3 through 7A.6-7 provide the CRAC2 input for Unit 2 for the isotopes, release parameters, evacuation, population, and meteorological data requirements, respectively.

7A.6.2 Discussion of Health and Economic Impacts

The results of CRAC2 computations are presented in Figures 7A.6-3 through 7A.6-8. CCDFs representing acute fatalities, acute injuries, latent fatalities, latent thyroid cancers, total whole-body man-Rem, and property damage, within 80 km (50 mi) of Unit 2 are provided. Table 7A.6-8 shows the sensitivity of early effects (acute fatalities and injuries), late effects (latent fatalities and thyroid cancers), and economic effects (property damage) to various parameters.

Acute fatalities are dominated by the high probability of Release Category 2 (Section 7A.5). Release Category 1, although possessing rather rapid timing and a large quantity of released activity is not as consequential a release as Category 2. Release Category 3 has a relatively high probability but a lower amount of released activity. Category 4 is characterized by releases through the SGTS, therefore the activity released is much lower. Category 4 does not contribute to acute fatality consequences.

Acute injuries are dominated by Categories 2 and 3 due to their relatively high probability of occurrence and higher release fractions. The lower activity magnitude of Release Category 3 is not quite as important for injuries as it is for fatalities because of the lower dose thresholds for

injuries. Release Category 4 makes a small but essentially negligible contribution to acute injuries. The Oswego County, New York Radiological Emergency Response Plan (RERP) outlines six evacuation scenarios covering the various combinations of season and time of day. No one evacuation model dominated early effects. The difference in early effect consequences among the 6 models differed by no more than 10 percent.

2 Latent fatalities and thyroid cancers result from lower doses than those that produce acute fatalities. These are integral effects over large areas and long time periods, and are extrapolated from the radiogenic cancer effects observed following exposure to higher doses such as the Japanese atomic bomb survivors. Because of the affinity of the human thyroid for halogens such as iodine, thyroid cancer is most sensitive to the amount of iodine released. According to the Committee of the Biological Effects of Ionizing Radiation (BEIR)[6], solid tumors may take as long as 30 yr to develop, whereas leukemia can occur within 5 yr. Release Categories 2 and 3 with their higher probabilities of occurrence, dominate the latent fatality CCDFs. Release Category 2, with its higher iodine release, dominates the thyroid cancer CCDFs. The thyroid cancer results include both malignant and benign radiogenic tumors.

2 Economic impact is assessed in terms of the cost to all affected property and includes both evacuation and relocation costs. As with latent effects, property damage CCDFs are dominated by Release Categories 2 and 3.

2 Figure 7A.6-7 provides the CCDFs for total cost with and without decontamination. When decontamination procedures are carried out, this adds cost; however, the decontamination restores property to economic use, and the interdiction costs are reduced. Although decontamination is expensive, it is a one-time cost, whereas interdiction of property, particularly farm property, has a long-term effect and hence creates greater economic loss and hardship. This is reflected in the CCDFs in Figure 7A.6-7. The probability of a given dollar loss is greater when decontamination is not performed. This reflects the higher (long-term) interdiction costs.

2 The demography and annual wind rose frequencies for the Unit 2 site are such that approximately 55 percent of the time the wind blows out over Lake Ontario including sectors containing both land and lake. Only 9 percent of the total 80-km (50-mi) regional population resides in sectors which border Lake Ontario, and one-half of these people live

QUESTION E240.5 (5.6)

Descriptions of floodplains, as required by Executive Order 11988, Floodplain Management, have not been provided. The definition used in the Executive Order is:

Floodplain: The lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore islands, including minimum that area subject to a one percent or greater changes of flooding in any given year.

a) Provide descriptions of the floodplain adjoining Lake Ontario adjacent to the site and plant facilities. On a suitable scale map(s) provide delineations of those areas that will be flooded during the one percent (100 year) flood both before and after plant construction.

b) Provide details of the methods used to determine the floodplain in response to a) above. Include your assumptions of and basis for the pertinent parameters used in the computation of the water elevations. If studies approved by the Federal Insurance Administration (FIA) are available for the site and other affected areas, the details of the analysis used in the reports need not be supplied. You can, instead, provide the reports from which you obtained the floodplain information.

c) Identify, locate on a map and describe all plant structures and topographic alterations in the floodplains. Indicate the start and completion dates of all such items.

RESPONSE

The response can be found in revised ER-OLS Section 2.3.1.1.7. Six copies of FIA report, "Flood Insurance Study for Scriba, New York," have been provided under separate correspondence to the NRC on August 25, 1983. | 3

QUESTION E291.1 (2.3.2.3)

a) Provide annual commercial fishery harvest estimates for the years 1976 through 1980 for that portion of Lake Ontario within the 80-km radius.

b) Provide estimates of the sport fish harvest by weight and species, similar to the estimates of number of fish presented in Tables 2.3-8, -9, -10. Also provide estimated sport fish harvest by weight for that portion of Lake Ontario within the 80 km radius.

RESPONSE

a) Commercial fishery harvest estimates are not available for only that portion of Lake Ontario within an 80-km radius of Unit 2. No further breakdown of data is available for U.S. waters; however, the U.S. figures in Table 2.3-7 are considered a reasonable estimate of the 80-km radius harvest since most of the U.S. commercial fish harvest is caught in the eastern basin of Lake Ontario (more than half of the catch comes from Chaumont Bay). Major ports of landing are Chaumont and Oswego, both of which are within the 80-km region. While data specific only to the 80 km region is not available for Canadian waters, catch estimates provided in the ER-OLS for an area approximately 80-km have been revised to include only statistical districts (of Lake Ontario and the St. Lawrence River) 3, 4, 5, and 6. Each of these districts is partially within the 80-km region. Commercial fish harvest in kilograms for these combined districts from 1976 through 1981 is listed in Table 2.3-16. 3

b) Sport fish harvest estimates are not available for areas smaller than those already provided in the ER-OLS; however, Tables 2.3-9 and 2.3-10 have been revised to include estimates of catch weight in kilograms (weight was estimated using average weight per species). No estimates of catch weight can be calculated for New York Anglers' harvest since fish catch numbers are not indicated for each species. The variation in weight of species included in each catch group is too broad to estimate average weight.

QUESTION E291.9 (5.3)

Provide the status of the application for an SPDES permit for operation of Unit 2.

RESPONSE

The final SPDES permit for Units 1 and 2 was issued by NYSDEC on June 6, 1983. A copy of the permit is provided in revised Appendix 1A. | 3

QUESTION E291.13 (6.5.2.2)

Provide the details of the proposed plan of study of 316(a) and (b) monitoring under the SPDES permit.

RESPONSE

In accordance with the provisions of the combined SPDES permit for Units 1 and 2 (see Revised Appendix 1A), NMPC is required to submit a plan of study for verification of the extent of the Unit 2 thermal plume in Lake Ontario to the NYSDEC 180 days prior to the initiation of discharge.

The SPDES permit also requires that existing biological studies in Lake Ontario required by regulatory agencies continue and that such study programs be adjusted as required by regulatory agencies to assess the operating impact of Unit 2. The scope of any adjustments to the biological studies will be negotiated between NMPC and the NYSDEC prior to operation. 3

QUESTION E291.14 (1.2)

Provide the estimated schedule for finalizing the SPDES; include the hearing schedule.

RESPONSE

The final SPDES permit was issued on June 6, 1983 (see revised Appendix 1A). | 3

QUESTION E320.1

Provide the following:

A production cost analysis which shows the difference in system production costs associated with the availability vs. unavailability of the proposed nuclear addition. Note, the resulting cost differential should be limited solely to the variable or incremental costs associated with generating electricity from the proposed nuclear addition and the sources of replacement energy. If, in your analysis, other factors influence the cost differential, explain in detail.

a. The analysis should provide results on an annual basis covering the period from initial operation of the first unit through five full years of operation of the last unit.

b. Where more than one utility shares ownership in the proposed nuclear addition or where the proposed facility is centrally dispatched as part of an interconnected pool, the results of the analysis may be aggregated for all participating systems.

c. The analysis should assume electrical energy requirements grow at (1) the system's latest official forecasted growth rate, and (2) zero growth from the latest actual annual energy requirement.

d. All underlying assumptions should be explicitly identified and explained.

e. For each year (and for each growth rate scenario) the following results should be clearly stated: (1) system production costs with the proposed nuclear addition available as scheduled; (2) system production costs without the proposed nuclear addition available; (3) the capacity factor assumed for the nuclear addition; (4) the average fuel cost and variable O&M for the nuclear addition and the sources of replacement energy (by fuel type) - both expressed in mills per kWh; and (5) the proportion of replacement energy assumed to be provided by coal, oil, gas, etc. (The base year for all costs should be identified.)

RESPONSE

A response to this request has been submitted to the NRC under separate cover on September 9, 1983. | 3

QUESTION E320.2

Provide average, present worth fuel and O and M costs for the Nuclear Unit. (This cost should be calculated for both a 30-year and a 40-year operating life.) Provide escalation, discount rates, and all other variables assumed in calculating these costs.

RESPONSE

A response to this request has been submitted to the NRC under separate cover on September 9, 1983. | 3

QUESTION E451.1

Hourly data tape with onsite meterological data for Nine Mile Point-2 was submitted on March 4, 1983. Dew point temperatures were not included on this tape. Provide the dew point temperatures from November 1, 1973, through October 31, 1980.

RESPONSE

The meteorological data tape, submitted by Niagara Mohawk in a letter dated March 4, 1983, did not contain the dew point temperatures from November 1, 1978, through October 31, 1980, since these data were not employed in any of the meteorological cooling tower plume or cooling tower drift analyses.

Dry bulb and dew point temperatures, as well as pressure measured at the meteorological installation, have been added to a revised NRC formatted tape that has been submitted with a separate transmittal letter dated April 29, 1983. FSAR Table 2B-52A lists the monthly data recovery for the dew point temperature for the 2-year period. The format of the revised tape is shown in FSAR Table 2B-54. 3