Niagara Mohawk Power Corporation

May 1987

# Nine Mile Point Nuclear Station
# 1986
# SPDES Annual Biological Monitoring Report

EA SCIENCE AND TECHNOLOGY

A Division of EA Engineering, Science, and Technology, Inc.

EA Report NMP61D

# NINE MILE POINT NUCLEAR STATION
# 1986 SPDES ANNUAL
# BIOLOGICAL MONITORING REPORT
# SPDES PERMIT NO. NY 000 1015
# SECTION IV.C

Prepared for

Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station
P.O. Box 32
Lycoming, New York 13093

Prepared by

EA Science and Technology
R.D. 2, Goshen Turnpike
Middletown, New York 10940

A Division of EA Engineering, Science, and Technology, Inc.

May 1987

CONTENTS

## LIST OF TABLES

# 1. INTRODUCTION

The Nine Mile Point (NMP) Nuclear Station Unit 1 is solely owned and operated by Niagara Mohawk Power Corporation. The station is located on a 900-acre site in Oswego County, New York, and is approximately 6.8 miles north-northeast of the City of Oswego. The power conversion system utilizes a 1,850-megawatt thermal boiling water reactor (BWR) designed and manufactured by the General Electric Corporation, and a 610,000-kilowatt (net) turbine-generator. NMP Unit 1 has been operational since December 1969. The station is a critical, integral part of the New York State Master Energy Plan and, with the exception of installed hydroelectric capacity, the station is one of the most cost efficient sources of electrical energy within Niagara Mohawk's service area.

NMP Unit 1 utilizes a once-through, non-contact cooling water system to dissipate thermal energy from the main condensers and auxiliary cooling systems. Cooling water is drawn from Lake Ontario by means of two main circulating water pumps rated at 946.25 $m^3$ (250,000 gallons) per minute and two service water pumps which operate at approximately 68.13 $m^3$ (18,000 gallons) per minute (total). Usually, one service water pump is operating except during the mid-summer months.

The lake intake structure is an open-sided hexagonal concrete structure located in approximately 5.5 meters (18 feet) of water and approximately 259 meters (850 feet) from the existing shoreline. The lake discharge structure is of a design that is similar to the intake structure. This structure is hexagonal with open-sided ports and is located approximately 102 meters (335 feet) from the shoreline and 2.6 meters (8.5 feet) below the surface (lowest expected lake level).

Aquatic organisms, detritus, and other debris enter with the water pumped from the vicinity of the submerged intake structure. Organisms, detritus, and debris flow through trash racks, which are used for removing large items, such as logs, and are impinged on traveling screens, which are used for screening out smaller materials. Periodically, the traveling screens are rotated and washed to remove any accumulation of impinged organisms or other material into a sluiceway which empties into an impingement collection basket. The aquatic organisms impinged at NMP Unit 1 have been monitored yearly since 1972 in order to estimate species abundance and composition.

This report presents the results of aquatic ecological studies conducted by EA Science and Technology, a Division of EA Engineering, Science, and Technology, Inc. during 1986 as required by the State Pollutant Discharge Elimination System (SPDES) Permit No. NY 000 1015, Section IV (dated 1 July 1983) covering Niagara Mohawk Power Corporation's NMP Unit 1.

Impingement catches (as required by Section IV.B of the permit) were monitored on a frequency of 4-9 samples per month from January through December 1986 (a total of 51 samples in 1986).

Impingement sampling at NMP Unit 1 in 1986 resulted in the collection and identification of 31 fish taxa. One was identified to the family level and 1 was identified to the genus level; the remaining 29 were identified to the species level. Two invertebrates (crayfish and clam) were also represented in the 1986 collections. Alewife was the most numerous (16,075) comprising 66 percent of the total catch. Alewife, rainbow smelt, white bass, and sculpins accounted for 95 percent (23,125) of all fish collected (24,264).

As required by correspondence from Niagara Mohawk Power Corporation to the Nuclear Regulatory Commission, all fish impingement samples are checked for the presence of the Asiatic clam (Corbicula sp.). No Corbicula sp. molluscs were found in the 1986 impingement collections.

## 2. METHODS AND MATERIALS

### 2.1 SCHEDULE (PERMIT SECTION IV.B.1)

In accordance with permit requirements, 78 impingement collections were scheduled between 1 January and 31 December 1986 (Table 2-1). Samples were collected over a 24-hour period on randomly selected days. Randomly selected sample dates were scheduled such that no more than ten (10) days occurred between samples. Table 2-2 lists the scheduled sampling dates.

In 1986, 51 of the 78 scheduled samples were successfully completed (Appendix A). From 9 March 1986 to 19 June 1986, NMP Unit 1 was shutdown for refueling and maintenance. During the outage, the main circulating water pumps and the traveling screens were shut down for extended periods of time. Whenever the screens were operating, attempts were made to collect impingement samples regardless of whether the main circulating water pumps were operating, although the SPDES permit (No. 0001015 Section IV.B.1) does not require sampling when the pumps are shut down. Maintenance on the traveling screens, coupled with the shutdown of the main circulating water pumps, prevented sample collections in April 1986. A total of 9 of 20 scheduled samples were collected in May 1986. During May, scheduled sample dates were often changed to conform with circulating water pump and traveling screen operating conditions at the station. In June, one sample was rescheduled due to additional maintenance associated with the outage. This sample was rescheduled and successfully collected on another date in June (Appendix A).

### 2.2 SAMPLING PROCEDURE (PERMIT SECTION IV.B.2,3,4,5)

Samples were initiated around 1300 hours of the sampling day. At the beginning of the sample collection period, the traveling screens were rotated and washed for five minutes. The collection basket, with a 9.5-mm (3/8-in.) stretch mesh liner, was then positioned at the end of the sluiceway. The collection basket remained in place for the duration of the sample, unless high impingement or debris loads required that it be emptied, in which case it was removed, emptied, and repositioned.

At the end of the 24-hour period, the traveling screens were rotated and washed for five minutes. The impinged organisms were washed into the collection basket; the basket was removed and emptied.

Plant operational data were obtained from station records for each sample date to document cooling water flow rates, intake and discharge temperatures, and power production (Appendix B).

A subsampling routine was utilized for occasions when high impingement rates or high debris loads were encountered. The subsampling technique was based on volume, and the total 24-hour catch was estimated using the formula:

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

TABLE 2-1 IMPINGEMENT SAMPLING INTENSITY AS REQUIRED BY THE SPDES PERMIT FOR NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | Number of Sampling Days Scheduled per Month[a] |
|---|---|
| January | 4 |
| February | 4 |
| March | 4 |
| April | 16[b] |
| May | 20[c] |
| June | 4 |
| July | 4 |
| August | 6 |
| September | 4 |
| October | 4 |
| November | 4 |
| December | 4 |
| | 78 |

a. Days assigned within each month were selected randomly using random numbers tables (Rand Corporation 1955).

b. None of the 16 scheduled samples were successfully completed (Appendix A).

c. Nine of the 20 scheduled samples were successfully completed (Appendix A).

TABLE 2-2 IMPINGEMENT SAMPLING DATES FOR NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| Scheduled Sampling Date* | Sampling Results |
|---|---|
| 07 JAN | C |
| 16 JAN | C |
| 22 JAN | C |
| 30 JAN | C |
| 06 FEB | C |
| 12 FEB | C |
| 20 FEB | C |
| 28 FEB | C |
| 07 MAR | C |
| 12 MAR | C |
| 20 MAR | C |
| 26 MAR | C |
| 02 APR | V |
| 03 APR | V |
| 04 APR | V |
| 08 APR | V |
| 10 APR | V |
| 11 APR | V |
| 15 APR | V |
| 16 APR | V |
| 17 APR | V |
| 18 APR | V |
| 22 APR | V |
| 24 APR | V |
| 25 APR | V |
| 29 APR | V |
| 30 APR | V |
| 01 MAY | V |
| 02 MAY | R*C;COMPLETED 24 MAY |
| 03 MAY | R*C;COMPLETED 25 MAY |
| 04 MAY | R*C;COMPLETED 26 MAY |
| 05 MAY | R*C;COMPLETED 27 MAY |
| 07 MAY | R*C;COMPLETED 28 MAY |
| 08 MAY | R*C;COMPLETED 31 MAY |
| 09 MAY | R*C;COMPLETED 01 JUN |
| 10 MAY | V |
| 12 MAY | V |
| 13 MAY | V |
| 14 MAY | V |
| 15 MAY | V |
| 16 MAY | V |
| 18 MAY | V |
| 19 MAY | V |
| 20 MAY | V |
| 22 MAY | V |
| 23 MAY | V |
| 29 MAY | C |
| 30 MAY | C |
| 05 JUN | C |
| 11 JUN | R*C;COMPLETED 18 JUN |
| 17 JUN | C |
| 26 JUN | C |
| 02 JUL | C |
| 09 JUL | C |
| 15 JUL | C |
| 25 JUL | C |
| 04 AUG | C |
| 05 AUG | C |
| 15 AUG | C |
| 20 AUG | C |
| 28 AUG | C |
| 29 AUG | C |
| 04 SEP | C |
| 11 SEP | C |
| 16 SEP | C |
| 24 SEP | C |
| 02 OCT | C |
| 09 OCT | C |
| 17 OCT | C |
| 24 OCT | C |
| 03 NOV | C |
| 14 NOV | C |
| 19 NOV | C |
| 25 NOV | C |
| 03 DEC | C |
| 10 DEC | C |
| 19 DEC | C |
| 29 DEC | C |

NOTE: * = Sample collection date.
C = Completed sample.
R*C = Sample rescheduled and completed on a different date within the confines of a random numbers table and any remaining available dates in the month.
V = Void sample; refer to Appendix A.

The volume of the total sample was determined by repeatedly filling a volumetrically graduated container, recording the values, and adding them. The total volume was thoroughly mixed by hand or with a shovel and spread out evenly over a flat surface. An aliquot(s) of the total sample was randomly selected and this portion of the sample was removed and measured to determine its volume.

During 1986, subsamples constituted at least 25 percent by volume of the total sample. The fish in the subsample were then processed according to regular laboratory procedures (Section 2.3).

## 2.3 LABORATORY PROCESSING (PERMIT SECTION IV.B.4)

After the impingement sample was collected, it was returned to the laboratory and all organisms were sorted, identified, and enumerated. Identification was made to the lowest possible taxonomic level, which was usually species. For the convenience of the reader, common names are used in the text; however, a list of common and their associated scientific names are included in Appendix C.

Specimens (to a maximum of 25 individuals) of the following species were analyzed for length and weight: white perch, alewife, rainbow smelt, smallmouth bass, yellow perch, and each species of salmonid. Any other species present in the collections were enumerated and weighed to obtain a total count and total weight for each species (or lowest taxonomic level).

Total lengths were measured to the nearest millimeter. For the purposes of this report, 100 millimeters were used as a determinant of size class differentiation between young of the year and adults based on size range information in Scott and Crossman (1973). Weights were measured to the nearest 0.1 gram for specimens less than 10 grams, to the nearest 1.0 gram for specimens between 10 and 2,000 grams, and to the nearest 25 grams for specimens over 2,000 grams based on the precision of the scales used for measurement. Any unusual conditions, abnormalities, or presence of fish tags were noted on the data sheets.

## 2.4 WATER QUALITY DETERMINATIONS (PERMIT SECTION IV.B.5)

Intake and discharge temperatures were recorded from the station operating conditions listed in Appendix B.

## 2.5 DATA PRESENTATION (PERMIT SECTION IV.C)

Intake and discharge water temperatures were recorded from the plant operating conditions listed in Appendix B.

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

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

Total estimated impingement for each month was calculated using the formula:

$$D = \frac{c}{v} (x)$$

where

- D = total estimated impingement
- c = the number of fish collected during the sampling period
- v = the volume of cooling water used during the sampling period
- x = the total monthly volume of cooling water used.

The annual impingement estimate was then calculated by adding the 12 monthly impingement estimates.

# 3. RESULTS

## 3.1 IMPINGEMENT ABUNDANCE AND COMPOSITION (PERMIT SECTION IV.C.3)

Impingement sampling at NMP Unit 1 during 1986 resulted in the collection of 31 fish taxa; 1 was identified to the family level, 1 was identified to the genus level, and 29 were identified to the species level. Two invertebrates (crayfish and clam) were also represented in the 1986 collections (Table 3-1).

Alewife was the most numerous species, comprising 66 percent of the total catch. Alewife, together with rainbow smelt, white bass, and sculpins, comprised 95 percent of the total catch for 1986.

In 1986, due to station outage conditions, temporal distributions of species collected were observed for only 11 months of the year (no samples were collected in April). Rainbow smelt were found in the collections from all 11 months. Alewife were collected in 9 months, absent only during the winter (February and March) collections. The other representative important species (RIS), white perch, yellow perch, and smallmouth bass, were collected during 8, 6, and 5 months, respectively. White perch, yellow perch, and smallmouth bass were generally collected during the fall and winter months (January - March; October - December). Four species of salmonids (brown trout, lake trout, rainbow trout, and chinook salmon) were collected in January. Brown trout were also collected in June and December, lake trout in October, and chinook salmon in May. Two species (spottail shiner and sculpin) were found in 10 of the 11 months sampled.

Species diversity in 1986 was highest in the fall (October, November, and December) and winter (January). The highest species diversity occurred in January when 30 taxa were collected. The lowest diversity occurred in September when 4 taxa were collected.

Generally, greater impingement collections occur during the spring and early summer months as adult fish (particularly alewife and rainbow smelt) migrate inshore to spawn. Impingement abundance then decreases through the summer as the adults finish spawning and move offshore into deeper, cooler water. Impingement rates increase again in the fall and winter as young-of-the-year (YOY) become susceptible to impingement. The predominance of YOY at this time can be associated with the movement of large schools of YOY from their inshore nursery areas to overwintering grounds in the deeper waters of Lake Ontario.

Previous samples in the vicinity of NMP (EA 1982, 1983, 1984, 1985, and 1986) have indicated that the rates of impingement can also be affected by specific meteorological conditions such as high winds from the west or northwest, and resulting wave action. These conditions seem particularly influential to YOY. At NMP Unit 1, the above stated meteorological conditions occurred in October (sample of 16-17 October) and November (2-3 November). On 16-17 October, west winds of 10-20 knots and 2- to 4-ft waves resulted in the collection of YOY alewife. In November, 15- to 25-knot winds from the southwest, which changed

TABLE 3-1 ACTUAL MONTHLY IMPINGEMENT COLLECTIONS, NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Samples | 4 | 4 | 4 | 0 | 9 | 4 | 4 | 6 | 4 | 4 | 4 | 4 | 51 |
| **Species** | | | | | | | | | | | | | |
| Alewife | 1 | --- | --- | NSC | 717 | 246 | 298 | 3,852 | 1,762 | 5,081 | 3,564 | 554 | 16,075 |
| Rainbow smelt | 992 | 218 | 33 | NSC | 88 | 44 | 3 | 3,363 | 23 | 60 | 416 | 1,106 | 6,346 |
| White bass | 263 | 21 | 57 | NSC | --- | --- | --- | 4 | --- | --- | 41 | 11 | 397 |
| Sculpins | 157 | 27 | 12 | NSC | 45 | 16 | 1 | 4 | --- | 6 | 15 | 24 | 307 |
| Tessellated darter | 1 | --- | --- | NSC | 91 | 91 | 1 | 6 | --- | 2 | 1 | --- | 193 |
| Gizzard shad | 15 | 3 | --- | NSC | --- | --- | --- | --- | --- | 34 | 116 | 15 | 183 |
| Spottail shiner | 6 | 4 | 9 | NSC | 11 | 27 | 17 | 50 | --- | 10 | 44 | 5 | 183 |
| White perch | 61 | 5 | 7 | NSC | --- | --- | 1 | 4 | --- | 10 | 12 | 35 | 135 |
| Threespine stickleback | 90 | 10 | --- | NSC | 1 | --- | --- | --- | --- | --- | 1 | --- | 102 |
| Emerald shiner | 50 | 11 | 9 | NSC | --- | --- | --- | --- | --- | 6 | 1 | 3 | 80 |
| Crayfish | 12 | 1 | 3 | NSC | 17 | --- | --- | 1 | --- | --- | 14 | 15 | 63 |
| Smallmouth bass | 37 | 1 | 5 | NSC | --- | --- | --- | --- | --- | 4 | --- | 1 | 48 |
| Rock bass | 18 | --- | --- | NSC | --- | --- | --- | 17 | --- | --- | 5 | --- | 40 |
| Minnow family (damaged) | --- | --- | --- | NSC | --- | --- | --- | --- | 28 | --- | --- | --- | 28 |
| Yellow perch | 3 | --- | --- | NSC | --- | 1 | --- | 5 | --- | 4 | 7 | 5 | 25 |
| Trout perch | 2 | 1 | --- | NSC | 8 | 7 | 4 | 2 | --- | --- | --- | --- | 24 |
| Stonecat | 7 | --- | --- | NSC | --- | 1 | --- | 11 | --- | --- | 1 | 1 | 21 |
| American eel | 3 | --- | --- | NSC | --- | 1 | --- | 6 | 3 | --- | --- | --- | 13 |
| Lake chub | 3 | 2 | 2 | NSC | --- | --- | --- | --- | --- | --- | 2 | 1 | 10 |
| White sucker | 3 | --- | --- | NSC | 1 | --- | --- | 5 | --- | --- | --- | --- | 9 |
| Burbot | 7 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 7 |
| Pumpkinseed | --- | --- | --- | NSC | --- | --- | --- | 5 | --- | --- | --- | 1 | 6 |
| Brown trout | 2 | --- | --- | NSC | --- | 1 | --- | --- | --- | --- | --- | 2 | 5 |
| Chinook salmon | 1 | --- | --- | NSC | 4 | --- | --- | --- | --- | --- | --- | --- | 5 |
| Lake trout | 1 | --- | --- | NSC | --- | --- | --- | --- | --- | 4 | --- | --- | 5 |
| Walleye | --- | --- | --- | NSC | --- | --- | --- | 4 | --- | --- | --- | 1 | 5 |
| Bluegill | 1 | --- | --- | NSC | --- | --- | --- | --- | --- | 2 | 1 | --- | 4 |
| Freshwater drum | 1 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | 1 | --- | 2 |
| Sea lamprey | --- | --- | --- | NSC | --- | --- | --- | --- | --- | 2 | --- | --- | 2 |
| Clam | 2 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 2 |
| Carp | 1 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 1 |
| Central mudminnow | 1 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 1 |
| Rainbow trout | 1 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 1 |
| Alewife (damaged) | 1 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 1 |
| Totals | 1,743 | 304 | 137 | 0 | 983 | 435 | 325 | 7,339 | 1,816 | 5,225 | 4,242 | 1,780 | 24,329 |

NOTE: Dashes (---) = no catches made.
NSC = no samples collected.

to the northwest during the sample period (wave height was 5-8 feet), resulted in the collection of 81 percent of YOY alewife for the month. Lifton and Storr (1977) found statistically significant correlations between environmental factors (wave height, water temperature, and wind action) and impingement at power plants on Lake Erie and Lake Ontario. Wave height was correlated at a higher level than either of the other factors. They hypothesized that wave-induced turbulence and possibly turbidity interfere with a fish's normal ability to detect and avoid an intake structure, resulting in a higher impingement.

In 1986, a station outage occurred from 8 March - 20 June at NMP Unit 1. The main circulating water pumps were shut down for extended periods, consequently reducing impingement rates at a time when abundances would have been high. The greatest impingement collections occurred in August, October, and November when YOY (Section 3.2) dominated the collections.

Rainbow smelt dominated impingement samples in January (57 percent), February (72 percent), and December (62 percent). White bass dominated the samples in March (42 percent). Alewife dominated the samples from May through November, ranging from 52 percent (August) to 97 percent (September and October) of the total monthly collections.

The mean daily impingement rate (Table 3-2) was highest during the late summer (August) and fall (October and November) which corresponded with the actual impingement abundances reported for 1986 in Table 3-1.

Impingement rates based on flow (Table 3-3) were slightly lower than the mean daily impingement rates expressed in Table 3-2. The exception is the data for March where the impingement rate based on flow is higher than the mean daily impingement rate. Differences are primarily due to the differences in the manner of data expression. The impingement rate based on flow is expressed by volume (number of fish per million cubic meters) of circulating water pumped. Outage conditions when little or no water is pumped and changes in the volume of water pumped during day-to-day station operations would influence the impingement rate expressed by this method. In March 1986, NMP Unit 1 began an outage for refueling and maintenance. A relatively small volume of water was pumped during the month which increased the rate of impingement based on flow for March.

The estimated number of aquatic organisms impinged at NMP Unit 1 (based on daily average rate) was 163,522 (Table 3-4). The estimate of impinged organisms based on flow was 160,861 (Table 3-5). The differences in the two estimates may be attributed to the two bases from which the estimations were made and the influence of station operating conditions and weather on data collected. Overall, the estimates on Tables 3-4 and 3-5 are significantly lower due to the scheduling of an extended outage during the spring (April, May, and June) when impingement is highest for species such as alewife and rainbow smelt. Estimated annual impingement of alewife for 1986 was 110,152 and 108,309, respectively, for both methods (estimate by daily average rate precedes estimate by flow). These values represented 67 percent of the total estimated annual impingements (for both methods) in 1986. Estimated

TABLE 3-2 MEAN DAILY IMPINGEMENT RATE BY SPECIES AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Samples | 4 | 4 | 4 | 0 | 9 | 4 | 4 | 6 | 4 | 4 | 4 | 4 | 51 |
| **Species** | | | | | | | | | | | | | |
| Alewife | 0.25 | --- | --- | NSC | 79.67 | 61.50 | 74.50 | 642.00 | 440.50 | 1,270.25 | 891.00 | 138.50 | 315.20 |
| Rainbow smelt | 248.00 | 54.50 | 8.25 | NSC | 9.78 | 11.00 | 0.75 | 560.50 | 5.75 | 15.00 | 104.00 | 276.50 | 124.43 |
| White bass | 65.75 | 5.25 | 14.25 | NSC | --- | --- | --- | 0.67 | --- | --- | 10.25 | 2.75 | 7.78 |
| Sculpins | 39.25 | 6.75 | 3.00 | NSC | 5.00 | 4.00 | 0.25 | 0.67 | --- | 1.50 | 3.75 | 6.00 | 6.02 |
| Tessellated darter | 0.25 | --- | --- | NSC | 10.11 | 22.75 | 0.25 | 1.00 | --- | 0.50 | 0.25 | --- | 3.78 |
| Gizzard shad | 3.75 | 0.75 | --- | NSC | --- | --- | --- | --- | --- | 8.50 | 29.00 | 3.75 | 3.59 |
| Spottail shiner | 1.50 | 1.00 | 2.25 | NSC | 1.22 | 6.75 | 4.25 | 8.33 | --- | 2.50 | 11.00 | 1.25 | 3.59 |
| White perch | 15.25 | 1.25 | 1.75 | NSC | --- | --- | 0.25 | 0.67 | --- | 2.50 | 3.00 | 8.75 | 2.65 |
| Threespine stickleback | 22.50 | 2.50 | --- | NSC | 0.11 | --- | --- | --- | --- | --- | 0.25 | --- | 2.00 |
| Emerald shiner | 12.50 | 2.75 | 2.25 | NSC | --- | --- | --- | --- | --- | 1.50 | 0.25 | 0.75 | 1.57 |
| Crayfish | 3.00 | 0.25 | 0.75 | NSC | 1.89 | --- | --- | 0.17 | --- | --- | 3.50 | 3.75 | 1.24 |
| Smallmouth bass | 9.25 | 0.25 | 1.25 | NSC | --- | --- | --- | --- | --- | 1.00 | --- | 0.25 | 0.94 |
| Rock bass | 4.50 | --- | --- | NSC | --- | --- | --- | 2.83 | --- | --- | 1.25 | --- | 0.78 |
| Minnow family (damaged) | --- | --- | --- | NSC | --- | --- | --- | --- | 7.00 | --- | --- | --- | 0.55 |
| Yellow perch | 0.75 | --- | --- | NSC | --- | 0.25 | --- | 0.83 | --- | 1.00 | 1.75 | 1.25 | 0.49 |
| Trout perch | 0.50 | 0.25 | --- | NSC | 0.89 | 1.75 | 1.00 | 0.33 | --- | --- | --- | --- | 0.47 |
| Stonecat | 1.75 | --- | --- | NSC | --- | 0.25 | --- | 1.83 | --- | --- | 0.25 | 0.25 | 0.41 |
| American eel | 0.75 | --- | --- | NSC | --- | 0.25 | --- | 1.00 | 0.75 | --- | --- | --- | 0.25 |
| Lake chub | 0.75 | 0.50 | 0.50 | NSC | --- | --- | --- | --- | --- | --- | 0.50 | 0.25 | 0.20 |
| White sucker | 0.75 | --- | --- | NSC | 0.11 | --- | --- | 0.83 | --- | --- | --- | --- | 0.18 |
| Burbot | 1.75 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 0.14 |
| Pumpkinseed | --- | --- | --- | NSC | --- | --- | --- | 0.83 | --- | --- | --- | 0.25 | 0.12 |
| Brown trout | 0.50 | --- | --- | NSC | --- | 0.25 | --- | --- | --- | --- | --- | 0.50 | 0.10 |
| Chinook salmon | 0.25 | --- | --- | NSC | 0.44 | --- | --- | --- | --- | --- | --- | --- | 0.10 |
| Lake trout | 0.25 | --- | --- | NSC | --- | --- | --- | --- | --- | 1.00 | --- | --- | 0.10 |
| Walleye | --- | --- | --- | NSC | --- | --- | --- | 0.67 | --- | --- | --- | 0.25 | 0.10 |
| Bluegill | 0.25 | --- | --- | NSC | --- | --- | --- | --- | --- | 0.50 | 0.25 | --- | 0.08 |
| Freshwater drum | 0.25 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | 0.25 | --- | 0.04 |
| Sea lamprey | --- | --- | --- | NSC | --- | --- | --- | --- | --- | 0.50 | --- | --- | 0.04 |
| Clam | 0.50 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 0.04 |
| Carp | 0.25 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 0.02 |
| Central mudminnow | 0.25 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 0.02 |
| Rainbow trout | 0.25 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 0.02 |
| Alewife (damaged) | 0.25 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 0.02 |
| Totals | 435.75 | 76.00 | 34.25 | 0 | 109.22 | 108.75 | 81.25 | 1,223.17 | 454.00 | 1,306.25 | 1,060.50 | 445.00 | 477.04 |

NOTE: Dashes (---) = no catches made.
NSC = no samples collected.
Units expressed as fish per day.

TABLE 3-3 MONTHLY IMPINGEMENT RATE BASED ON FLOW AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Samples | 4 | 4 | 4 | 0 | 9 | 4 | 4 | 6 | 4 | 4 | 4 | 4 | 51 |
| Flow Sampled (MCM) | 4.915 | 4.878 | 1.718 | 0.00 | 12.249 | 5.779 | 5.725 | 9.071 | 5.972 | 5.825 | 5.790 | 5.802 | 67.724 |
| **Species** | | | | | | | | | | | | | |
| Alewife | 0.203 | --- | --- | NSC | 58.535 | 42.568 | 52.052 | 424.650 | 295.044 | 872.275 | 615.554 | 95.484 | NA |
| Rainbow smelt | 201.831 | 44.690 | 19.208 | NSC | 7.184 | 7.614 | 0.524 | 370.742 | 3.851 | 10.300 | 71.848 | 190.624 | NA |
| White bass | 53.510 | 4.305 | 33.178 | NSC | --- | --- | --- | 0.441 | --- | --- | 7.081 | 1.896 | NA |
| Sculpins | 31.943 | 5.535 | 6.985 | NSC | 3.674 | 2.769 | 0.175 | 0.441 | --- | 1.030 | 2.591 | 4.137 | NA |
| Tessellated darter | 0.203 | --- | --- | NSC | 7.429 | 15.747 | 0.175 | 0.661 | --- | 0.343 | 0.173 | --- | NA |
| Gizzard shad | 3.052 | 0.615 | --- | NSC | --- | --- | --- | --- | --- | 5.837 | 20.035 | 2.585 | NA |
| Spottail shiner | 1.221 | 0.820 | 5.239 | NSC | 0.898 | 4.672 | 2.969 | 5.512 | --- | 1.717 | 7.599 | 0.862 | NA |
| White perch | 12.411 | 1.025 | 4.074 | NSC | --- | --- | 0.175 | 0.441 | --- | 1.717 | 2.073 | 6.032 | NA |
| Threespine stickleback | 18.311 | 2.050 | --- | NSC | 0.082 | --- | --- | --- | --- | --- | 0.173 | --- | NA |
| Emerald shiner | 10.173 | 2.255 | 5.239 | NSC | --- | --- | --- | --- | --- | 1.030 | 0.173 | 0.517 | NA |
| Crayfish | 2.442 | 0.205 | 1.746 | NSC | 1.388 | --- | --- | 0.110 | --- | --- | 2.418 | 2.585 | NA |
| Smallmouth bass | 7.528 | 0.205 | 2.910 | NSC | --- | --- | --- | --- | --- | 0.687 | --- | 0.172 | NA |
| Rock bass | 3.662 | --- | --- | NSC | --- | --- | --- | 1.874 | --- | --- | 0.864 | --- | NA |
| Minnow family (damaged) | --- | --- | --- | NSC | --- | --- | --- | --- | 4.689 | --- | --- | --- | NA |
| Yellow perch | 0.610 | --- | --- | NSC | --- | 0.173 | --- | 0.551 | --- | 0.687 | 1.209 | 0.862 | NA |
| Trout perch | 0.407 | 0.205 | --- | NSC | 0.653 | 1.211 | 0.699 | 0.220 | --- | --- | --- | --- | NA |
| Stonecat | 1.424 | --- | --- | NSC | --- | 0.173 | --- | 1.213 | --- | --- | 0.173 | 0.172 | NA |
| American eel | 0.610 | --- | --- | NSC | --- | 0.173 | --- | 0.661 | 0.502 | --- | --- | --- | NA |
| Lake chub | 0.610 | 0.410 | 1.164 | NSC | --- | --- | --- | --- | --- | --- | 0.345 | 0.172 | NA |
| White sucker | 0.610 | --- | --- | NSC | 0.082 | --- | --- | 0.551 | --- | --- | --- | --- | NA |
| Burbot | 1.424 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | NA |
| Pumpkinseed | --- | --- | --- | NSC | --- | --- | --- | 0.551 | --- | --- | --- | 0.172 | NA |
| Brown trout | 0.407 | --- | --- | NSC | --- | 0.173 | --- | --- | --- | --- | --- | 0.345 | NA |
| Chinook salmon | 0.203 | --- | --- | NSC | 0.327 | --- | --- | --- | --- | --- | --- | --- | NA |
| Lake trout | 0.203 | --- | --- | NSC | --- | --- | --- | --- | --- | 0.687 | --- | --- | NA |
| Walleye | --- | --- | --- | NSC | --- | --- | --- | 0.441 | --- | --- | --- | 0.172 | NA |
| Bluegill | 0.203 | --- | --- | NSC | --- | --- | --- | --- | --- | 0.343 | 0.173 | --- | NA |
| Freshwater drum | 0.203 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | 0.173 | --- | NA |
| Sea lamprey | --- | --- | --- | NSC | --- | --- | --- | --- | --- | 0.343 | --- | --- | NA |
| Clam | 0.407 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | NA |
| Carp | 0.203 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | NA |
| Central mudminnow | 0.203 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | NA |
| Rainbow trout | 0.203 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | NA |
| Alewife (damaged) | 0.203 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | NA |
| Totals | 354.629 | 62.321 | 79.744 | 0 | 80.251 | 75.273 | 56.769 | 809.062 | 304.086 | 896.996 | 732.642 | 306.791 | NA |

NOTE: Dashes (---) = no catches made.
NSC = no samples collected.
Units expressed as fish per million cubic meters (MCM).

TABLE 3-4 ESTIMATED MONTHLY IMPINGEMENT BASED ON DAILY AVERAGE RATE AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Samples | 4 | 4 | 4 | 0 | 9 | 4 | 4 | 6 | 4 | 4 | 4 | 4 | 51 |
| **Species** | | | | | | | | | | | | | |
| Alewife | 8 | --- | --- | NSC | 2,470 | 1,845 | 2,310 | 19,902 | 13,215 | 39,378 | 26,730 | 4,294 | 110,152 |
| Rainbow smelt | 7,688 | 1,526 | 256 | NSC | 303 | 330 | 23 | 17,376 | 172 | 465 | 3,120 | 8,572 | 39,831 |
| White bass | 2,038 | 147 | 442 | NSC | --- | --- | --- | 21 | --- | --- | 308 | 85 | 3,041 |
| Sculpins | 1,217 | 189 | 93 | NSC | 155 | 120 | 8 | 21 | --- | 46 | 112 | 186 | 2,147 |
| Tessellated darter | 8 | --- | --- | NSC | 313 | 682 | 8 | 31 | --- | 16 | 8 | --- | 1,066 |
| Gizzard shad | 116 | 21 | --- | NSC | --- | --- | --- | --- | --- | 264 | 870 | 116 | 1,387 |
| Spottail shiner | 46 | 28 | 70 | NSC | 38 | 202 | 132 | 258 | --- | 78 | 330 | 39 | 1,221 |
| White perch | 473 | 35 | 54 | NSC | --- | --- | 8 | 21 | --- | 78 | 90 | 271 | 1,030 |
| Threespine stickleback | 698 | 70 | --- | NSC | 3 | --- | --- | --- | --- | --- | 8 | --- | 779 |
| Emerald shiner | 388 | 77 | 70 | NSC | --- | --- | --- | --- | --- | 46 | 8 | 23 | 612 |
| Crayfish | 93 | 7 | 23 | NSC | 59 | --- | --- | 5 | --- | --- | 105 | 116 | 408 |
| Smallmouth bass | 287 | 7 | 39 | NSC | --- | --- | --- | --- | --- | 31 | --- | 8 | 372 |
| Rock bass | 140 | --- | --- | NSC | --- | --- | --- | 88 | --- | --- | 38 | --- | 266 |
| Minnow family (damaged) | --- | --- | --- | NSC | --- | --- | --- | --- | 210 | --- | --- | --- | 210 |
| Yellow perch | 23 | --- | --- | NSC | --- | 8 | --- | 26 | --- | 31 | 52 | 39 | 179 |
| Trout perch | 16 | 7 | --- | NSC | 28 | 52 | 31 | 10 | --- | --- | --- | --- | 144 |
| Stonecat | 54 | --- | --- | NSC | --- | 8 | --- | 57 | --- | --- | 8 | 8 | 135 |
| American eel | 23 | --- | --- | NSC | --- | 8 | --- | 31 | 22 | --- | --- | --- | 84 |
| Lake chub | 23 | 14 | 16 | NSC | --- | --- | --- | --- | --- | --- | 15 | 8 | 76 |
| White sucker | 23 | --- | --- | NSC | 3 | --- | --- | 26 | --- | --- | --- | --- | 52 |
| Burbot | 54 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 54 |
| Pumpkinseed | --- | --- | --- | NSC | --- | --- | --- | 26 | --- | --- | --- | 8 | 34 |
| Brown trout | 16 | --- | --- | NSC | --- | 8 | --- | --- | --- | --- | --- | 16 | 40 |
| Chinook salmon | 8 | --- | --- | NSC | 14 | --- | --- | --- | --- | --- | --- | --- | 22 |
| Lake trout | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | 31 | --- | --- | 39 |
| Walleye | --- | --- | --- | NSC | --- | --- | --- | 21 | --- | --- | --- | 8 | 29 |
| Bluegill | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | 16 | 8 | --- | 32 |
| Freshwater drum | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | 8 | --- | 16 |
| Sea lamprey | --- | --- | --- | NSC | --- | --- | --- | --- | --- | 16 | --- | --- | 16 |
| Clam | 16 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 16 |
| Carp | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Central mudminnow | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Rainbow trout | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Alewife (damaged) | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Totals | 13,512 | 2,128 | 1,063 | 0 | 3,386 | 3,263 | 2,520 | 37,920 | 13,619 | 40,496 | 31,818 | 13,797 | 163,522 |

NOTE: Dashes (---) = no catches made.
NSC = no samples collected.

TABLE 3-5 ESTIMATED MONTHLY IMPINGEMENT BASED ON FLOW AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Samples | 4 | 4 | 4 | 0 | 9 | 4 | 4 | 6 | 4 | 4 | 4 | 4 | 51 |
| Flow Sampled (MCM) | 4.915 | 4.878 | 1.718 | 0.00 | 12.249 | 5.779 | 5.725 | 9.071 | 5.972 | 5.825 | 5.790 | 5.802 | 67.724 |
| Total Monthly Flow (MCM) | 37.619 | 34.262 | 13.754 | 2.039 | 14.413 | 41.508 | 43.557 | 46.815 | 44.771 | 45.036 | 43.468 | 44.962 | 412.204 |
| **Species** | | | | | | | | | | | | | |
| Alewife | 8 | --- | --- | NSC | 844 | 1,767 | 2,267 | 19,880 | 13,209 | 39,284 | 26,757 | 4,293 | 108,309 |
| Rainbow smelt | 7,593 | 1,531 | 264 | NSC | 104 | 316 | 23 | 17,356 | 172 | 464 | 3,123 | 8,571 | 39,517 |
| White bass | 2,013 | 147 | 456 | NSC | --- | --- | --- | 21 | --- | --- | 308 | 85 | 3,030 |
| Sculpins | 1,202 | 190 | 96 | NSC | 53 | 115 | 8 | 21 | --- | 46 | 113 | 186 | 2,030 |
| Tessellated darter | 8 | --- | --- | NSC | 107 | 654 | 8 | 31 | --- | 15 | 8 | --- | 831 |
| Gizzard shad | 115 | 21 | --- | NSC | --- | --- | --- | --- | --- | 263 | 871 | 116 | 1,386 |
| Spottail shiner | 46 | 28 | 72 | NSC | 13 | 194 | 129 | 258 | --- | 77 | 330 | 39 | 1,186 |
| White perch | 467 | 35 | 56 | NSC | --- | --- | 8 | 21 | --- | 77 | 90 | 271 | 1,025 |
| Threespine stickleback | 689 | 70 | --- | NSC | 1 | --- | --- | --- | --- | --- | 8 | --- | 768 |
| Emerald shiner | 383 | 77 | 72 | NSC | --- | --- | --- | --- | --- | 46 | 8 | 23 | 609 |
| Crayfish | 92 | 7 | 24 | NSC | 20 | --- | --- | 5 | --- | --- | 105 | 116 | 369 |
| Smallmouth bass | 283 | 7 | 40 | NSC | --- | --- | --- | --- | --- | 31 | --- | 8 | 369 |
| Rock bass | 138 | --- | --- | NSC | --- | --- | --- | 88 | --- | --- | 38 | --- | 264 |
| Minnow family (damaged) | --- | --- | --- | NSC | --- | --- | --- | --- | 210 | --- | --- | --- | 210 |
| Yellow perch | 23 | --- | --- | NSC | --- | 7 | --- | 26 | --- | 31 | 53 | 39 | 179 |
| Trout perch | 15 | 7 | --- | NSC | 9 | 50 | 30 | 10 | --- | --- | --- | --- | 121 |
| Stonecat | 54 | --- | --- | NSC | --- | 7 | --- | 57 | --- | --- | 8 | 8 | 134 |
| American eel | 23 | --- | --- | NSC | --- | 7 | --- | 31 | 22 | --- | --- | --- | 83 |
| Lake chub | 23 | 14 | 16 | NSC | --- | --- | --- | --- | --- | --- | 15 | 8 | 76 |
| White sucker | 23 | --- | --- | NSC | 1 | --- | --- | 26 | --- | --- | --- | --- | 50 |
| Burbot | 54 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 54 |
| Pumpkinseed | --- | --- | --- | NSC | --- | --- | --- | 26 | --- | --- | --- | 8 | 34 |
| Brown trout | 15 | --- | --- | NSC | --- | 7 | --- | --- | --- | --- | --- | 15 | 37 |
| Chinook salmon | 8 | --- | --- | NSC | 5 | --- | --- | --- | --- | --- | --- | --- | 13 |
| Lake trout | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | 31 | --- | --- | 39 |
| Walleye | --- | --- | --- | NSC | --- | --- | --- | 21 | --- | --- | --- | 8 | 29 |
| Bluegill | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | 15 | 8 | --- | 31 |
| Freshwater drum | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | 8 | --- | 16 |
| Sea lamprey | --- | --- | --- | NSC | --- | --- | --- | --- | --- | 15 | --- | --- | 15 |
| Clam | 15 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 15 |
| Carp | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Central mudminnow | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Rainbow trout | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Alewife (damaged) | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Totals | 13,346 | 2,134 | 1,096 | 0 | 1,157 | 3,124 | 2,473 | 37,878 | 13,613 | 40,395 | 31,851 | 13,794 | 160,861 |

NOTE: Dashes (---) = no catches made.
NSC = no samples collected.

impingement of rainbow smelt was 39,837 and 39,517 (24 and 25 percent), respectively, for the two methods of determination. Estimated impingement for the other RIS collected in 1986 are as follows: yellow perch (179; 179), white perch (1,030; 1,025), and smallmouth bass (372; 369). Annual impingement of the salmonid species was estimated as follows: brown trout (40; 37), lake trout (39; 39), chinook salmon (22; 13), and rainbow trout (8; 8). Both methods of calculation arrived at identical estimates for some of the species (yellow perch, lake trout, rainbow trout). The small numbers of individuals impinged were probably a factor in the resulting equivalent estimations.

## 3.2 LENGTH DISTRIBUTIONS (PERMIT SECTION IV.B.4)

Length frequency distributions are given for nine representative important species (RIS): alewife, rainbow smelt, smallmouth bass, white perch, yellow perch, and salmonid species (brown trout, rainbow trout, lake trout, and chinook salmon) in Tables 3-6a through 3-6f. Alewife collections were dominated by adults and subadults from May through August. YOY alewife dominated impingement samples from October through December. Collections of alewife in January and September were limited to only a few individuals, all of which were adults. No samples were collected during a station outage in April.

Adult and subadult rainbow smelt dominated the smelt collections in the winter (January, February, and March) and late fall (November and December). Collections of rainbow smelt from May through August were dominated by YOY. In some months, particularly August, September, and October, the YOY rainbow smelt were damaged and the required number of individual length measurements (25) could not be obtained accurately. In September, 23 rainbow smelt were collected, however, none were measurable.

In 1986, 89 percent of the white perch collected were YOY. Collections of white perch in January and December were 89 and 91 percent YOY, respectively.

Yellow perch were generally collected as adults and subadults. Five YOY were collected in December impingement samples.

Smallmouth bass were collected as adults with the exception of 3 YOY collected in January, March, and December.

The salmonid family was represented by brown trout, rainbow trout, lake trout, and chinook salmon at NMP Unit 1 in 1986. All brown trout collected were collected as adults. One lake trout collected was a parr-marked YOY, the other was an adult. One parr rainbow trout was collected. In May, chinook salmon were collected as parrs. One adult chinook salmon was collected in January.

## 3.3 BIOMASS (PERMIT SECTION IV.B.4)

Total biomass collected in the 1986 impingement samples at NMP Unit 1 was 211,013 grams (211 kilograms). Alewife (66,473 grams, 66 kilograms) comprised 32 percent of the total biomass for 1986. Smallmouth bass (28 kilograms,

TABLE 3-6a LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

ALEWIFE

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 - 4.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.0 - 6.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 3 | 0 | 45 | 45 | 39 | 132 |
| 7.0 - 8.9 | 0 | 0 | 0 | NSC | 9 | 0 | 0 | 0 | 0 | 3 | 17 | 16 | 45 |
| 9.0 - 10.9 | 0 | 0 | 0 | NSC | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 14 |
| 11.0 - 12.9 | 0 | 0 | 0 | NSC | 11 | 9 | 1 | 0 | 0 | 0 | 0 | 3 | 24 |
| 13.0 - 14.9 | 1 | 0 | 0 | NSC | 13 | 15 | 17 | 19 | 0 | 0 | 14 | 5 | 84 |
| 15.0 - 16.9 | 0 | 0 | 0 | NSC | 69 | 36 | 41 | 57 | 0 | 1 | 19 | 22 | 245 |
| 17.0 - 18.9 | 0 | 0 | 0 | NSC | 90 | 39 | 23 | 11 | 1 | 1 | 5 | 9 | 179 |
| 19.0 - 20.9 | 0 | 0 | 0 | NSC | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 6 |
| 21.0 - 22.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23.0 - 24.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25.0 - 26.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27.0 - 28.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29.0 - 30.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31.0 - 32.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33.0 - 34.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Measured | 1 | 0 | 0 | NSC | 208 | 100 | 82 | 90 | 2 | 50 | 100 | 96 | 729 |
| Mean Length | 13.7 | 0 | 0 | NSC | 15.8 | 16.0 | 16.1 | 15.4 | 18.5 | 6.5 | 9.9 | 10.6 | 13.7 |
| Minimum Length | 13.7 | 0 | 0 | NSC | 7.6 | 9.3 | 11.7 | 5.0 | 17.8 | 5.3 | 5.4 | 5.3 | 5.0 |
| Maximum Length | 13.7 | 0 | 0 | NSC | 19.6 | 18.9 | 18.8 | 18.0 | 19.1 | 18.5 | 18.5 | 19.0 | 19.6 |

NOTE: NSC = No samples collected.

TABLE 3-6b LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

RAINBOW SMELT

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 - 4.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 11 |
| 5.0 - 6.9 | 3 | 1 | 3 | NSC | 13 | 11 | 1 | 4 | 0 | 0 | 11 | 14 | 61 |
| 7.0 - 8.9 | 7 | 5 | 2 | NSC | 36 | 23 | 1 | 4 | 0 | 2 | 14 | 11 | 105 |
| 9.0 - 10.9 | 7 | 9 | 1 | NSC | 9 | 2 | 1 | 7 | 0 | 3 | 2 | 14 | 55 |
| 11.0 - 12.9 | 60 | 66 | 15 | NSC | 22 | 3 | 0 | 0 | 0 | 5 | 19 | 24 | 214 |
| 13.0 - 14.9 | 18 | 18 | 4 | NSC | 5 | 2 | 0 | 0 | 0 | 4 | 11 | 26 | 88 |
| 15.0 - 16.9 | 1 | 0 | 0 | NSC | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 10 | 16 |
| 17.0 - 18.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 19.0 - 20.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 21.0 - 22.9 | 0 | 1 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 23.0 - 24.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25.0 - 26.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27.0 - 28.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29.0 - 30.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31.0 - 32.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33.0 - 34.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Measured | 97 | 100 | 25 | NSC | 86 | 41 | 3 | 26 | 0 | 15 | 61 | 100 | 554 |
| Mean Length | 11.8 | 12.0 | 11.1 | NSC | 9.3 | 8.0 | 7.9 | 6.5 | 0 | 11.7 | 10.5 | 11.4 | 10.6 |
| Minimum Length | 5.9 | 6.1 | 6.0 | NSC | 5.2 | 5.6 | 6.9 | 4.0 | 0 | 7.2 | 5.0 | 5.3 | 4.0 |
| Maximum Length | 20.7 | 22.1 | 14.5 | NSC | 15.5 | 14.0 | 9.9 | 9.9 | 0 | 15.1 | 22.7 | 17.0 | 22.7 |

NOTE: NSC = No samples collected.

TABLE 3-6c LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

WHITE PERCH

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 - 4.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 4 | 9 |
| 5.0 - 6.9 | 38 | 2 | 2 | NSC | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 48 |
| 7.0 - 8.9 | 10 | 1 | 1 | NSC | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 8 | 24 |
| 9.0 - 10.9 | 1 | 0 | 2 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 16 | 21 |
| 11.0 - 12.9 | 0 | 1 | 2 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 13.0 - 14.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15.0 - 16.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17.0 - 18.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19.0 - 20.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21.0 - 22.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 23.0 - 24.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 25.0 - 26.9 | 2 | 0 | 0 | NSC | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 4 |
| 27.0 - 28.9 | 2 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 29.0 - 30.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31.0 - 32.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33.0 - 34.9 | 2 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total Measured | 56 | 4 | 7 | NSC | 0 | 0 | 1 | 1 | 0 | 3 | 9 | 34 | 115 |
| Mean Length | 8.9 | 7.6 | 9.0 | NSC | 0 | 0 | 26.0 | 3.9 | 0 | 6.1 | 7.4 | 9.7 | 9.0 |
| Minimum Length | 4.8 | 5.2 | 5.2 | NSC | 0 | 0 | 26.0 | 3.9 | 0 | 3.3 | 4.6 | 4.4 | 3.3 |
| Maximum Length | 33.3 | 11.6 | 11.7 | NSC | 0 | 0 | 26.0 | 3.9 | 0 | 8.2 | 10.4 | 26.7 | 33.3 |

NOTE: NSC = No samples collected.

TABLE 3-6d LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

YELLOW PERCH

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 - 4.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.0 - 6.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7.0 - 8.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 9.0 - 10.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 11.0 - 12.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13.0 - 14.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15.0 - 16.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17.0 - 18.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 19.0 - 20.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 21.0 - 22.9 | 0 | 0 | 0 | NSC | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 3 |
| 23.0 - 24.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 25.0 - 26.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 27.0 - 28.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 29.0 - 30.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 31.0 - 32.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33.0 - 34.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Measured | 3 | 0 | 0 | NSC | 0 | 1 | 0 | 2 | 0 | 2 | 4 | 5 | 17 |
| Mean Length | 25.2 | 0 | 0 | NSC | 0 | 22.2 | 0 | 27.7 | 0 | 23.4 | 21.8 | 9.0 | 19.5 |
| Minimum Length | 19.6 | 0 | 0 | NSC | 0 | 22.2 | 0 | 25.5 | 0 | 22.0 | 17.0 | 7.1 | 7.1 |
| Maximum Length | 29.9 | 0 | 0 | NSC | 0 | 22.2 | 0 | 30.0 | 0 | 24.7 | 27.2 | 10.4 | 30.0 |

NOTE: NSC = No samples collected.

TABLE 3-6e LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

SMALLMOUTH BASS

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.0 - 6.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 7.0 - 8.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9.0 - 10.9 | 0 | 0 | 1 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11.0 - 12.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13.0 - 14.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15.0 - 16.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17.0 - 18.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19.0 - 20.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 21.0 - 22.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 23.0 - 24.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 25.0 - 26.9 | 3 | 0 | 2 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 27.0 - 28.9 | 5 | 0 | 1 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 29.0 - 30.9 | 4 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 31.0 - 32.9 | 3 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 |
| 33.0 - 34.9 | 3 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 35.0 - 36.9 | 4 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 37.0 - 38.9 | 3 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 39.0 - 40.9 | 5 | 1 | 1 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 41.0 - 42.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 43.0 - 44.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 45.0 - 46.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Measured | 37 | 1 | 5 | NSC | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 45 |
| Mean Length | 32.4 | 39.5 | 25.4 | NSC | 0 | 0 | 0 | 0 | 0 | 32.5 | 0 | 5.6 | 31.2 |
| Minimum Length | 8.4 | 39.5 | 9.2 | NSC | 0 | 0 | 0 | 0 | 0 | 32.5 | 0 | 5.6 | 5.6 |
| Maximum Length | 45.3 | 39.5 | 40.0 | NSC | 0 | 0 | 0 | 0 | 0 | 32.5 | 0 | 5.6 | 45.3 |

NOTE: NSC = No samples collected.

TABLE 3-6f LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

**BROWN TROUT**

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 47.0 - 48.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 49.0 - 50.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 51.0 - 52.9 | 0 | 0 | 0 | NSC | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 53.0 - 54.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 55.0 - 56.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57.0 - 58.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 59.0 - 60.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61.0 - 62.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 63.0 - 64.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total Measured | 2 | 0 | 0 | NSC | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 5 |
| Mean Length | 55.6 | 0 | 0 | NSC | 0 | 52.0 | 0 | 0 | 0 | 0 | 0 | 55.3 | 54.8 |
| Minimum Length | 50 | 0 | 0 | NSC | 0 | 52.0 | 0 | 0 | 0 | 0 | 0 | 47.0 | 47.0 |
| Maximum Length | 61.2 | 0 | 0 | NSC | 0 | 52.0 | 0 | 0 | 0 | 0 | 0 | 63.6 | 63.6 |

**RAINBOW TROUT**

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 - 4.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5.0 - 6.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7.0 - 8.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9.0 - 10.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11.0 - 12.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13.0 - 14.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15.0 - 16.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17.0 - 18.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19.0 - 20.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21.0 - 22.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23.0 - 24.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25.0 - 26.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27.0 - 28.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29.0 - 30.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31.0 - 32.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33.0 - 34.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Measured | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Mean Length | 4.8 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.8 |
| Minimum Length | 4.8 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.8 |
| Maximum Length | 4.8 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.8 |

TABLE 3-6f (Cont.)

LAKE TROUT

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9.0 - 10.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11.0 - 12.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 13.0 - 14.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| * | | | | | | | | | | | | | |
| 65.0 - 66.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 67.0 - 68.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 69.0 - 70.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Measured | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Mean Length | 11.3 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 68.3 | 0 | 0 | 39.8 |
| Minimum Length | 11.3 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 68.3 | 0 | 0 | 11.3 |
| Maximum Length | 11.3 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 68.3 | 0 | 0 | 68.3 |

CHINOOK SALMON

| Length Intervals Centimeters (cm) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Interval Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 - 4.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.0 - 6.9 | 0 | 0 | 0 | NSC | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7.0 - 8.9 | 0 | 0 | 0 | NSC | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| * | | | | | | | | | | | | | |
| 33.0 - 34.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35.0 - 36.9 | 1 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 37.0 - 38.9 | 0 | 0 | 0 | NSC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Measured | 1 | 0 | 0 | NSC | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Mean Length | 36.0 | 0 | 0 | NSC | 7.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13.1 |
| Minimum Length | 36.0 | 0 | 0 | NSC | 6.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.4 |
| Maximum Length | 36.0 | 0 | 0 | NSC | 7.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36.0 |

* A break in the length intervals was necessary due to the disparity in the lengths of chinook salmon and lake trout collected in 1986.

NOTE: NSC = No samples collected.

13 percent), rainbow smelt (17 kilograms, 8 percent), gizzard shad (16 kilograms, 7 percent), and burbot (14 kilograms, 7 percent) were second through fifth in rank, respectively, by weight (Table 3-7).

The estimated biomass (based on flow) was 1,411,953 grams (1,412 kilograms) of which 353,205 grams (353 kilograms, 25 percent) was estimated as the weight of alewife (Table 3-8). The biomass of smallmouth bass was estimated at 212,688 grams (213 kilograms, 15 percent). Estimated biomass for rainbow smelt was 121,940 (9 percent); for gizzard shad the estimated biomass was 119,378 grams (8 percent); and burbot was 108,502 grams (8 percent) of the total estimated biomass. Biomass is generally more widely distributed among the species collected since a few heavy-bodied fish (basses and perches) can weigh more than larger numbers of the more fragile-bodied alewife and rainbow smelt.

## 3.4 WATER QUALITY (PERMIT SECTION IV.B.5)

Intake and discharge temperatures were recorded in the station operating conditions and are listed in Appendix B. The intake temperatures ranged from 0.0 C on 1 January 1987 to a maximum of 23.1 C on 5 August 1987. The discharge temperatures ranged from a minimum of 0.2 C on 24 January 1987 to a maximum of 39.6 C on 9 August 1986. These temperatures may have occurred on additional days, however, the dates given are the first date of occurrence for minimum and maximum temperatures in the intake and discharge at NMP Unit 1.

TABLE 3-7 TOTAL BIOMASS OF IMPINGED ORGANISMS COLLECTED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Annual Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Samples | 4 | 4 | 4 | 0 | 9 | 4 | 4 | 6 | 4 | 4 | 4 | 4 | 51 |
| **Species** | | | | | | | | | | | | | |
| Alewife | 23 | --- | --- | NSC | 17,303 | 5,491 | 6,378 | 15,801 | 845 | 6,200 | 12,204 | 2,228 | 66,473 |
| Rainbow smelt | 7,907 | 1,935 | 243 | NSC | 405 | 133 | 7 | 1,360 | 7 | 518 | 1,342 | 3,000 | 16,857 |
| White bass | 3,257 | 305 | 813 | NSC | --- | --- | --- | 352 | --- | --- | 1,346 | 121 | 6,194 |
| Sculpins | 554 | 94 | 37 | NSC | 113 | 40 | 2 | 4 | --- | 29 | 55 | 97 | 1,025 |
| Tessellated darter | <1 | --- | --- | NSC | 204 | 138 | <1 | 7 | --- | <1 | 3 | --- | 355 |
| Gizzard shad | 8,517 | 1,305 | --- | NSC | --- | --- | --- | --- | --- | 196 | 976 | 4,669 | 15,663 |
| Spottail shiner | 88 | 19 | 65 | NSC | 98 | 265 | 164 | 376 | --- | 41 | 400 | 31 | 1,547 |
| White perch | 3,122 | 30 | 67 | NSC | --- | --- | 237 | 3 | --- | 25 | 44 | 898 | 4,426 |
| Threespine stickleback | 105 | 13 | --- | NSC | 1 | --- | --- | --- | --- | --- | 1 | --- | 120 |
| Emerald shiner | 216 | 45 | 34 | NSC | --- | --- | --- | --- | --- | 32 | <1 | 12 | 340 |
| Crayfish | 48 | 3 | 6 | NSC | 72 | --- | --- | 6 | --- | --- | 109 | 45 | 289 |
| Smallmouth bass | 23,139 | 806 | 1,812 | NSC | --- | --- | --- | --- | --- | 1,992 | --- | 2 | 27,751 |
| Rock bass | 5,592 | --- | --- | NSC | --- | --- | --- | 1,450 | --- | --- | 557 | --- | 7,599 |
| Minnow family (damaged) | --- | --- | --- | NSC | --- | --- | --- | --- | 12 | --- | --- | --- | 12 |
| Yellow perch | 744 | --- | --- | NSC | --- | 123 | --- | 1,250 | --- | 582 | 713 | 34 | 3,446 |
| Trout perch | 24 | 3 | --- | NSC | 104 | 87 | 35 | 18 | --- | --- | --- | --- | 271 |
| Stonecat | 508 | --- | --- | NSC | --- | 26 | --- | 693 | --- | --- | 26 | 55 | 1,308 |
| American eel | 1,460 | --- | --- | NSC | --- | 136 | --- | 5,297 | 560 | --- | --- | --- | 7,453 |
| Lake chub | 96 | 7 | 4 | NSC | --- | --- | --- | --- | --- | --- | 36 | 12 | 155 |
| White sucker | 2,342 | --- | --- | NSC | 508 | --- | --- | 3,142 | --- | --- | --- | --- | 5,992 |
| Burbot | 14,176 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 14,176 |
| Pumpkinseed | --- | --- | --- | NSC | --- | --- | --- | 567 | --- | --- | --- | 190 | 757 |
| Brown trout | 4,800 | --- | --- | NSC | --- | 2,000 | --- | --- | --- | --- | --- | 5,023 | 11,823 |
| Chinook salmon | 487 | --- | --- | NSC | 13 | --- | --- | --- | --- | --- | --- | --- | 500 |
| Lake trout | 10 | --- | --- | NSC | --- | --- | --- | --- | --- | 13,200 | --- | --- | 13,210 |
| Walleye | --- | --- | --- | NSC | --- | --- | --- | 52 | --- | --- | --- | 725 | 777 |
| Bluegill | 22 | --- | --- | NSC | --- | --- | --- | --- | --- | 2 | 2 | --- | 26 |
| Freshwater drum | 24 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | 15 | --- | 39 |
| Sea lamprey | --- | --- | --- | NSC | --- | --- | --- | --- | --- | 366 | --- | --- | 366 |
| Clam | 4 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 4 |
| Carp | 2,050 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 2,050 |
| Central mudminnow | 4 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 4 |
| Rainbow trout | 1 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 1 |
| Alewife (damaged) | 4 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 4 |
| Totals | 79,325 | 4,565 | 3,081 | 0 | 18,821 | 8,439 | 6,824 | 30,378 | 1,424 | 23,184 | 17,830 | 17,142 | 211,013 |

NOTE: Dashes (---) = no catches made.
NSC = no samples collected.
Units expressed in grams.

TABLE 3-8 ESIMATED MONTHLY BIOMASS OF COLLECTED TAXA AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Samples | 4 | 4 | 4 | 0 | 9 | 4 | 4 | 6 | 4 | 4 | 4 | 4 | 51 |
| Flow Sampled (MCM) | 4.915 | 4.878 | 1.718 | 0.00 | 12.249 | 5.779 | 5.725 | 9.071 | 5.972 | 5.825 | 5.790 | 5.802 | 67.724 |
| Total Monthly Flow (MCM) | 37.619 | 34.262 | 13.754 | 2.039 | 14.413 | 41.508 | 43.557 | 46.815 | 44.771 | 45.036 | 43.468 | 44.962 | 412.204 |
| **Species** | | | | | | | | | | | | | |
| Alewife | 176 | --- | --- | NSC | 20,360 | 39,439 | 48,525 | 81,548 | 6,335 | 47,935 | 91,621 | 17,266 | 353,205 |
| Rainbow smelt | 60,520 | 13,591 | 1,945 | NSC | 477 | 955 | 53 | 7,019 | 52 | 4,005 | 10,075 | 23,248 | 121,940 |
| White bass | 24,929 | 2,142 | 6,509 | NSC | --- | --- | --- | 1,817 | --- | --- | 10,105 | 938 | 46,440 |
| Sculpins | 4,240 | 660 | 296 | NSC | 133 | 287 | 15 | 21 | --- | 224 | 413 | 752 | 7,041 |
| Tessellated darter | 8 | --- | --- | NSC | 240 | 991 | 8 | 36 | --- | 8 | 23 | --- | 1,314 |
| Gizzard shad | 65,188 | 9,166 | --- | NSC | --- | --- | --- | --- | --- | 1,515 | 7,327 | 36,182 | 119,378 |
| Spottail shiner | 674 | 133 | 520 | NSC | 115 | 1,903 | 1,248 | 1,941 | --- | 317 | 3,003 | 240 | 10,094 |
| White perch | 23,896 | 211 | 536 | NSC | --- | --- | 1,803 | 15 | --- | 193 | 330 | 6,959 | 33,943 |
| Threespine stickleback | 804 | 91 | --- | NSC | 1 | --- | --- | --- | --- | --- | 8 | --- | 904 |
| Emerald shiner | 1,653 | 316 | 272 | NSC | --- | --- | --- | --- | --- | 247 | 8 | 93 | 2,589 |
| Crayfish | 367 | 21 | 48 | NSC | 85 | --- | --- | 31 | --- | --- | 818 | 349 | 1,719 |
| Smallmouth bass | 177,104 | 5,661 | 14,507 | NSC | --- | --- | --- | --- | --- | 15,401 | --- | 15 | 212,688 |
| Rock bass | 42,801 | --- | --- | NSC | --- | --- | --- | 7,483 | --- | --- | 4,182 | --- | 54,466 |
| Minnow family (damaged) | --- | --- | --- | NSC | --- | --- | --- | --- | 90 | --- | --- | --- | 90 |
| Yellow perch | 5,695 | --- | --- | NSC | --- | 883 | --- | 6,451 | --- | 4,500 | 5,353 | 263 | 23,145 |
| Trout perch | 184 | 21 | --- | NSC | 122 | 625 | 266 | 93 | --- | --- | --- | --- | 1,311 |
| Stonecat | 3,888 | --- | --- | NSC | --- | 187 | --- | 3,577 | --- | --- | 195 | 426 | 8,273 |
| American eel | 11,175 | --- | --- | NSC | --- | 977 | --- | 27,338 | 4,198 | --- | --- | --- | 43,688 |
| Lake chub | 735 | 49 | 32 | NSC | --- | --- | --- | --- | --- | --- | 270 | 93 | 1,179 |
| White sucker | 17,925 | --- | --- | NSC | 598 | --- | --- | 16,216 | --- | --- | --- | --- | 34,739 |
| Burbot | 108,502 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 108,502 |
| Pumpkinseed | --- | --- | --- | NSC | --- | --- | --- | 2,926 | --- | --- | --- | 1,472 | 4,398 |
| Brown trout | 36,739 | --- | --- | NSC | --- | 14,365 | --- | --- | --- | --- | --- | 38,925 | 90,033 |
| Chinook salmon | 3,727 | --- | --- | NSC | 15 | --- | --- | --- | --- | --- | --- | --- | 3,742 |
| Lake trout | 77 | --- | --- | NSC | --- | --- | --- | --- | --- | 102,056 | --- | --- | 102,133 |
| Walleye | --- | --- | --- | NSC | --- | --- | --- | 268 | --- | --- | --- | 5,618 | 5,886 |
| Bluegill | 168 | --- | --- | NSC | --- | --- | --- | --- | --- | 15 | 15 | --- | 198 |
| Freshwater drum | 184 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | 113 | --- | 297 |
| Sea lamprey | --- | --- | --- | NSC | --- | --- | --- | --- | --- | 2,830 | --- | --- | 2,830 |
| Clam | 31 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 31 |
| Carp | 15,691 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 15,691 |
| Central mudminnow | 31 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 31 |
| Rainbow trout | 8 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 8 |
| Alewife (damaged) | 31 | --- | --- | NSC | --- | --- | --- | --- | --- | --- | --- | --- | 31 |
| Totals | 607,151 | 32,062 | 24,665 | 0 | 22,146 | 60,612 | 51,918 | 156,780 | 10,675 | 179,246 | 133,859 | 132,839 | 1,411,953 |

NOTE: Dashes (---) = no catches made.
NSC = no samples collected.
Units expressed in grams.

## REFERENCES


EA Science and Technology, a Division of EA Engineering, Science, and Technology, Inc. (formerly Ecological Analysts, Inc.). 1982. 1981 Nine Mile Point Aquatic Ecology Studies. Prepared for Niagara Mohawk Power Corporation and Power Authority of the State of New York.

EA. 1983. Nine Mile Point 1982 Aquatic Ecology Studies. Prepared for Niagara Mohawk Power Corporation and Power Authority of the State of New York.

EA. 1984. Nine Mile Point Nuclear Station 1983 SPDES Annual Biological Monitoring Report. SPDES Permit No. NY 0001015 Section IV.C.

EA. 1985. Nine Mile Point Nuclear Station 1984 SPDES Annual Biological Monitoring Report. SPDES Permit No. NY 0001015 Section IV.C.

EA. 1986. Nine Mile Point Nuclear Station 1985 SPDES Annual Biological Monitoring Report. SPDES Permit No. NY 0001015 Section IV.C.

Lifton and Storr. 1977. The Effect of Environmental Variables on Fish Impingement, in Fourth National Workshop on Entrainment and Impingement (L.D. Jensen, ed.), pp. 299-311.

Rand Corporation. 1955. A Million Random Digits with 100,000 Normal Deviates. Free Press, Glencoe, Illinois.

# APPENDIX A

## EXCEPTIONS TO STANDARD OPERATING PROCEDURES

## APPENDIX A

### EXCEPTIONS TO STANDARD OPERATING PROCEDURES FOR IMPINGEMENT AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

| | |
|---|---|
| 01 APR - 23 MAY | Void Impingement Samples - In 1986, 51 of the 78 scheduled samples were successfully completed. From 1 April to 23 May, the traveling screens were inoperable (due to required maintenance during an outage) and no samples could be collected. During this time, the main circulating water pumps were shut down and, according to SPDES Permit No. 0001015 Section IV.B.1, sampling was not required. Samples were rescheduled as soon as the traveling screens were operable, regardless of whether the main circulating water pumps were operating. Rescheduled samples were collected on every available date from 23 May to the end of the month. Nine of the 20 scheduled samples were collected in May. None of the scheduled samples for April were collected. |
| 11 JUN | Void Impingement Sample - At the time of collection on 11 June, the impingement sample was declared void as a result of work conducted on valves and the shutdown of the main circulating water pumps. The traveling screens were unable to be washed. The sample was rescheduled and successfully collected on 17 June. |

APPENDIX B

STATION OPERATING CONDITIONS
(PERMIT SECTION IV.C.9)

TABLE B-1 STATION OPERATING CONDITIONS AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1986

STATION: Nine Mile Point, Unit 1 MONTH: January 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Temperatures (C) Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1,148,399.3 | 529 | 0.0 | 19.0 |
| 2 | 2 | 1 | 1,150,034.4 | 525 | 0.4 | 19.7 |
| 3 | 2 | 1 | 1,193,637.6 | 523 | 0.7 | 19.2 |
| 4 | 2 | 1 | 1,178,921.5 | 522 | 1.0 | 19.9 |
| 5 | 2 | 1 | 1,336,983.1 | 521 | 1.7 | 18.4 |
| 6 | 2 | 1 | 1,236,695.8 | 520 | 0.0 | 19.6 |
| 7 | 2 | 1 | 1,221,979.7 | 512 | 0.[illegible] | 21.9 |
| 8 | 2 | 1 | 1,193,637.6 | 515 | 0.0 | 18.4 |
| 9 | 2 | 1 | 1,135,863.4 | 513 | 0.0 | 17.4 |
| 10 | 2 | 1 | 1,078,089.1 | 511 | 0.0 | 17.4 |
| 11 | 2 | 1 | 1,221,979.7 | 508 | 0.0 | 17.4 |
| 12 | 2 | 1 | 1,221,979.7 | 510 | 0.0 | 17.4 |
| 13 | 2 | 1 | 1,221,979.7 | 505 | 0.0 | 17.3 |
| 14 | 2 | 1 | 1,221,979.7 | 501 | 0.9 | 17.4 |
| 15 | 2 | 1 | 1,226,885.0 | 498 | 0.6 | 18.1 |
| 16 | 2 | 1 | 1,226,885.0 | 498 | 1.0 | 18.5 |
| 17 | 2 | 1 | 1,226,885.0 | 499 | 0.3 | 17.9 |
| 18 | 2 | 1 | 1,226,885.0 | 351 | 0.1 | 12.6 |
| 19 | 2 | 1 | 1,226,885.0 | 0 | 0.4 | 0.6 |
| 20 | 2 | 1 | 1,226,885.0 | 0 | 0.5 | 0.6 |
| 21 | 2 | 1 | 1,226,885.0 | 0 | 0.3 | 0.4 |
| 22 | 2 | 1 | 1,226,885.0 | 0 | 0.3 | 0.3 |
| 23 | 2 | 1 | 1,226,885.0 | 0 | 0.3 | 0.3 |
| 24 | 2 | 1 | 1,226,885.0 | 0 | 0.1 | 0.2 |
| 25 | 2 | 1 | 1,226,885.0 | 117 | 0.9 | 10.2 |
| 26 | 2 | 1 | 1,226,885.0 | 338 | 1.6 | 15.6 |
| 27 | 2 | 1 | 1,226,885.0 | 461 | 0.4 | 16.6 |
| 28 | 2 | 1 | 1,226,885.0 | 518 | 0.0 | 16.9 |
| 29 | 2 | 1 | 1,226,885.0 | 484 | 0.0 | 16.4 |
| 30 | 2 | 1 | 1,226,885.0 | 483 | 0.3 | 17.0 |
| 31 | 2 | 1 | 1,226,885.0 | 483 | 0.0 | 16.2 |

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: February 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Temperatures (C) Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1,220,344.6 | 479 | 0.3 | 17.0 |
| 2 | 2 | 1 | 1,220,344.6 | 478 | 0.8 | 17.1 |
| 3 | 2 | 1 | 1,220,344.6 | 475 | 0.0 | 16.3 |
| 4 | 2 | 1 | 1,220,344.6 | 472 | 0.8 | 17.1 |
| 5 | 2 | 1 | 1,220,344.6 | 472 | 0.6 | 16.9 |
| 6 | 2 | 1 | 1,220,344.6 | 468 | 2.3 | 16.2 |
| 7 | 2 | 1 | 1,220,344.6 | 466 | 0.1 | 16.3 |
| 8 | 2 | 1 | 1,220,344.6 | 463 | 0.8 | 17.1 |
| 9 | 2 | 1 | 1,249,231.7 | 460 | 0.6 | 16.5 |
| 10 | 2 | 1 | 1,263,402.7 | 460 | 0.9 | 16.6 |
| 11 | 2 | 1 | 1,249,231.7 | 457 | 0.2 | 15.7 |
| 12 | 2 | 1 | 1,249,231.7 | 453 | 0.1 | 15.5 |
| 13 | 2 | 1 | 1,220,344.6 | 450 | 0.0 | 15.2 |
| 14 | 2 | 1 | 1,220,344.6 | 449 | 0.3 | 16.1 |
| 15 | 2 | 1 | 1,220,344.6 | 448 | 0.0 | 15.3 |
| 16 | 2 | 1 | 1,206,173.5 | 445 | 0.0 | 15.5 |
| 17 | 2 | 1 | 1,220,344.6 | 443 | 0.3 | 15.8 |
| 18 | 2 | 1 | 1,220,344.6 | 440 | 1.5 | 16.9 |
| 19 | 2 | 1 | 1,206,173.5 | 438 | 2.4 | 17.8 |
| 20 | 2 | 1 | 1,206,173.5 | 437 | 1.6 | 16.9 |
| 21 | 2 | 1 | 1,206,173.5 | 436 | 1.0 | 16.4 |
| 22 | 2 | 1 | 1,220,344.6 | 433 | 0.2 | 15.4 |
| 23 | 2 | 1 | 1,220,344.6 | 431 | 0.7 | 15.6 |
| 24 | 2 | 1 | 1,229,065.2 | 430 | 0.2 | 15.4 |
| 25 | 2 | 1 | 1,229,065.2 | 429 | 1.2 | 15.9 |
| 26 | 2 | 1 | 1,229,065.2 | 423 | 0.4 | 16.6 |
| 27 | 2 | 1 | 1,217,074.3 | 422 | 0.1 | 14.9 |
| 28 | 2 | 1 | 1,217,074.3 | 420 | 0.0 | 14.4 |

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1

MONTH: March 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Temperatures (C) Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1,217,074.3 | 419 | 0.0 | 14.2 |
| 2 | 2 | 1 | 1,217,074.3 | 417 | 0.0 | 14.2 |
| 3 | 2 | 1 | 1,217,074.3 | 415 | 0.1 | 14.8 |
| 4 | 2 | 1 | 1,248,686.6 | 414 | 0.3 | 15.3 |
| 5 | 2 | 1 | 1,262,857.7 | 411 | 0.3 | 15.5 |
| 6 | 2 | 1 | 1,262,857.7 | 409 | 0.4 | 15.4 |
| 7 | 2 | 1 | 1,261,222.6 | 396 | 0.1 | 11.1 |
| 8 | 2 | 1 | 1,261,222.6 | 63 | 0.0 | 3.6 |
| 9 | 2 | 1 | 1,261,222.6 | 0 | 0.1 | 0.6 |
| 10 | 2/1 | 1 | 658,953.4 | 0 | 0.4 | 0.8 |
| 11 | 1 | 1 | 654,593.0 | 0 | 0.6 | 3.4* |
| 12 | 1/0 | 1 | 63,769.7 | 0 | 0.7 | 5.1 |
| 13 | 0 | 1 | 63,769.7 | 0 | 0.9 | 5.8 |
| 14 | 0 | 1 | 63,769.7 | 0 | 1.0 | 6.2 |
| 15 | 0 | 1 | 63,769.7 | 0 | 1.1 | 5.9 |
| 16 | 0 | 1 | 63,769.7 | 0 | 1.2 | 6.0 |
| 17 | 0 | 1 | 59,954.4 | 0 | 1.2 | 5.3 |
| 18 | 0 | 1 | 59,954.4 | 0 | 1.2 | 5.3 |
| 19 | 0 | 1 | 59,954.4 | 0 | 2.2 | 6.2 |
| 20 | 0 | 1 | 59,954.4 | 0 | 2.1 | 5.7 |
| 21 | 0 | 1 | 59,954.4 | 0 | 1.2 | 4.3 |
| 22 | 0 | 1 | 59,954.4 | 0 | 1.4 | 4.8 |
| 23 | 0 | 1 | 59,954.4 | 0 | 1.6 | 4.9 |
| 24 | 0 | 1 | 61,589.5 | 0 | 1.7 | 5.5 |
| 25 | 0 | 1 | 61,589.5 | 0 | 1.5 | 5.4 |
| 26 | 0 | 1 | 61,589.5 | 0 | 2.8 | 5.5 |
| 27 | 0 | 1 | 61,589.5 | 0 | 2.3 | 6.5 |
| 28 | 0 | 1 | 61,589.5 | 0 | 2.8 | 5.9 |
| 29 | 0 | 1 | 61,589.5 | 0 | 3.4 | 7.0 |
| 30 | 0 | 1 | 61,589.5 | 0 | 3.2 | 6.3 |
| 31 | 0 | 1 | 61,589.5 | 0 | 4.1 | 6.4 |

* Minimal flow in the discharge canal resulted in a data record of higher (than actual) temperatures as a result of the effect of the position of the temperature probe and the minimal flow from 11 to 31 March 1986.

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: April 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Discharge |
|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 61,589.5 | 0 | 3.8 | 6.6* |
| 2 | 0 | 1 | 61,589.5 | 0 | 5.7 | 7.6 |
| 3 | 0 | 1 | 61,589.5 | 0 | 4.1 | 7.2 |
| 4 | 0 | 1 | 61,589.5 | 0 | 3.6 | 6.5 |
| 5 | 0 | 1 | 61,589.5 | 0 | 3.6 | 7.3 |
| 6 | 0 | 1 | 61,589.5 | 0 | 4.3 | 7.2 |
| 7 | 0 | 1 | 61,589.5 | 0 | 3.9 | 7.3 |
| 8 | 0 | 1 | 61,589.5 | 0 | 5.3 | 7.8 |
| 9 | 0 | 1 | 61,589.5 | 0 | 5.8 | 9.3 |
| 10 | 0 | 1 | 61,589.5 | 0 | 5.5 | 9.0 |
| 11 | 0 | 1 | 61,589.5 | 0 | 5.7 | 9.1 |
| 12 | 0 | 1 | 61,589.5 | 0 | 3.8 | 7.3 |
| 13 | 0 | 1 | 61,589.5 | 0 | 5.6 | 8.1 |
| 14 | 0 | 1 | 61,589.5 | 0 | 4.8 | 8.2 |
| 15 | 0 | 1 | 61,589.5 | 0 | 3.9 | 7.3 |
| 16 | 0 | 1 | 61,589.5 | 0 | 3.4 | 7.0 |
| 17 | 0 | 1 | 61,589.5 | 0 | 3.9 | 7.2 |
| 18 | 0 | 1 | 65,404.8 | 0 | 4.5 | 7.9 |
| 19 | 0 | 1 | 65,404.8 | 0 | 3.7 | 7.2 |
| 20 | 0 | 1 | 65,404.8 | 0 | 3.2 | 6.2 |
| 21 | 0 | 1 | 79,575.8 | 0 | 5.1 | 7.2 |
| 22 | 0 | 1 | 79,575.8 | 0 | 5.1 | 7.9 |
| 23 | 0 | 1 | 79,575.8 | 0 | 4.1 | 6.5 |
| 24 | 0 | 1 | 79,575.8 | 0 | 6.2 | 8.3 |
| 25 | 0 | 1 | 79,575.8 | 0 | 6.7 | 8.9 |
| 26 | 0 | 1 | 79,575.8 | 0 | 7.4 | 9.5 |
| 27 | 0 | 1 | 79,575.8 | 0 | 7.7 | 9.8 |
| 28 | 0 | 1 | 79,575.8 | 0 | 7.6 | 10.1 |
| 29 | 0 | 1 | 79,575.8 | 0 | 8.1 | 9.8 |
| 30 | 0 | 1 | 79,575.8 | 0 | 7.9 | 10.4 |

* Minimal flow in the discharge canal resulted in a data record of higher (than actual) temperatures as a result of the effect of the position of the temperature probe and the minimal flow from 1 to 30 April 1986.

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: May 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Discharge |
|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 79,575.8 | 0 | 6.7 | 9.3* |
| 2 | 0 | 1 | 79,575.8 | 0 | 8.0 | 10.6 |
| 3 | 0 | 1 | 79,575.8 | 0 | 7.4 | 9.6 |
| 4 | 0 | 1 | 79,575.8 | 0 | 7.2 | 9.3 |
| 5 | 0 | 1 | 79,575.8 | 0 | 7.1 | 9.2 |
| 6 | 0 | 1 | 79,575.8 | 0 | 7.8 | 9.8 |
| 7 | 0 | 1 | 79,575.8 | 0 | 7.9 | 10.6 |
| 8 | 0 | 1 | 79,575.8 | 0 | 7.5 | 10.0 |
| 9 | 0 | 1 | 79,575.8 | 0 | 7.3 | 9.9 |
| 10 | 0 | 1 | 79,575.8 | 0 | 6.7 | 9.3 |
| 11 | 0 | 1 | 79,575.8 | 0 | 7.8 | 10.4 |
| 12 | 0 | 1 | 79,575.8 | 0 | 7.7 | 9.8 |
| 13 | 0 | 1 | 79,575.8 | 0 | 6.1 | 8.3 |
| 14 | 0 | 1 | 79,575.8 | 0 | 5.8 | 8.4 |
| 15 | 0 | 1 | 79,575.8 | 0 | 5.4 | 7.7 |
| 16 | 0 | 1 | 79,575.8 | 0 | 6.2 | 8.4 |
| 17 | 0 | 1 | 79,575.8 | 0 | 6.4 | 8.9 |
| 18 | 0 | 1 | 79,575.8 | 0 | 8.6 | 10.8 |
| 19 | 0 | 1 | 79,575.8 | 0 | 8.4 | 10.7 |
| 20 | 0 | 1 | 79,575.8 | 0 | 6.8 | 9.4 |
| 21 | 0 | 1 | 79,575.8 | 0 | 7.5 | 9.5 |
| 22 | 0 | 1 | 79,575.8 | 0 | 9.0 | 10.9 |
| 23 | 0/2 | 1 | 719,997.8 | 0 | 8.5 | 9.6 |
| 24 | 2 | 1 | 1,257,952.3 | 0 | 8.6 | 8.8 |
| 25 | 2 | 1 | 1,257,952.3 | 0 | 9.4 | 9.7 |
| 26 | 2 | 1 | 1,445,991.1 | 0 | 9.7 | 9.8 |
| 27 | 2 | 1 | 1,439,995.7 | 0 | 10.3 | 10.5 |
| 28 | 2 | 1 | 1,439,995.7 | 0 | 10.8 | 11.2 |
| 29 | 2 | 1 | 1,439,995.7 | 0 | 11.2 | 11.6 |
| 30 | 2 | 1 | 1,439,995.7 | 0 | 11.1 | 11.4 |
| 31 | 2 | 1 | 1,439,995.7 | 0 | 11.5 | 11.8 |

* Minimal flow in the discharge canal resulted in a data record of higher (than actual) temperatures as a result of the effect of the position of the temperature probe and the minimal flow from 1 to 23 May 1986.

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: June 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1,439,995.7 | 0 | 12.3 | 12.6 |
| 2 | 2 | 1 | 1,439,995.7 | 0 | 11.1 | 11.2 |
| 3 | 2 | 1 | 1,439,995.7 | 0 | 11.5 | 11.9 |
| 4 | 2 | 1 | 1,439,995.7 | 0 | 12.2 | 12.7 |
| 5 | 2 | 1 | 1,439,995.7 | 0 | 13.0 | 13.2 |
| 6 | 2 | 1 | 1,439,995.7 | 0 | 9.2 | 9.5 |
| 7 | 2 | 1 | 1,439,995.7 | 0 | 6.6 | 6.9 |
| 8 | 2 | 1 | 1,439,995.7 | 0 | 8.7 | 9.0 |
| 9 | 2 | 1 | 1,439,995.7 | 0 | 11.8 | 12.1 |
| 10 | 2 | 1 | 1,439,995.7 | 0 | 12.6 | 12.9 |
| 11 | 2/0 | 1 | 219,106.1 | 0 | 12.4 | 13.2 |
| 12 | 0/2 | 1 | 787,037.8 | 0 | 8.8 | 11.2 |
| 13 | 2 | 1 | 1,448,716.3 | 0 | 7.4 | 7.8 |
| 14 | 2 | 1 | 1,448,716.3 | 0 | 11.2 | 11.4 |
| 15 | 2 | 1 | 1,448,716.3 | 0 | 12.1 | 12.4 |
| 16 | 2 | 1 | 1,448,716.3 | 0 | 13.3 | 13.6 |
| 17 | 2 | 1 | 1,448,716.3 | 0 | 14.4 | 14.8 |
| 18 | 2 | 1 | 1,448,716.3 | 0 | 13.4 | 13.7 |
| 19 | 2 | 1 | 1,448,716.3 | 0 | 13.0 | 13.7 |
| 20 | 2 | 1 | 1,448,716.3 | 38 | 14.0 | 18.6 |
| 21 | 2 | 1 | 1,448,716.3 | 134 | 13.6 | 18.5 |
| 22 | 2 | 1 | 1,448,716.3 | 218 | 13.0 | 21.7 |
| 23 | 2 | 1/2: 2/1 | 1,486,324.1 | 238 | 14.7 | 22.7 |
| 24 | 2 | 1 | 1,445,991.1 | 412 | 14.8 | 27.2 |
| 25 | 2 | 1 | 1,445,991.1 | 520 | 15.2 | 30.0 |
| 26 | 2 | 1 | 1,445,991.1 | 596 | 14.5 | 31.5 |
| 27 | 2 | 1 | 1,445,991.1 | 608 | 14.4 | 31.4 |
| 28 | 2 | 1 | 1,445,991.1 | 592 | 15.8 | 32.8 |
| 29 | 2 | 1 | 1,445,991.1 | 601 | 15.6 | 32.5 |
| 30 | 2 | 1 | 1,451,986.6 | 605 | 15.6 | 32.4 |

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: July 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1,451,986.6 | 602 | 16.2 | 33.1 |
| 2 | 2 | 1 | 1,451,986.6 | 601 | 15.9 | 33.1 |
| 3 | 2 | 1 | 1,451,986.6 | 601 | 16.9 | 34.1 |
| 4 | 2 | 1 | 1,451,986.6 | 604 | 16.6 | 33.9 |
| 5 | 2 | 1 | 1,451,986.6 | 602 | 17.4 | 34.9 |
| 6 | 2 | 1 | 1,451,986.6 | 602 | 17.5 | 35.1 |
| 7 | 2 | 1 | 1,451,986.6 | 576 | 18.3 | 31.5 |
| 8 | 2 | 1 | 1,451,986.6 | 3 | 18.4 | 22.3 |
| 9 | 2 | 1 | 1,451,986.6 | 0 | 19.1 | 19.3 |
| 10 | 2/1 | 1 | 936,923.8 | 0 | 18.9 | 18.9 |
| 11 | 1 | 1 | 1,431,275.0 | 0 | 18.3 | 18.3 |
| 12 | 1/2 | 1 | 1,078,634.2 | 0 | 16.8 | 16.8 |
| 13 | 2 | 1 | 1,431,275.0 | 0 | 15.9 | 16.1 |
| 14 | 2 | 1 | 1,431,275.0 | 120 | 17.7 | 23.3 |
| 15 | 2/1 | 1 | 1,176,741.4 | 377 | 17.8 | 31.1 |
| 16 | 1 | 1 | 1,451,986.6 | 220 | 18.1 | 32.3 |
| 17 | 1 | 1 | 1,451,986.6 | 227 | 18.5 | 33.1 |
| 18 | 1/2: 2/1 | 1 | 745,069.7 | 232 | 18.5 | 30.1 |
| 19 | 1/2 | 1 | 1,244,326.3 | 455 | 18.1 | 30.2 |
| 20 | 2 | 1 | 1,450,896.5 | 542 | 20.0 | 34.6 |
| 21 | 2 | 1/2 | 1,496,679.8 | 593 | 16.0 | 32.4 |
| 22 | 2 | 2 | 1,496,679.8 | 594 | 16.1 | 32.5 |
| 23 | 2 | 2 | 1,506,490.6 | 582 | 19.6 | 35.8 |
| 24 | 2 | 2 | 1,506,490.6 | 590 | 20.7 | 37.1 |
| 25 | 2 | 2 | 1,521,751.7 | 586 | 21.9 | 38.1 |
| 26 | 2 | 2 | 1,521,751.7 | 585 | 21.9 | 38.5 |
| 27 | 2 | 2 | 1,521,751.7 | 593 | 19.2 | 35.7 |
| 28 | 2 | 2 | 1,521,751.7 | 591 | 19.9 | 36.4 |
| 29 | 2 | 2 | 1,521,751.7 | 588 | 22.7 | 39.2 |
| 30 | 2 | 2 | 1,521,751.7 | 587 | 20.9 | 37.5 |
| 31 | 2 | 2 | 1,521,751.7 | 593 | 19.5 | 36.1 |

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: July 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1,451,986.6 | 602 | 16.2 | 33.1 |
| 2 | 2 | 1 | 1,451,986.6 | 601 | 15.9 | 33.1 |
| 3 | 2 | 1 | 1,451,986.6 | 601 | 16.9 | 34.1 |
| 4 | 2 | 1 | 1,451,986.6 | 604 | 16.6 | 33.9 |
| 5 | 2 | 1 | 1,451,986.6 | 602 | 17.4 | 34.9 |
| 6 | 2 | 1 | 1,451,986.6 | 602 | 17.5 | 35.1 |
| 7 | 2 | 1 | 1,451,986.6 | 576 | 18.3 | 31.5 |
| 8 | 2 | 1 | 1,451,986.6 | 3 | 18.4 | 22.3 |
| 9 | 2 | 1 | 1,451,986.6 | 0 | 19.1 | 19.3 |
| 10 | 2/1 | 1 | 936,923.8 | 0 | 18.9 | 18.9 |
| 11 | 1 | 1 | 1,431,275.0 | 0 | 18.3 | 18.3 |
| 12 | 1/2 | 1 | 1,078,634.2 | 0 | 16.8 | 16.8 |
| 13 | 2 | 1 | 1,431,275.0 | 0 | 15.9 | 16.1 |
| 14 | 2 | 1 | 1,431,275.0 | 120 | 17.7 | 23.3 |
| 15 | 2/1 | 1 | 1,176,741.4 | 377 | 17.8 | 31.1 |
| 16 | 1 | 1 | 1,451,986.6 | 220 | 18.1 | 32.3 |
| 17 | 1 | 1 | 1,451,986.6 | 227 | 18.5 | 33.1 |
| 18 | 1/2: 2/1 | 1 | 745,069.7 | 232 | 18.5 | 30.1 |
| 19 | 1/2 | 1 | 1,244,326.3 | 455 | 18.1 | 30.2 |
| 20 | 2 | 1 | 1,450,896.5 | 542 | 20.0 | 34.6 |
| 21 | 2 | 1/2 | 1,496,679.8 | 593 | 16.0 | 32.4 |
| 22 | 2 | 2 | 1,496,679.8 | 594 | 16.1 | 32.5 |
| 23 | 2 | 2 | 1,506,490.6 | 582 | 19.6 | 35.8 |
| 24 | 2 | 2 | 1,506,490.6 | 590 | 20.7 | 37.1 |
| 25 | 2 | 2 | 1,521,751.7 | 586 | 21.9 | 38.1 |
| 26 | 2 | 2 | 1,521,751.7 | 585 | 21.9 | 38.5 |
| 27 | 2 | 2 | 1,521,751.7 | 593 | 19.2 | 35.7 |
| 28 | 2 | 2 | 1,521,751.7 | 591 | 19.9 | 36.4 |
| 29 | 2 | 2 | 1,521,751.7 | 588 | 22.7 | 39.2 |
| 30 | 2 | 2 | 1,521,751.7 | 587 | 20.9 | 37.5 |
| 31 | 2 | 2 | 1,521,751.7 | 593 | 19.5 | 36.1 |

STATION: Nine Mile Point, Unit 1 MONTH: August 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 2 | 1,521,751.7 | 332 | 21.0 | 30.7 |
| 2 | 2 | 2 | 1,503,765.4 | 0 | 22.1 | 22.2 |
| 3 | 2 | 2 | 1,503,765.4 | 0 | 22.3 | 22.2 |
| 4 | 2 | 2 | 1,503,765.4 | 0 | 22.5 | 22.5 |
| 5 | 2 | 2 | 1,503,765.4 | 0 | 23.1 | 22.9 |
| 6 | 2 | 2 | 1,503,765.4 | 231 | 23.1 | 29.4 |
| 7 | 2 | 2 | 1,503,765.4 | 474 | 22.8 | 37.6 |
| 8 | 2 | 2 | 1,521,751.7 | 532 | 22.7 | 38.3 |
| 9 | 2 | 2 | 1,521,751.7 | 580 | 23.0 | 39.6 |
| 10 | 2 | 2 | 1,521,751.7 | 582 | 22.9 | 39.6 |
| 11 | 2 | 2 | 1,521,751.7 | 584 | 22.7 | 39.3 |
| 12 | 2 | 2 | 1,521,751.7 | 588 | 22.3 | 39.1 |
| 13 | 2 | 2 | 1,521,751.7 | 586 | 22.3 | 38.8 |
| 14 | 2 | 2 | 1,503,765.4 | 587 | 22.0 | 38.7 |
| 15 | 2 | 2 | 1,503,765.4 | 586 | 22.4 | 38.9 |
| 16 | 2 | 2 | 1,503,765.4 | 566 | 22.9 | 38.8 |
| 17 | 2 | 2 | 1,503,765.4 | 570 | 22.9 | 39.3 |
| 18 | 2 | 2 | 1,521,751.7 | 580 | 22.9 | 39.4 |
| 19 | 2 | 2 | 1,521,751.7 | 594 | 17.3 | 34.0 |
| 20 | 2 | 2 | 1,521,751.7 | 599 | 14.3 | 30.8 |
| 21 | 2 | 2 | 1,521,751.7 | 596 | 14.7 | 31.3 |
| 22 | 2 | 2 | 1,503,765.4 | 317 | 14.7 | 23.0 |
| 23 | 2 | 2 | 1,503,765.4 | 0 | 12.6 | 12.4 |
| 24 | 2 | 2 | 1,503,765.4 | 0 | 18.7 | 18.7 |
| 25 | 2 | 2 | 1,503,765.4 | 0 | 18.9 | 18.7 |
| 26 | 2 | 2 | 1,503,765.4 | 320 | 19.2 | 26.6 |
| 27 | 2 | 2 | 1,503,765.4 | 526 | 19.8 | 34.5 |
| 28 | 2 | 2 | 1,503,765.4 | 558 | 19.8 | 35.5 |
| 29 | 2 | 2 | 1,503,765.4 | 582 | 19.1 | 35.4 |
| 30 | 2 | 2 | 1,503,765.4 | 593 | 19.4 | 36.0 |
| 31 | 2 | 2 | 1,503,765.4 | 595 | 19.4 | 35.9 |

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: September 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Temperatures (C) Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 2 | 1,503,765.4 | 594 | 19.2 | 35.7 |
| 2 | 2 | 2 | 1,503,765.4 | 596 | 19.3 | 35.8 |
| 3 | 2 | 2 | 1,503,765.4 | 594 | 19.7 | 36.2 |
| 4 | 2 | 2 | 1,503,765.4 | 597 | 18.6 | 35.3 |
| 5 | 2 | 2 | 1,493,954.6 | 594 | 18.8 | 35.4 |
| 6 | 2 | 2 | 1,493,954.6 | 592 | 19.4 | 35.8 |
| 7 | 2 | 2 | 1,493,954.6 | 595 | 19.2 | 35.7 |
| 8 | 2 | 2 | 1,491,229.4 | 587 | 18.6 | 35.0 |
| 9 | 2 | 2 | 1,491,229.4 | 592 | 18.6 | 35.3 |
| 10 | 2 | 2 | 1,491,229.4 | 595 | 18.7 | 35.3 |
| 11 | 2 | 2 | 1,491,229.4 | 593 | 18.6 | 35.1 |
| 12 | 2 | 2 | 1,491,229.4 | 595 | 18.9 | 35.5 |
| 13 | 2 | 2 | 1,491,229.4 | 594 | 18.4 | 35.2 |
| 14 | 2 | 2 | 1,491,229.4 | 592 | 18.6 | 35.3 |
| 15 | 2 | 2 | 1,491,229.4 | 595 | 18.2 | 34.9 |
| 16 | 2 | 2 | 1,491,229.4 | 594 | 18.4 | 35.1 |
| 17 | 2 | 2 | 1,491,229.4 | 596 | 17.7 | 34.5 |
| 18 | 2 | 2 | 1,491,229.4 | 595 | 17.3 | 34.3 |
| 19 | 2 | 2 | 1,491,229.4 | 595 | 17.4 | 34.1 |
| 20 | 2 | 2 | 1,491,229.4 | 596 | 17.0 | 33.9 |
| 21 | 2 | 2 | 1,491,229.4 | 597 | 16.8 | 33.6 |
| 22 | 2 | 2 | 1,491,229.4 | 595 | 16.5 | 33.2 |
| 23 | 2 | 2 | 1,491,229.4 | 591 | 15.8 | 32.2 |
| 24 | 2 | 2 | 1,493,954.6 | 594 | 17.4 | 34.2 |
| 25 | 2 | 2 | 1,493,954.6 | 591 | 17.4 | 34.3 |
| 26 | 2 | 2 | 1,493,954.6 | 592 | 17.2 | 34.0 |
| 27 | 2 | 2 | 1,493,954.6 | 600 | 10.4 | 28.4 |
| 28 | 2 | 2 | 1,493,954.6 | 603 | 10.7 | 27.6 |
| 29 | 2 | 2 | 1,491,229.4 | 606 | 10.1 | 26.8 |
| 30 | 2 | 2/1 | 1,453,076.6 | 601 | 11.9 | 28.8 |

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: October 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) Intake | Discharge |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1,453,076.6 | 601 | 14.2 | 30.6 |
| 2 | 2 | 1 | 1,453,076.6 | 601 | 14.8 | 31.4 |
| 3 | 2 | 1 | 1,454,711.8 | 595 | 15.0 | 31.8 |
| 4 | 2 | 1 | 1,454,711.8 | 538 | 15.6 | 31.0 |
| 5 | 2 | 1 | 1,454,711.8 | 598 | 13.3 | 30.3 |
| 6 | 2 | 1 | 1,455,801.8 | 600 | 14.1 | 30.9 |
| 7 | 2 | 1 | 1,450,896.5 | 601 | 13.7 | 30.7 |
| 8 | 2 | 1 | 1,453,076.6 | 601 | 14.3 | 31.2 |
| 9 | 2 | 1 | 1,453,076.6 | 601 | 14.3 | 31.2 |
| 10 | 2 | 1 | 1,453,076.6 | 600 | 13.7 | 30.5 |
| 11 | 2 | 1 | 1,453,076.6 | 600 | 13.5 | 30.4 |
| 12 | 2 | 1 | 1,453,076.6 | 603 | 13.7 | 30.7 |
| 13 | 2 | 1 | 1,450,896.5 | 599 | 13.8 | 30.9 |
| 14 | 2 | 1 | 1,453,076.6 | 602 | 13.5 | 30.6 |
| 15 | 2 | 1 | 1,453,076.6 | 601 | 12.9 | 29.9 |
| 16 | 2 | 1 | 1,450,896.5 | 602 | 13.2 | 30.2 |
| 17 | 2 | 1 | 1,450,896.5 | 600 | 13.8 | 30.7 |
| 18 | 2 | 1 | 1,450,896.5 | 601 | 13.5 | 30.5 |
| 19 | 2 | 1 | 1,450,896.5 | 604 | 13.3 | 30.3 |
| 20 | 2 | 1 | 1,450,896.5 | 603 | 13.3 | 30.3 |
| 21 | 2 | 1 | 1,450,896.5 | 603 | 13.4 | 30.4 |
| 22 | 2 | 1 | 1,448,716.3 | 604 | 13.3 | 30.3 |
| 23 | 2 | 1 | 1,448,716.3 | 603 | 13.5 | 30.5 |
| 24 | 2 | 1 | 1,454,711.8 | 602 | 13.8 | 30.8 |
| 25 | 2 | 1 | 1,454,711.8 | 601 | 13.3 | 30.3 |
| 26 | 2 | 1 | 1,454,711.8 | 603 | 13.2 | 30.2 |
| 27 | 2 | 1 | 1,454,711.8 | 602 | 13.0 | 30.0 |
| 28 | 2 | 1 | 1,454,711.8 | 604 | 12.9 | 29.9 |
| 29 | 2 | 1 | 1,454,711.8 | 604 | 12.8 | 29.8 |
| 30 | 2 | 1 | 1,454,711.8 | 601 | 12.8 | 29.7 |
| 31 | 2 | 1 | 1,450,896.5 | 595 | 12.9 | 29.6 |

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: November 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) | |
|---|---|---|---|---|---|---|
| | | | | | Intake | Discharge |
| 1 | 2 | 1 | 1,450,896.5 | 604 | 12.6 | 29.6 |
| 2 | 2 | 1 | 1,450,896.5 | 603 | 12.4 | 29.4 |
| 3 | 2 | 1 | 1,445,446.1 | 606 | 12.1 | 29.1 |
| 4 | 2 | 1 | 1,445,446.1 | 604 | 11.7 | 28.7 |
| 5 | 2 | 1 | 1,445,446.1 | 605 | 12.1 | 29.1 |
| 6 | 2 | 1 | 1,445,446.1 | 603 | 12.0 | 29.0 |
| 7 | 2 | 1 | 1,450,896.5 | 599 | 11.9 | 28.8 |
| 8 | 2 | 1 | 1,450,896.5 | 605 | 11.7 | 28.7 |
| 9 | 2 | 1 | 1,450,896.5 | 605 | 11.5 | 28.6 |
| 10 | 2 | 1 | 1,450,896.5 | 607 | 10.3 | 27.3 |
| 11 | 2 | 1 | 1,445,446.1 | 606 | 11.3 | 28.4 |
| 12 | 2 | 1 | 1,450,896.5 | 603 | 10.9 | 27.9 |
| 13 | 2 | 1 | 1,445,446.1 | 606 | 8.7 | 25.7 |
| 14 | 2 | 1 | 1,445,446.1 | 605 | 8.3 | 25.2 |
| 15 | 2 | 1 | 1,445,446.1 | 607 | 9.3 | 26.4 |
| 16 | 2 | 1 | 1,445,446.1 | 608 | 9.4 | 26.5 |
| 17 | 2 | 1 | 1,445,446.1 | 601 | 8.8 | 26.1 |
| 18 | 2 | 1 | 1,445,446.1 | 607 | 9.3 | 26.3 |
| 19 | 2 | 1 | 1,445,446.1 | 608 | 9.2 | 26.2 |
| 20 | 2 | 1 | 1,449,806.4 | 604 | 8.9 | 25.9 |
| 21 | 2 | 1 | 1,450,896.5 | 598 | 8.3 | 25.2 |
| 22 | 2 | 1 | 1,450,896.5 | 607 | 8.4 | 25.4 |
| 23 | 2 | 1 | 1,450,896.5 | 607 | 8.7 | 25.7 |
| 24 | 2 | 1 | 1,450,896.5 | 608 | 7.8 | 24.8 |
| 25 | 2 | 1 | 1,447,626.2 | 608 | 7.4 | 24.7 |
| 26 | 2 | 1 | 1,453,076.6 | 607 | 8.7 | 25.8 |
| 27 | 2 | 1 | 1,453,076.6 | 608 | 8.8 | 26.0 |
| 28 | 2 | 1 | 1,453,076.6 | 606 | 8.2 | 25.3 |
| 29 | 2 | 1 | 1,453,076.6 | 609 | 7.7 | 24.8 |
| 30 | 2 | 1 | 1,453,076.6 | 604 | 8.4 | 25.6 |

TABLE B-1 (Cont.)

STATION: Nine Mile Point, Unit 1 MONTH: December 1986

| Date | No. of Circulating Water Pumps | No. of Service Water Pumps | Total Volume (m3) of Water Pumped | Mean Electrical Output (MWe) | Temperatures (C) | |
|---|---|---|---|---|---|---|
| | | | | | Intake | Discharge |
| 1 | 2 | 1 | 1,445,446.1 | 606 | 7.4 | 24.5 |
| 2 | 2 | 1 | 1,445,446.1 | 608 | 6.7 | 23.7 |
| 3 | 2 | 1 | 1,450,896.5 | 608 | 6.1 | 23.2 |
| 4 | 2 | 1 | 1,450,896.5 | 611 | 4.7 | 21.8 |
| 5 | 2 | 1 | 1,450,896.5 | 607 | 4.6 | 21.5 |
| 6 | 2 | 1 | 1,450,896.5 | 612 | 5.0 | 22.2 |
| 7 | 2 | 1 | 1,450,896.5 | 612 | 6.6 | 23.8 |
| 8 | 2 | 1 | 1,450,896.5 | 614 | 6.1 | 23.0 |
| 9 | 2 | 1 | 1,450,896.5 | 614 | 6.6 | 23.4 |
| 10 | 2 | 1 | 1,450,896.5 | 615 | 4.2 | 21.4 |
| 11 | 2 | 1 | 1,450,896.5 | 609 | 4.2 | 21.3 |
| 12 | 2 | 1 | 1,450,896.5 | 612 | 2.9 | 20.8 |
| 13 | 2 | 1 | 1,450,896.5 | 614 | 5.1 | 21.6 |
| 14 | 2 | 1 | 1,450,896.5 | 616 | 2.8 | 20.1 |
| 15 | 2 | 1 | 1,446,536.2 | 615 | 2.2 | 20.4 |
| 16 | 2 | 1 | 1,446,536.2 | 612 | 4.2 | 21.4 |
| 17 | 2 | 1 | 1,450,896.5 | 613 | 5.9 | 23.0 |
| 18 | 2 | 1 | 1,454,711.8 | 614 | 5.9 | 23.0 |
| 19 | 2 | 1 | 1,450,896.5 | 611 | 4.6 | 21.6 |
| 20 | 2 | 1 | 1,450,896.5 | 615 | 4.4 | 21.5 |
| 21 | 2 | 1 | 1,450,896.5 | 616 | 5.4 | 22.5 |
| 22 | 2 | 1 | 1,450,896.5 | 614 | 4.5 | 21.6 |
| 23 | 2 | 1 | 1,450,896.5 | 615 | 2.8 | 19.9 |
| 24 | 2 | 1 | 1,450,896.5 | 615 | 4.1 | 21.2 |
| 25 | 2 | 1 | 1,450,896.5 | 614 | 4.9 | 21.9 |
| 26 | 2 | 1 | 1,450,896.5 | 614 | 4.1 | 21.0 |
| 27 | 2 | 1 | 1,450,896.5 | 612 | 5.8 | 22.9 |
| 28 | 2 | 1 | 1,450,896.5 | 521 | 5.2 | 20.0 |
| 29 | 2 | 1 | 1,450,896.5 | 613 | 4.3 | 21.3 |
| 30 | 2 | 1 | 1,450,896.5 | 613 | 5.6 | 22.6 |
| 31 | 2 | 1 | 1,450,896.5 | 614 | 5.6 | 22.6 |

# APPENDIX C

## SCIENTIFIC AND COMMON NAMES OF ALL TAXA COLLECTED IN 1986

# SCIENTIFIC AND COMMON NAMES OF ALL TAXA COLLECTED IN 1986

| Scientific Name | Common Name |
|---|---|
| *Alosa pseudoharengus* | Alewife |
| *Ambloplites rupestris* | Rock bass |
| *Anguilla rostrata* | American eel |
| *Aplodinotus grunniens* | Freshwater drum |
| Cambaridae | Crayfish |
| *Catostomus commersoni* | White sucker |
| *Cottus* spp. | Sculpins |
| *Couesius plumbeus* | Lake chub |
| Cyprinidae | Minnow family |
| *Cyprinus carpio* | Carp |
| *Dorosoma cepedianum* | Gizzard shad |
| *Etheostoma olmstedi* | Tessellated darter |
| *Gasterosteus aculeatus* | Threespine stickleback |
| *Lepomis gibbosus* | Pumpkinseed |
| *Lepomis macrochirus* | Bluegill |
| *Lota lota* | Burbot |
| *Micropterus dolomieui* | Smallmouth bass |
| *Mollusca* | Clam |
| *Morone americana* | White perch |
| *Morone chrysops* | White bass |
| *Notropis atherinoides* | Emerald shiner |
| *Notropis hudsonius* | Spottail shiner |
| *Noturus flavus* | Stonecat |
| *Onchorhynchus tschawytscha* | Chinook salmon |
| *Osmerus mordax* | Rainbow smelt |
| *Perca flavescens* | Yellow perch |
| *Percopsis omiscomaycus* | Trout perch |
| *Petromyzon marinus* | Sea lamprey |
| *Salmo gairdneri* | Rainbow trout |
| *Salmo trutta* | Brown trout |
| *Salvelinus namaycush* | Lake trout |
| *Stizostedion vitreum* | Walleye |
| *Umbra limi* | Central mudminnow |

# APPENDIX D

## COLLECTION EFFICIENCY AT
## NINE MILE POINT NUCLEAR STATION UNIT 1, 1984

## APPENDIX D
## COLLECTION EFFICIENCY (PERMIT SECTION IV.B.6)

To assess the efficiency of the traveling screens in removing impinged organisms from the circulating water intake system at NMP Unit 1, a collection efficiency study was conducted on 7-8 November 1984. Since collection efficiency is a function of species and their respective sizes, and at no one time during the year are all species and size classes available to the impingement process, representative fish of each of the selected species and size classes to be tested were saved and frozen following routine impingement analysis. Species tested were alewife, rainbow smelt, white perch, yellow perch, and smallmouth bass (Table D-1).

The fish to be tested were thawed and marked using a visible dye (Rose Bengal) and a fin clip, then sorted into size classes according to the following ranges:

| | | |
|---|---|---|
| Size Class | I: | less than 10.0 cm |
| | II: | 10.1 - 15.0 cm |
| | III: | 15.1 - 20.0 cm |
| | IV: | greater than 20.1 cm |

The marked fish were released in the intake canal prior to the traveling screens and at a point below the surface of the water. The release was made at the beginning of a regularly scheduled impingement sample immediately following the pre-wash. The results of the efficiency test are presented by species and size class in Table D-1.

The percent efficiency ranged from 67 percent to 100 percent. Size Class I fish (all species combined) had a mean collection efficiency of 94 percent (range: 88-100 percent). Size Class II fish had a mean collection efficiency of 89 percent (range: 67-100 percent). Size Class III fish had a mean collection efficiency of 88 percent (range: 80-92 percent). Size Class IV white perch were recovered at an efficiency of 93 percent. Overall collection efficiency for all species and size classes combined was 91 percent.

TABLE D-1 COLLECTION EFFICIENCY DATA NINE MILE POINT NUCLEAR STATION UNIT 1, 1984

| Date Released | Species Tested | Size Class | Number Released | Number Recovered | Percent |
|---|---|---|---|---|---|
| 7 NOV 84 | Alewife | I | 12 | 12 | 100 |
| | | II | 24 | 24 | 100 |
| | | III | 25 | 23 | 92 |
| 7 NOV 84 | Rainbow smelt | I | 25 | 24 | 96 |
| | | II | 26 | 23 | 88 |
| | | III | 28 | 25 | 89 |
| 7 NOV 84 | Smallmouth bass | I | 8 | 7 | 88 |
| | | II | 13 | 13 | 100 |
| | | III | 10 | 8 | 80 |
| 7 NOV 84 | Yellow perch | I | 0 | 0 | 0 |
| | | II | 29 | 26 | 90 |
| 7 NOV 84 | White perch | I | 30 | 28 | 93 |
| | | II | 6 | 4 | 67 |
| | | III | 10 | 9 | 90 |
| | | IV | 27 | 25 | 93 |