Distribution
Docket
ORB #3
Local PDR
NRC PDR
KGoller
TJCarter
OELD
OI&E (5)
CParrish
EVerdery
BJones (8)
BScharf
JMcGough
ACRS (16)
CMiles
DRoss
TBAbernathy
JRBuchanan
VStello
File
Xtra Copies
BHarless
WPasciak

Dockets Nos. 50-277
and 50-278

Philadelphia Electric Company
ATTN: Mr. Edward G. Bauer, Jr., Esquire
Vice President and General Counsel
2301 Market Street
Philadelphia, Pennsylvania 19101

Gentlemen:

The Commission has issued the enclosed Amendments Nos. 26 and 25 to the Facility Licenses Nos. DPR-44 and DPR-56 for the Peach Bottom Atomic Power Station, Units Nos. 2 and 3. These amendments are in response to your request dated September 15, 1975.

These amendments revised the provisions in the Technical Specifications relating to the Aquatic Environmental Surveillance and Special Study Programs conducted to monitor the effects of the operation of Units Nos. 2 and 3 on the aquatic community in Conowingo Pond.

We have evaluated the potential for environmental impact of plant operation in accordance with the enclosed amendments. The amendments (1) modify details pertaining to sampling methods and techniques such that adequate flexibility exists to accommodate changes when improved methods are developed, (2) clarify the required content of the semi-annual report to delineate more specifically between the type of information to be routinely reported in each report and the results of longer range studies which can be reported only after extensive analyses have been completed, and (3) modify and renumber the sampling locations to reflect changes necessitated by certain stations becoming unavailable or undesirable for use and their being replaced by new stations which are more representative of the ecosystem. The amendments do not authorize a change in effluent types or amounts nor an increase in power level, and will not result in any significant environmental impact. We conclude that the amendments involve actions which are insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental statement, negative declaration or environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

| | | | | | | |
|---|---|---|---|---|---|---|
| OFFICE➤ | | | | | | |
| SURNAME➤ | | | | | | |
| DATE➤ | | | | | | |

Since the amendments apply only to administrative details, to the environmental sampling locations, and to sampling frequencies, they do not involve safety information not considered by a previous Commission safety review of the facility. They do not involve an increase in the probability or consequences of an accident, do not involve a decrease in a safety margin and, therefore, do not involve a hazards consideration. We have also concluded that there is reasonable assurance that the health and safety of the public will not be endangered by these actions.

A copy of the related Federal Register Notice is also enclosed.

Sincerely,

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:
1. Amendments Nos. 26 and 25 to DPR-44 and DPR-56
2. Federal Register Notice

cc w/encls: See next page

*SEE PREVIOUS YELLOW FOR CONCURRENCES

| | | | | | | |
|---|---|---|---|---|---|---|
| OFFICE➤ | ORB #3 | ORB #3 | OELD SWS | ORB #3 | | |
| SURNAME➤ | *CParrish | TVerdery:acr for | S. Sobrwki | GLear | | |
| DATE➤ | 8/17/76 | 9/20/76 | 9/20/76 | 9/23/76 | | |

A copy of the related Federal Register Notice is also enclosed.

Sincerely,

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:
1. Amendments Nos. 26 and 25 to DPR-44 and DPR-56
2. Federal Register Notice

cc w/encls: See next page

DISTRIBUTION:
Dockets
NRC PDR
Local PDR
KRGoller
TJCarter
OELD
OI&E (5)
CParrish
TVerdery
BJones (8)
BScharf
JMcGough
~~JXAESXXXX~~
ACRS (16)
CMiles
DRoss
TBAbernathy
JRBuchanan
VStello
File
Xtra Copies
B Harless
W Pasciak

| | | | | | | |
|---|---|---|---|---|---|---|
| OFFICE➤ | ORB#3 | ORB#3 | OELD | ORB#3 | | |
| SURNAME➤ | CParrish | TVerdery:acr | | GLear | | |
| DATE➤ | 8/ 17 /76 | 8/ /76 | 8/ /76 | 8/ /76 | | |

cc:

Eugene J. Bradley
Philadelphia Electric Company
Assistant General Counsel
2301 Market Street
Philadelphia, Pennsylvania 19101

Troy B. Conner, Jr.
Conner and Knotts
1747 Pennsylvania Avenue, N. W.
Washington, D. C. 20006

Raymond L. Hovis, Esquire
35 South Duke Street
York, Pennsylvania 17401

Warren K. Rich, Esquire
Assistant Attorney General
Department of Natural Resources
Annapolis, Maryland 21401

Philadelphia Electric Company
ATTN: Mr. W. T. Ullrich
Peach Bottom Atomic
Power Station
Delta, Pennsylvania 17314

Mr. R. A. Heiss, Coordinator
Pennsylvania State Clearinghouse
Governor's Office of State Planning
and Development
P. O. Box 1323
Harrisburg, Pennsylvania 17120

Albert R. Steel, Chairman
Board of Supervisors
Peach Bottom Township
R. D. #1
Delta, Pennsylvania 17314

Martin Memorial Library
159 E. Market Street
York, Pennsylvania 17401

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

PHILADELPHIA ELECTRIC COMPANY
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-277

PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 26
License No. DPR-44

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Philadelphia Electric Company, Public Service Electric and Gas Company, Delmarva Power and Light Company, and Atlantic City Electric Company, (the licensees) dated September 15, 1975, complies with the standards and requirements of the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations; and

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Attachment:
Changes to the
Technical Specifications

Date of Issuance: September 24, 1976

ATTACHMENT TO LICENSE AMENDMENT NO. 26

TO THE TECHNICAL SPECIFICATIONS

FACILITY OPERATING LICENSE NO. DPR-44

DOCKET NO. 50-277/278

Replace cover page, pages i, ii, 13, 14 through 47, 51, and 52 with the attached revised pages (no change has been made on pages ii and 13). Delete pages 13a and 13b.

APPENDIX B

TO

FACILITY OPERATING LICENSE DPR-44 AND
FACILITY OPERATING LICENSE DPR-56

ENVIRONMENTAL

TECHNICAL SPECIFICATIONS AND BASES

FOR

THE FULL POWER FULL TERM
OPERATION OF
PEACH BOTTOM ATOMIC POWER STATION

UNITS NO. 2 & 3

PHILADELPHIA ELECTRIC COMPANY

DOCKET NOS. 50-277 & 50-278

APPENDIX B
REVISED

AUGUST 1976

Amendment No. 26

TABLE OF CONTENTS


| | | | | Page No. |
|---|---|---|---|---|
| 1.0 | Definitions, Abbreviations and Symbols | | | 1 |
| 1.1 | Definitions | | | 1 |
| 1.2 | Abbreviations | | | 2 |
| 1.3 | Symbols | | | 3 |
| 2.0 | Protection Limits | 3.0 | Monitoring Requirements | 5 |
| 2.1 | Thermal | | 3.1 | 5 |
| 2.2 | Chemical | | 3.[illegible] | 5c |
| 2.2.1 | Biocides | | 3.[illegible].1 | 5c |
| 2.2.2 | Suspended Solids | | 3.2.2 | 7 |
| 2.2.3 | pH | | 3.2.3 | 7 |
| 2.2.4 | Plant Chemical Usage | | 3.2.4 | 8 |
| 2.3 | Noise | | 3.3 | 10 |
| 4.0 | Report Levels | 5.0 | Monitoring Requirements | 11 |
| 4.1 | Impingement of Fishes | | 5.1 | 11 |
| 4.2 | Unusual Environmental Events | | 5.2 | 12 |
| 4.3 | Radiological | | 5.3 | 13 |
| 6.0 | Environmental Surveillance and Special Study Programs | | | 14 |
| 6.1 | Aquatic | | | 14 |
| | a. General Ecological Survey Program | | | 14 |
| | b. Impingement of Organisms | | | 34 |
| | c. Entrainment of Planktonic Organisms | | | 34 |
| | d. Thermal Tolerances of Organisms | | | 35 |
| 6.2 | Chemical | | | 39 |
| | a. Biocides | | | 39 |
| | b. Heavy Metals | | | 39 |
| 6.3 | Physical | | | 40 |
| | a. Thermal Plume Mapping | | | 40 |
| | b. Erosion | | | 41 |
| 6.4 | Radiological Study Program | | | 41 |
| 7.0 | Administrative Controls | | | 48 |
| 7.1 | Organization, Review and Audit | | | 48 |
| 7.1.1 | Organization | | | 48 |
| 7.1.2 | Review and Audit | | | 48 |

| | | Page No. |
|---|---|---|
| 7.2 | Action to be Taken if a Protection Limit or Report Limit is Exceeded or if Harmful Effects Detected | 49 |
| 7.3 | Unit Operating Procedures | 50 |
| 7.4 | Plant Reporting Requirements | 51 |
| 7.4.1 | Routine Reports | 51 |
| 7.4.2 | Non-Routine Reports | 51 |
| 7.5 | Records Retention | 52 |
| 7.5.1 | Records Retained for 5 Years | 52 |
| 7.5.2 | Records Retained for the Life of the Plant | 52 |

REPORT LEVELS (Continued)

4.3 Radiological

Objective

The purpose of this specification is to monitor radiological effects of station operation on the environment. The design objective for radioisotopes except halogens and particulates with half lives greater than eight days is a dose rate at the site boundary of less than 10 mrem per year to the whole body or any organ. The design objective for I-131 is a dose rate of less than 5 mrem per year to the thyroid of a child through the grass-cow-milk chain; and for I-131 and other particulate radioisotopes with half lives greater than eight days is a dose rate at the site boundary of less than 5 mrem per year by breathing.

Specification

If a measured level of radioactivity in critical pathway environmental medium samples indicates that the resultant annual dose to an individual from those levels could equal or exceed four times the design objective, suitable action will be taken as per Section 7.2.

If samples of critical pathway environmental media collected over a calendar quarter show total levels of radioactivity that could result in accumulated plant related doses to an individual over that quarter of one-half the annual dose objective the results shall be reported and a plan submitted and implemented within 30 days so that the annual dose to an individual will not exceed the design objective.

Bases

Yearly dose levels to an individual within the design objectives from PBAPS releases meet the requirements of 10 CFR 20 and will result in negligible effects to man or his environment.

MONITORING REQUIREMENTS (Continued)

5.3 Radiological

Objective

The purpose of this monitoring requirement is to measure the radioactivity levels in the environment as a result of the operation of PBAPS.

Specification

An environmental monitoring program shall be conducted as detailed in Section 6.4.

Bases

To assure that man and his environment are not adversely affected by the operation of PBAPS, it is necessary to monitor the radioactivity levels in the environment.

## 6.0 Environmental Surveillance and Special Study Programs

Studies described in this section will be terminated upon agreement by Philadelphia Electric Company and the Nuclear Regulatory Commission that the intended purpose of the study has been satisfied.

### 6.1 Aquatic

### 6.1.a General Ecological Study Program

#### 6.1.a.1 Fisheries

Objectives

The principal objective of this study on fishes is to determine: (1) species composition, (2) distribution, (3) relative abundance, (4) annual and seasonal variations in numbers and biomass, (5) growth rates, (6) mortality rates, (7) food habits, (8) relative importance of the Peach Bottom Atomic Power Station site as the spawning areas for fishes, (9) reproductive potential and (10) movement. This data will be used to determine any detrimental effects on the Conowingo Pond ecosystem which may be the result of the normal operation of Peach Bottom Atomic Power Station, Units 2 and 3.

Objectives 1 through 4 will be routinely reported in the semi-annual report; objectives 5 through 10, pertaining to the biology of fishes, will be reported in the semi-annual reports as the results of studies become available.

Specification

Several types of gear are employed to monitor the fish populations since each type of gear is selective to some extent with regard to the size and species caught. Data on the fish populations of Conowingo Pond will be gathered using seines, trawls, trap nets and plankton nets. Location of the sampling sites and the efficiency of each gear is subject to several constraints imposed by local topographic and meteorological conditions.

The sampling stations for the various fisheries studies are listed in Tables 6.1-1 to 6.1-7 and are shown in Figures 6.1-1 to 6.1-7. Stations, other than plankton net, are sampled twice monthly* throughout the year unless unusual conditions such as an equipment malfunction or an act of nature (meteorological and/or hydrological)

* +7 days.

prevent the sample from being obtained or analyzed. Plankton net tows are made on a weekly* basis only during the spawning season when eggs and larvae of fishes are available. The diurnal distribution of young (larval) fishes is determined from transect stations.

Trap net, seine, trawl and plankton net catches are used to estimate the relative abundance of species on a seasonal and/or annual basis. Catches from each gear are converted to catch per unit of effort for that particular gear. Data on the catch per unit of effort are an index of abundance.

Fork length, weight and scale samples are taken from subsamples of fishes. Seine and plankton net samples are preserved in the field. Specimens from these samples are identified and counted in the laboratory.

Depth of water, air temperature and water temperature are recorded. Light penetration is measured at all but seine stations. Other physico-chemical parameters measured in the General Ecology Program are described in Section 6.1.a.2.

Many specimens of fishes which occur in Conowingo Pond have been preserved, identified, and stored for future reference. These reference specimens serve as a source for material from the preoperational period and are available for studies on the biology of fishes as required during the postoperational period.

Bases

Since the operation of the Peach Bottom Atomic Power Station will cause an input into the Conowingo Pond ecosystem which would not normally occur, it is desirable to monitor this ecosystem to determine whether any effects might be resultant from this input.

The various sampling locations were selected on the basis of their representative distribution throughout the pond. As the data from these stations is analyzed or changes in physiography occur, it is determined if new stations are needed or old stations should be abandoned. The frequency of sampling was established in much the same manner. As can be seen in Tables 6.1-1 and 6.1-3 to 6.1-7, stations for most gears have been sampled since 1967 or 1968.

The information from this portion of the monitoring program will be submitted on a semi-annual basis as per Section 7.4.

* ± 3 days.

Amendment No. 26

TABLE 6.1-1

Location of Trap Net Stations in Conowingo Pond.

| Station | Location | Depth (feet) | Year Sampling Started |
|---|---|---|---|
| 102 | Mouth of Wissler Run | 4 | 1966 |
| 103 | Muddy Creek, approximately 25 yards upstream from mouth | 10 | " |
| 104 | Offshore from Peach Bottom Atomic Power Station Unit No. 1 | 13 | " |
| 106 | Approximately 200 yards downriver from the mouth of Peters Creek | 5 | 1967 |
| 107 | At the mouth of Broad Creek | 14 | " |
| 108 | Approximately 50 yards upriver from the mouth of Conowingo Creek | 20 | " |
| 109 | North shore of Hopkins Cove | 12 | " |
| 110 | Off Burkins Run (Stonewall Point) | 5 | 1970 |
| 136 | In Broad Creek | 12 | 1972 |
| 138 | In Conowingo Creek | 11 | " |
| 141 | Approximately 400 yards upriver from the mouth of Peters Creek | 17 | " |
| 142 | Approximately 600 yards upriver from the mouth of Peters Creek | 13 | " |

TABLE 6.1-2

Location of Trawl Zones 401-410 in Conowingo Pond. Trawl zones are sampled as listed in Table 6.1-3.

| Zone | Location |
|---|---|
| 401 | From a point off the mouth of Muddy Creek to a point off Rollins Point |
| 402 | From a point just downriver from Sicily Island to a point off the mouth of Fishing Creek |
| 403 | From a point off Rollins Point to a point just downriver from Mt. Johnson Island |
| 404 | From a point off the mouth of Fishing Creek to a point just downriver from Mt. Johnson Island |
| 405 | Off the Peach Bottom Atomic Power Station, from a point just downriver from Mt. Johnson Island to a point off Stonewall Point |
| 406 | From a point just downriver from Mt. Johnson Island to a point off the mouth of Peters Creek |
| 407 | From a point off Stonewall Point to a point off the mouth of Michael Run |
| 408 | From a point off the mouth of Peters Creek to a point approximately 800 yards downriver from Williams Tunnel |
| 409 | From a point off the mouth of Micael Run to a point off the mouth of Broad Creek |
| 410 | From a point approximately 800 yards downriver from Williams Tunnel to a point approximately 800 yards downriver from Wildcat Tunnel |

Amendment No. 26

TABLE 6.1-3

Location of Stations 451 to 456 in Trawl Zone 405, Stations 461 to 466 in Trawl Zone 406 and Stations 481 to 486 in Trawl Zone 408 in Conowingo Pond. Trawls made at nearshore stations are indicated by odd numbers and offshore stations by even numbers.

| Station | Location | Depth (feet) | Year Sampling Started |
|---|---|---|---|
| | **Zone 405** | | |
| 451 | From a point off Stonewall Point to the Peach Bottom Atomic Power Station Discharge | 16 | 1968 |
| 452 | | 20 | " |
| 453 | From a point approximately 50 yards upriver from the Peach Bottom Atomic Power Station Discharge to a point off Peach Bottom Atomic Power Station Unit No. 1 | 20 | " |
| 454 | | 17 | " |
| 455 | From a point off Peach Bottom Atomic Power Station Unit No. 1 to a point just upriver from Peach Bottom Atomic Power Station Unit Nos. 2 and 3 | 23 | " |
| 456 | | 20 | " |
| | **Zone 406** | | |
| 461 | From a point approximately 50 yards upriver from the mouth of Peters Creek | 25 | 1972 |
| 462 | | 26 | " |
| 463 | From a point approximately 500 yards upriver from the mouth of Peters Creek | 14 | " |
| 464 | | 18 | " |
| 465 | From a point approximately 700 yards upriver from the mouth of Peters Creek | 30 | " |
| 466 | | 28 | " |
| | **Zone 408** | | |
| 481 | From a point approximately 300 yards downriver from Peach Bottom Beach to a point off Peach Bottom Beach | 17 | 1968 |
| 482 | | 12 | " |
| 483 | From a point off Peach Bottom Beach to a point approximately 200 yards downriver from the mouth of Peters Creek | 7 | " |
| 484 | | 10 | " |
| 485 | From a point approximately 200 yards downriver from the mouth of Peters Creek to a point off the mouth of Peters Creek | 7 | " |
| | | 12 | " |

TABLE 6.1-4

Location of Trawl Transect Stations in Conowingo Pond.

| Transect | Location | Depth (feet) | Year Sampling Started |
|---|---|---|---|
| Transect 1 | | | |
| 312 | Mid-pond between Fishing Creek and Rollins Point | 16 | 1967 |
| 313 | Off Fishing Creek | 13 | " |
| Transect 2 | | | |
| 321 | Off Peach Bottom Atomic Power Station | 22 | " |
| 322 | Mid-pond between Mt. Johnson Island and the Peach Bottom Atomic Power Station | 20 | " |
| 323 | Just downriver from Mt. Johnson Island | 18 | 1967 (1973) |
| Transect 3 | | | |
| 331 | Off Michael Run | 13 | 1967 |
| 332 | Mid-pond between Michael Run and Williams Tunnel | 15 | " |
| 333 | Off Williams Tunnel | 35 | " |
| Transect 4 | | | |
| 341 | Off Broad Creek | 34 | 1968 |
| 342 | Mid-pond off Broad Creek | 35 | " |
| 343 | Off Wildcat Tunnel | 35 | " |
| Transect 7 | | | |
| 371 | Off Burkins Run (Stonewall Point) | 12 | " |
| 372 | Mid-pond off Burkins Run | 15 | " |
| 373 | Off the mouth of Peters Creek | 11 | " |

TABLE 6.1-5

Location of Seine Stations in Conowingo Pond.

| Station | Location | Year Sampling Started |
|---|---|---|
| 201 | Approximately 200 yards upriver from the mouth of the Fishing Creek | 1966 |
| 202 | Southeast shore of Sicily Island | " |
| 203 | West shore of Big Chestnut Island | " |
| 206 | At the mouth of Wissler Run | " |
| 207 | Approximately 100 yards downriver from Peach Bottom Atomic Power Station Unit No. 1 | 1967 |
| 208 | Peach Bottom Beach | " |
| 209 | Broad Creek at the boat launch | " |
| 210 | Conowingo Creek at the boat launch | " |
| 211 | North shore of Hopkins Cove | " |
| 212 | Fishing Creek at first road bridge upstream from mouth | 1968 |
| 213 | Peters Creek at third road bridge upstream from mouth | " |
| 214 | Beach at mouth of Burkins Run (Stonewall Point) | 1970 |

TABLE 6.1-6

Location of near-shore surface Plankton Net Stations in Conowingo Pond.

| Station | Location | Year Sampling Started |
|---|---|---|
| 529 | Broad Creek, near boat launch | 1970 |
| 531 | Broad Creek, towing downstream along northern shore beginning opposite Shangri-la cabin | 1970 |
| 539 | Glen Cove | 1968 |
| 540 | Hopkins Cove | 1968 |
| 542 | Conowingo Creek | 1972 |
| 543 | Muddy Creek | 1972 |

TABLE 6.1-7

Location of Plankton Net Stations on Transects in Conowingo Pond. Samples are taken at the surface and bottom.

| Station | Location | Year Sampling Started |
|---|---|---|
| 570* | Off Rollins Point | 1968 |
| 560 | Mid-pond between Fishing Creek and Rollins Point | " |
| 561 | Off Fishing Creek | " |
| 562 | Off the Peach Bottom Atomic Power Station | " |
| 563 | Mid-pond between Mt. Johnson Island and the Peach Bottom Atomic Power Station | " |
| 575* | Approximately 250 yards downriver from Mt. Johnson Island | 1973 |
| 576 | Approximately 700 yards downriver from Mt. Johnson Island | " |
| 564 | Off Burkins Run (Stonewall Point) | 1968 |
| 565 | Mid-pond between Burkins Run and the mouth of Peters Creek | " |
| 566 | Point off the mouth of Peters Creek | " |
| 567 | Off Coopers Rock Point | " |
| 568 | Mid-pond between Coopers Rock Point and Chester Water Authority intake | " |
| 569 | Off Chester Water Authority intake | " |

*Sampled only at surface because of too many bottom obstructions.

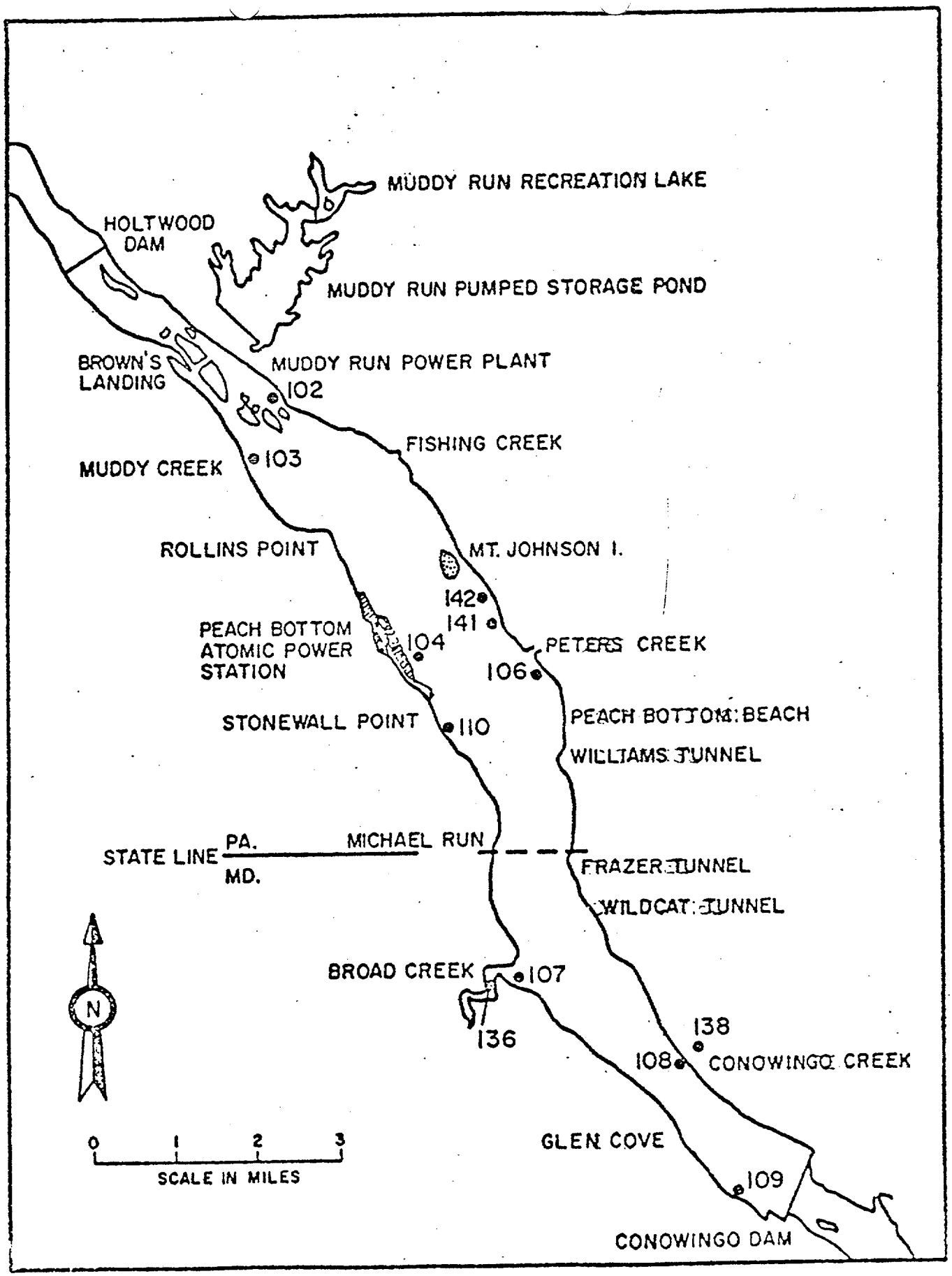



FIGURE 6.1-1 MAP OF CONOWINGO POND SHOWING THE LOCATION OF TRAP NET STATIONS.

Amendment No. 26

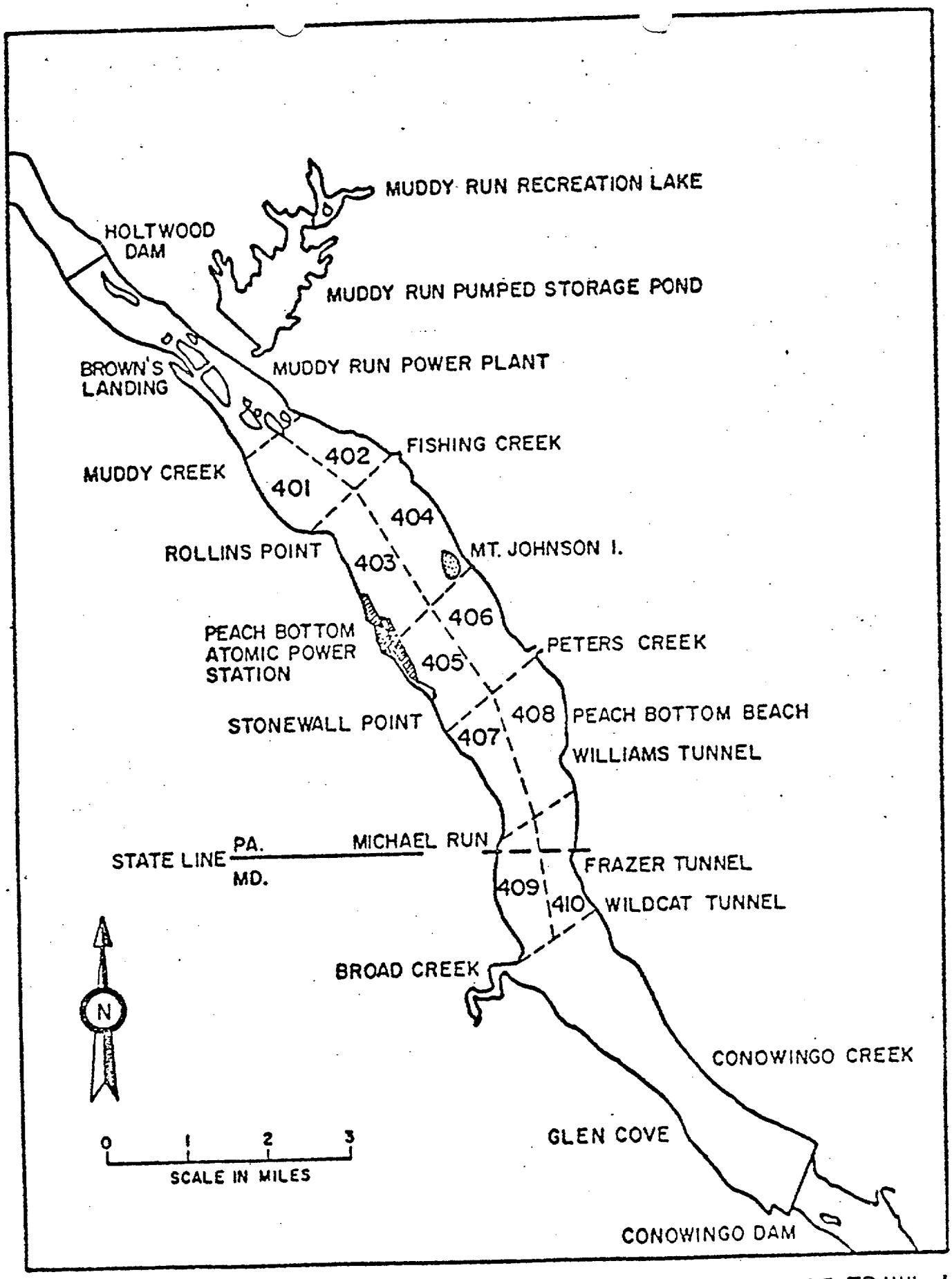



FIGURE 6.1-2 MAP OF CONOWINGO POND SHOWING THE LOCATION OF TRAWL ZONES 401-410. TRAWL ZONES ARE SAMPLED AS SHOWN ON FIGURE 6.1.3.

Amendment No. 26

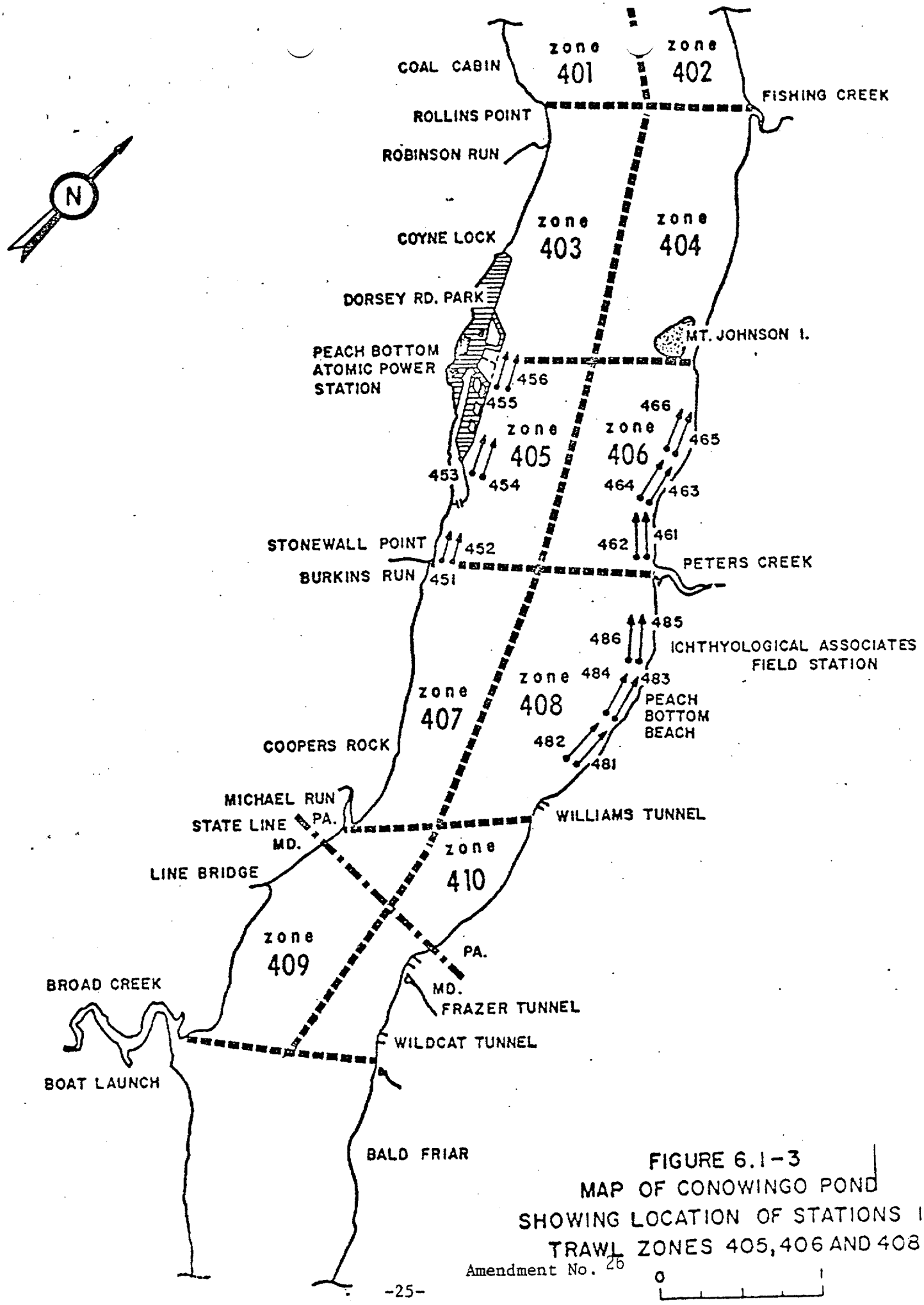



FIGURE 6.1-3
MAP OF CONOWINGO POND
SHOWING LOCATION OF STATIONS IN
TRAWL ZONES 405, 406 AND 408

Amendment No. 26

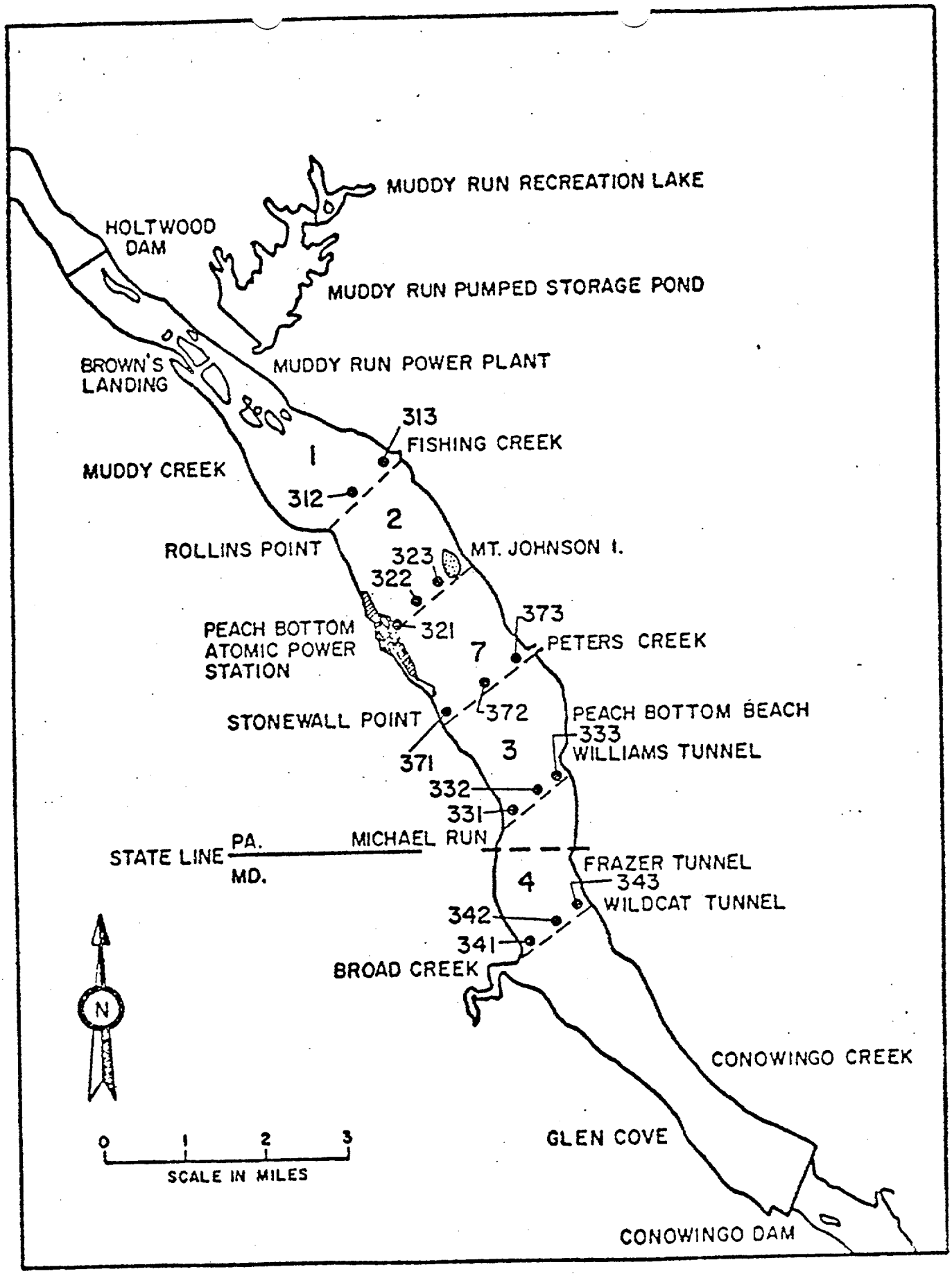



FIGURE 6.1-4 MAP OF CONOWINGO POND SHOWING THE LOCATION OF STATIONS C' TRAWL TRANSECTS 1-4, AND 7 (DASHED LINES)

Amendment No. 26

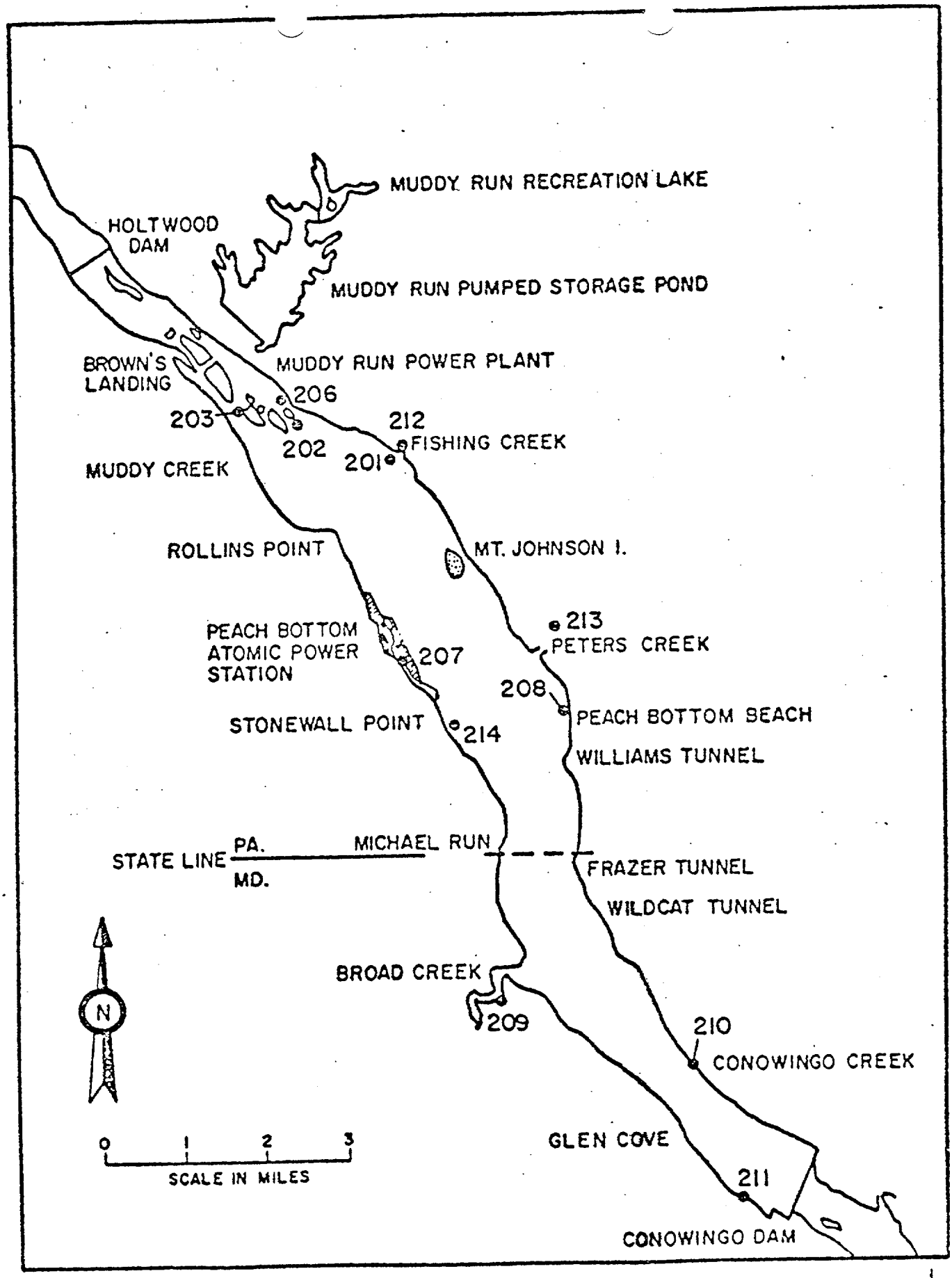



FIGURE 6.1-5 MAP OF CONOWINGO POND SHOWING THE LOCATION OF SEINE STATIONS.

Amendment No. 26

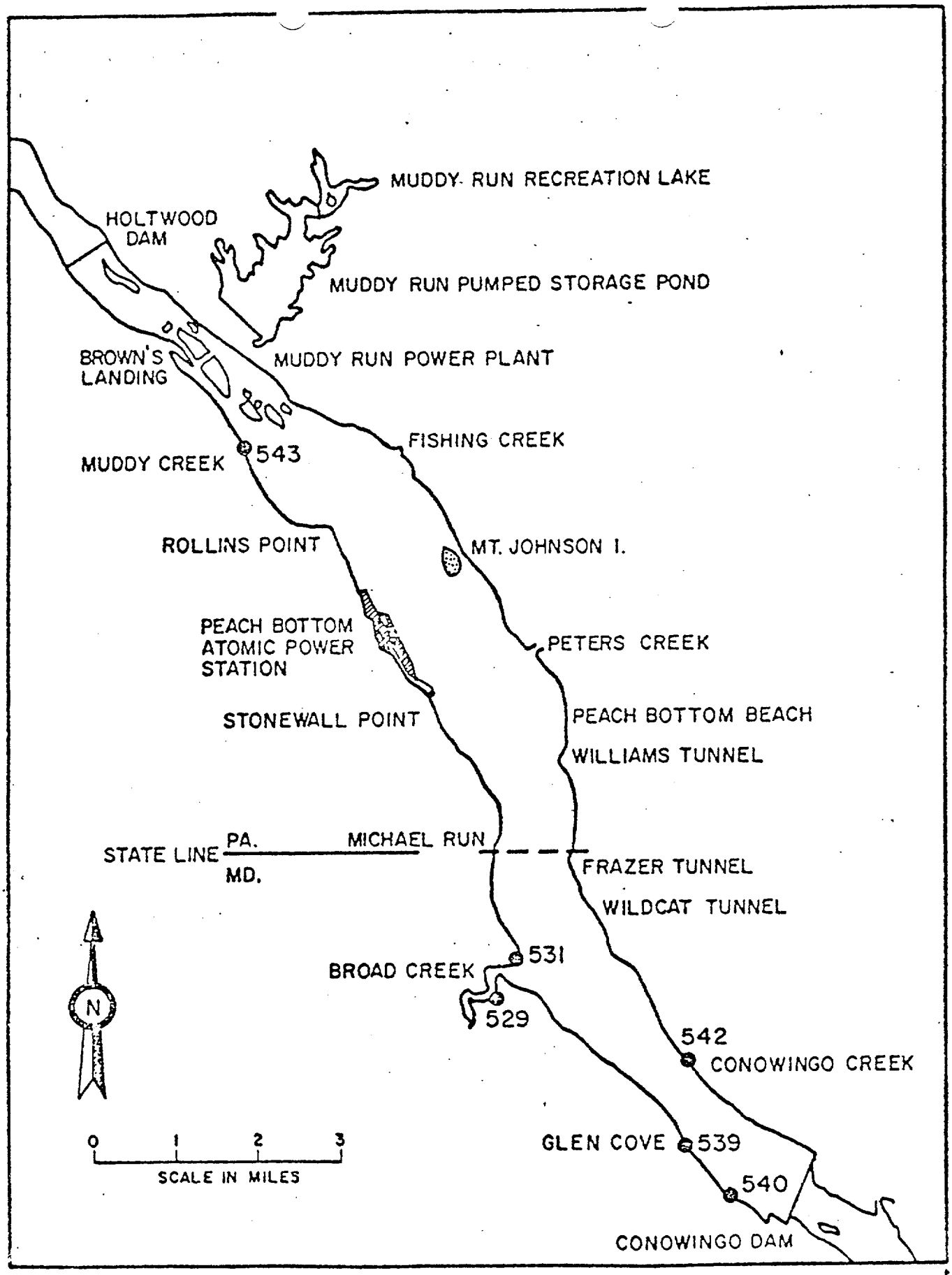



FIGURE 6.1-6. MAP OF CONOWINGO POND SHOWING THE LOCATION OF NEAR SHORE SURFACE PLANKTON NET STATIONS.

Amendment No. 26

6.1.a.2 Limnology

Objective

The objectives of the Limnological Studies portion of the General Ecology Study Program are as follows:

A. For benthic and Planktonic Organisms: to determine (1) the species composition, (2) distribution, (3) relative abundance, and (4) annual and seasonal variations in relative numbers and biomass.

B. For Water Quality: To monitor quantitatively and qualitatively the physical and chemical parameters of Conowingo Pond; to document and evaluate (1) the ecological effects (if any) of the operation of Peach Bottom Atomic Power Station, (2) the effects of natural phenomena on these parameters, and (3) to draw correlations between these parameters and the aquatic communities present in the Pond.

Specification

The description of limnological stations and parameters sampled at each are given in Table 6.1-8. The locations of limnological sampling stations in Conowingo Pond are shown in Figure 6.1-8. The stations are sampled for each parameter listed in Table 6.1-8 on a twice monthly* basis throughout the year, unless unusual conditions - such as an equipment malfunction or an act of nature (meteorological and/or hydrological) - prevent the samples from being obtained or analyzed.

Plankton samples are preserved for analysis and catalogued for a reference collection. Zooplankters are identified and counted. A subsample of the plankton is weighed (dry weight). Biomass is not determined on samples containing excessive detritus.

Benthos samples are washed and preserved for subsequent analysis. Organisms are identified, counted, and weighed (dry weights).

Concentrations of some plant pigments, including total chlorophyll a, are determined from water samples taken for chemical analysis (Table 6.1-8).

Organisms are identified by biologists of contracted consultants with the aid of standard reference works on the various groups encounted. When necessary, specimen identification is verified by recognized experts on the group(s) in question.

* ± 7 days

Amendment No. 26

Water samples are collected at the surface and bottom at five selected stations in Conowingo Pond. Samples are also taken at outlet pipes at Conowingo and Holtwood Dams (Table 6.1-8). Each water sample is analyzed for the following:

| | |
|---|---|
| pH | Bicarbonate |
| Conductivity | Chloride |
| Total Suspended Solids (Seaton) | Sulfate |
| Sodium | Reactive Silica |
| Potassium | Iron |
| Calcium | Nitrate |
| Magnesium | Nitrite |
| Carbonate | Phosphate (total) |

Methods of chemical analysis used are generally those described by the American Public Health Associated (1965), Golterman (1969) and/or those recommended by the Environmental Protection Agency (1971). If more acceptable methods become available the methodology will be updated.

Dissolved oxygen, water temperature, air temperature and light penetration measurements are made at selected stations in Conowingo Pond (Table 6.1-8). Dissolved oxygen and water temperature measurements are taken at the surface, 5 feet, 10 feet, and bottom. Dissolved oxygen, air temperature and light penetration are not measured at Conowingo and Holtwood Dams.

Bases

These studies were undertaken in order to obtain sufficient data to enable the determination of the effects on the pond ecology which may occur as a result of the operation of the Peach Bottom Atomic Power Station. Studies were initiated to establish baseline conditions and to determine the relative importance of the parameters monitored. Parameters will be compared to the baseline conditions to determine differences which may occur after operation of the station.

The sampling locations were selected on the basis of their representative distribution throughout the pond. The frequency of sampling was established at its current level in order to minimize redundancy but maintain sufficient data inflow to satisfy the objectives listed above.

The information from this portion of the monitoring program will be submitted on a semi-annual basis as per Section 7.4.

## REFERENCE MATERIAL

### Limnology

1. Anonymous. 1965. Standard Methods for the Examination of Water and Wastewater, Amer. Pub. Health Assoc., N. Y. 874 p. (or latest version).

2. Anonymous. 1971. Methods for Chemical Analysis of Water and Wastes. Environmental Protection Agency, Cincinnati, Ohio. (or latest version).

3. Golterman, H. L. (ed.). 1969. Methods for Chemical Analysis of Fresh Waters, Internat. Biol. Program Handbook No. 8, Blackwell Sci. Pub., Oxford. 166 p. (or latest version).

Table 6.1-8

Location of limnological stations and parameters sampled at each in Conowingo Pond. Key: a-zooplankton, b-benthos, c-chemistry, d-oxygen, e-temperature and f-light penetration. Depths are given in parentheses.

| Station | Description | Parameter Sampled |
|---|---|---|
| 630 | Holtwood Steam Electric Station - outlet pipe for circulating water pump 17-B | a,c,e |
| 601 | Mid-pond off mouth of Fishing Creek (16) | a,b,c,d,e,f |
| 602 | Point off Dorsey Road north of Peach Bottom Atomic Power Station (11) | a,b,e,f |
| 603 | Mid-pond just below towers off Mt. Johnson Island (18) | a,b,e,f |
| 604 | Point off east shore south of Mt. Johnson Island (10) | a,b,c,d,e,f |
| 605 | Point just below south end of discharge canal Peach Bottom Atomic Power Station (15) | a,b,c,d,e,f |
| 606 | Mid-pond off mouth of Peters Creek (9) | a,b,e,f |
| 607 | Point just upriver from mouth of Peters Creek (9) | a,b,c,d,e,f |
| 608 | West shore just north of Williams Tunnel (24) | a,b,e,f |
| 609 | Between west shore and mid-pond off Michael Run (26) | a,b,e,f |
| 610 | Mid-pond off Broad Creek (38) | a,b,e,f |
| 611 | Mid-pond off Hopkins Cove (68) | a,b,c,d,e,f |
| 640 | Conowingo Hydro-electric Plant - outlet pipe for Unit No. 1 | a,c,e |

Amendment No. 26

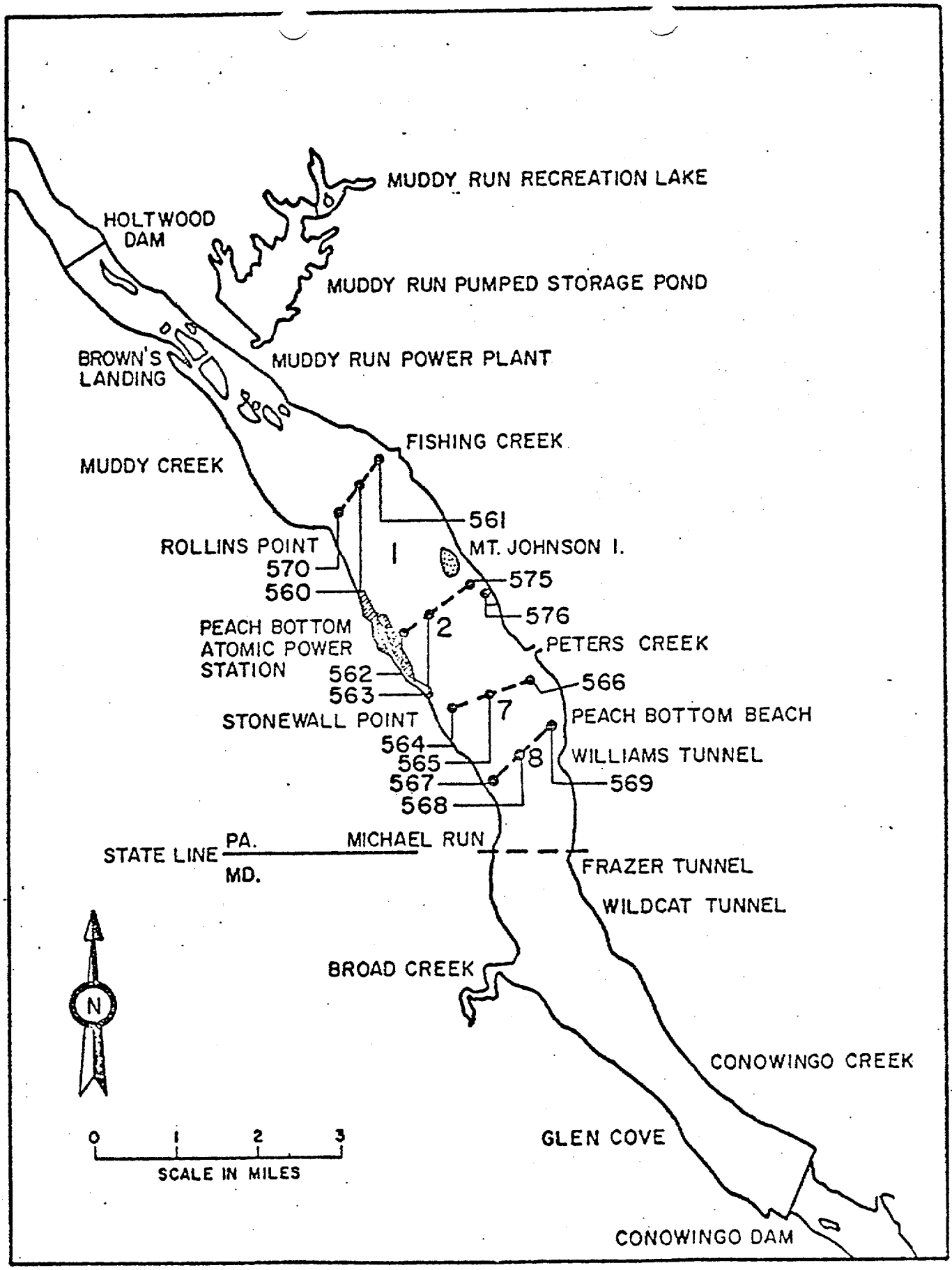



FIGURE 6.1-7 MAP OF CONOWINGO POND SHOWING THE LOCATION OF PLANKTON NET STATIONS ON TRANSECTS 1,2,7 AND 8 (DASHED LINES)

6.1.b Impingement of Organisms

Objectives

The principal objectives of the Impingement Study are to: (1) to determine the species composition, and (2) quantify the number of fishes which may become impinged on the circulating water intake screens.

Specification

The fish collected at the intake screen trash pit will be surveyed twice weekly for the first three months of Unit No. 2 operation. The number, species and size of each fish collected during the past two twelve hour periods will be catalogued. These data will then be compared to previous screen surveys and analyzed to determine the impact to the ecology of the pond caused by the intake screens.

During the first year of plant operation, a one time measurement of water velocities will be made across the face of the intake screens at the water surface, mid-water and bottom.

Bases

This survey and subsequent data analysis will aid in determining the effectiveness of the intake design in minimizing the environmental impact.. These data will be reported as per Section 7.4.

6.1.c Entrainment of Planktonic Organisms

Objective

The objectives of the entrainment studies are to determine (1) species composition, (2) abundance, (3) effects of entrainment on organisms and (4) impact to the pond ecology due to entrainment.

Specification

In order to obtain estimates of the amount of organisms passing through the circulating water system, a sampling program was established. The first phase of the studies will consist of sampling during the initial start-up of the circulating water system. This initial start-up will only circulate water through the various components of the system from the intake screens to the submerged discharge "jet" structure. Since there will be no heat added to the water at this time, it will allow an assessment

of mortalities due solely to mechanical damage. During the second phase, sampling will continue with varying heat load rejected to the circulating water system and varying station operating conditions. This will allow an estimation of organism mortalities relative to the various operating modes of the circulating water system.

Sampling locations have been established in the intake pond immediately before the service pump structure screen and near the southern end of the discharge canal. Sampling will be conducted twice a month* for zooplankton during the peak production period. During the spawning season, fish eggs and larvae will be sampled weekly**. The above sampling schedule will take place unless unusual conditions*** prevent the sample from being obtained. The studies will be terminated after the first year of Unit No. 3 operation (12 months after commercial operation begins).

Bases

One hundred percent mortality is assumed for planktonic organisms which pass through the condenser system, the cooling towers and the discharge canal. The cooling water intake will be carefully monitored under various operating conditions to quantitatively determine the extent of entrainment. Studies of the Conowingo Pond will continue for the purpose of assessing the effect of entrainment on the fish populations.

6.1.d Thermal Tolerances of Organisms

Objectives

The principal objectives of these studies are to determine: (1) temperature preference, (2) temperature avoidance, and (3) lethal temperatures for the various common species of fish in Conowingo Pond.

Specification

1. Temperature Preference Studies

The apparatus to be used for the preference study is illustrated in Figure 6.1-9. It consists of a trough having a stainless steel bottom. Water is introduced at one end of the trough from a temperature controlled circulating bath. As the water flows down the trough, it is heated by banks of infra-red bulbs beneath the stainless steel bottom to form a stationary horizontal thermal gradient. Each bank consists of bulbs connected to a dimmer switch and a temperature regulator. The intensity of each bank can be varied, as well as the length of time the bank is on. Upon reaching the other end of the trough, the water is returned to the circulating bath. Lighting is provided by "vita-Lites" which extend the length of the trough.

---

* ± 7 days

** ± 3 days

*** If Peach Bottom Atomic Power Station circulating pumps are not operating, no sampling will take place.

Amendment No. 26

The normal test procedure is as follows: initially the trough is filled with water of the acclimation temperature to a depth which will permit horizontal, but restrict vertical movement. Fish are then placed in the center of the trough and allowed free movement prior to establishment of a thermal gradient. Observations are made at regular intervals. The temperature at the position of each fish is recorded using thermistors (placed equidistant along the length of the trough) which are connected to a temperature readout. The test is concluded when the same temperature is selected continuously or if no preference is reached. Tests are terminated after approximately three hours because of reacclimation of fish to a temperature other than the original acclimation temperature.

2. Temperature Avoidance Studies

The avoidance design employed in these studies is a modification of that designed by Meldrim and Gift. In this design (Figure 6.1-10), temperature controlled circulating baths serve as a storage reservoirs. Water from the respective bath flows (via gravity-flow) into each end of the sub-troughs and drains from their centers, where it is recirculated to the temperature baths. Dye tests show a sharp boundary at the center drain. The apparatus is thus effectively divided into quadrants.

The normal test procedure is as follows: equal numbers of fish are placed into each quadrant. Two of the quadrants (on opposite ends of the respective subtroughs) contain water of the acclimation temperature ("T"), while the remaining two contain water of increased (or decreased) temperature "T+"). AFter the T+ quadrant stabilizes at a temperature above that of the T quadrant, Trial Number 1 is initiated. The amount of time spent by each fish in each quadrant is measured (which constitutes a trial). The number of occurrences of fish in each quadrant is then multiplied by the amount of time they spent in the respective quadrants to give a frequency distribution for each quadrant. A t-test is then performed to determine if a significant difference exists between the distributions.

If no significant avoidance exists, the respective temperatures are then increased in a step-gradient fashion by increasing "T" and "T+" beyond their former points. The same fish are then tested at these new temperatures.

Oxygen and pH are measured at the end of each test. Oxygen is recorded in percent saturation (since the ppm value is temperature dependent) using temperature compensated oxygen analyzer probes. The pH is recorded using a pH meter. The thermal conditions are monitored by a temperature recorder connected to thermocouples along each sub-trough. Observations are made via closed-circuit television because the trough is enclosed for light level regulation.

3. Temperature Shock Studies

Response to rapid decreases and increases in temperature of approximately 10 to 21 F are usually determined for 96 hours. Responses noted are mortality and loss of equilibrium. Responses to temperature decreases are conducted in partitioned Plexiglass flow-through aquaria (Figure 6.1-11). The temperature in these aquaria generally fluctuates less than 1 F over a 96 hour period. All test containers are aerated. Fish are not fed prior to or during testing.

Temperature shock studies are normally conducted by exposing fishes to sudden temperature changes. The fish are transferred directly from water of their acclimation temperature into water 1 to 21 F cooler or warmer. Observations are made periodically over the first hour following introduction, and at 24-hour intervals over the 96-hour test period. Additional observations are generally made between one hour and 96 hours after a test has begun.

Bases

Bases portions of the Conowingo Pond will be affected by the heated discharge from Peach Bottom Atomic Power Station, it is desirable to have information about the thermal tolerances and preferences of the common fish found in the vicinity of the predicted plume.

The results of these studies will be presented in the semi-annual report as they become available.

## REFERENCE MATERIAL

### Thermal Tolerance Studies of Organisms

1. Meldrim, J. W. and J. J. Gift. 1971. Temperature preference, avoidance and shock experiments with estuarine fishes. Ichthyological Associates. Bull. 7. 75 p.

Amendment No. 26

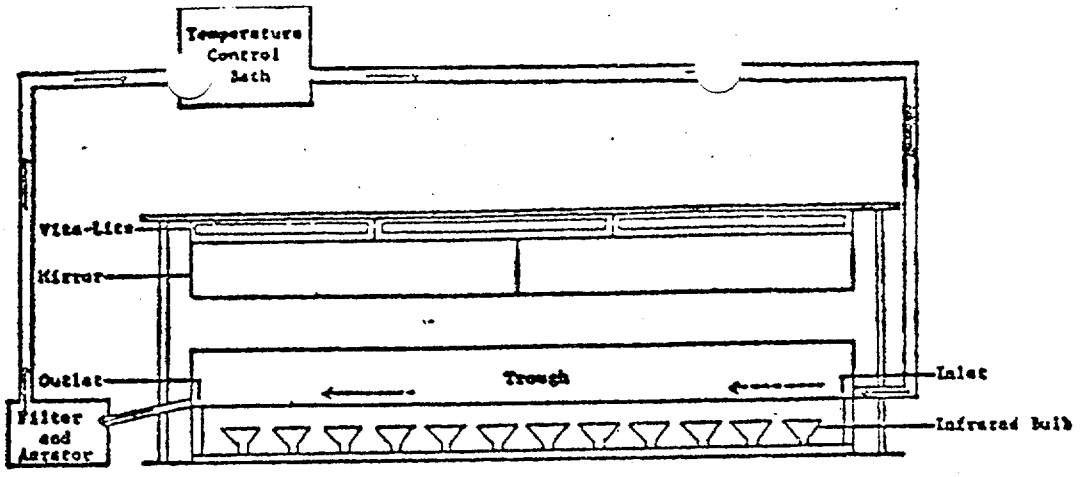



FIGURE 6.1-9

A schematic diagram of the modified Maldrim and Gift temperature preference unit. Arrows indicate direction of water flow.

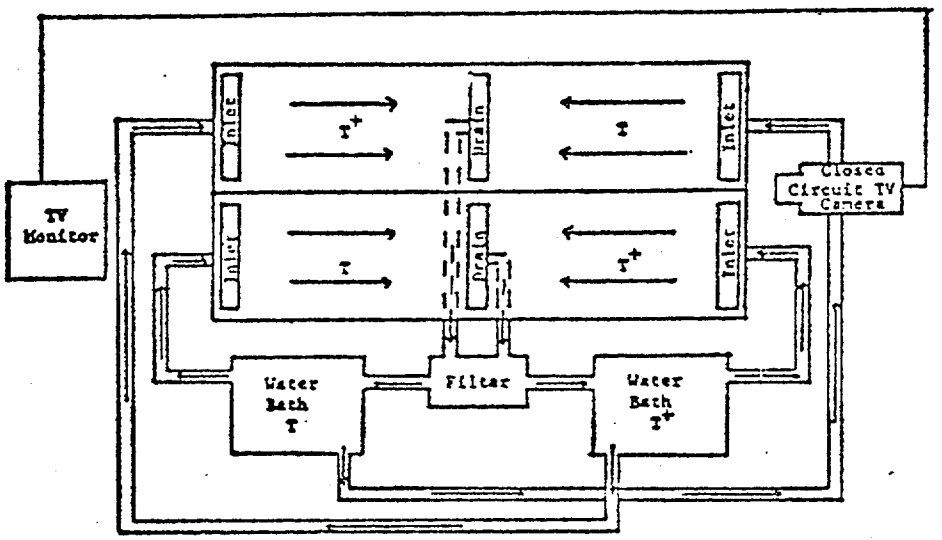
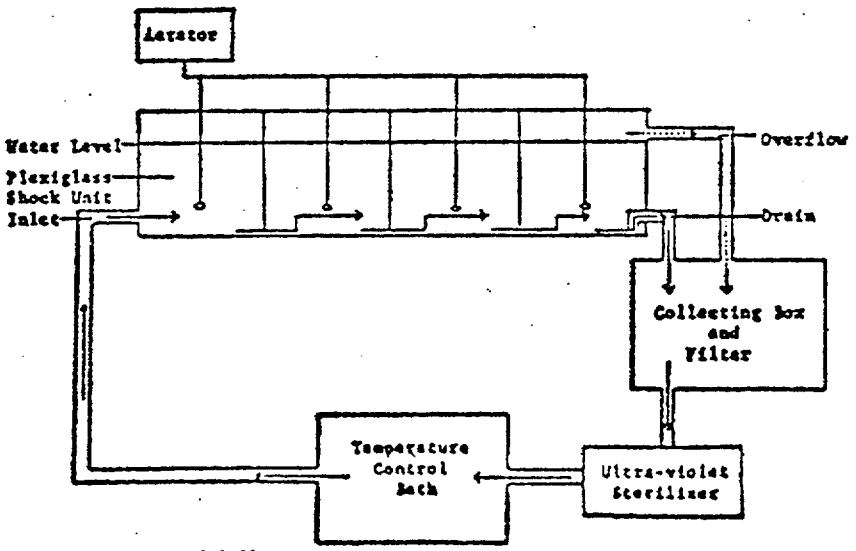



FIGURE 6.1-10

A schematic diagram of the modified Maldrim and Gift after Shelford-Allee avoidance design. Arrows indicate direction of water flow.




Amendment No. 26

FIGURE 6.1-11

A schematic diagram of the plexiglass shock unit. Arrows indicate direction of water flow.

Note: A small fish unit was 4" x 4" x 31" with eight evenly spaced compartments. The test unit had a screen 1½" from each end to prevent the escape of test specimens through inlet and drain.

A large fish unit (shown above) was 12"x12"x31" with four compartments

## 6.2 Chemical

### 6.2.a Biocides

Objective

To determine the optimum chlorination program which would minimize chlorine usage and releases, while keeping the heat exchanger equipment in serviceable condition.

Specification

A study will be made to determine minimum rates and duration of chlorine addition. The study will cover the period of the first year of one unit commercial operation.

During the study, the requirements for chlorine addition versus water quality will be monitored. The effectiveness and necessity of chlorine treatment will be gauged against heat exchanger performance.

Bases

The chlorine demand of the intake water does not normally change significantly from day to day, although significant seasonal variations do occur. Adequate monitoring can be achieved under steady state flow conditions by controlling the chlorine addition rate and daily monitoring of the residual chlorine in the discharge.

Results of this study will be reported as per Section 7.4.

### 6.2.b Heavy Metals

Objective

A monitoring program for heavy metals, such as copper, zinc, iron, cadmium, cobalt, nickel, chromium, and manganese, will be implemented. This study program will seek to determine if there is any heavy metal pick-up in the plant circulating water system.

Specification

At least once a month, samples will be collected at the station intake, upstream of the station intake, and at the circulating water system discharge to Conowingo Pond. These samples will be analyzed for the following metals: copper, zinc, cadmium, iron, cobalt, nickel, chromium, and manganese.

The water quality program as outlined above will continue for one year after Unit #2 begins commercial operation. At this time, the

collected data will be reviewed and those metal concentrations which are shown not to be significantly affected by plant operation will be eliminated from the program.

Bases

This study will provide information as to the degree and nature of heavy metal pick-up in the PBAPS circulating water system.

Data from this study will be reported as per Section 7.4.

6.3 Physical

6.3.a Thermal Plume Mapping

Objective

To determine the extent of the thermal plume in the Conowingo Pond and in the discharge canal resulting from the heated circulating water discharge, and to select a representative measurement that will accurately predict pond conditions.

Specification

A thermal monitoring program will be conducted essentially as described in Supplement No. 2 to "Applicant's Environmental Report-Operating License Stage" in the answer to question 24. Isothermal plots of the receiving waters shall be produced at 1°F intervals to show the results of plant operations under various conditions of load, stream flow, operations of hydroelectric plants, meteorological conditions and ambient stream temperatures. Such plots shall indicate both surface and depth temperature distribution and shall be determined by model tests and prototype monitoring. A minimum number of continuously monitoring temperature sensors shall be determined to accurately predict pond conditions. Twice a month, weather conditions permitting, data will be collected utilizing a motor boat mounted temperature recorder.

Discharge canal water temperatures shall be monitored monthly using the temperature measurement points at the outlet of the discharge pond into the discharge canal, at the discharge point of each cooling tower, and at the discharge point to Conowingo Pond.

Bases

Hydraulic model tests have been completed to predict the extent of the thermal plume. However, the model does not account for the effect of meteorological conditions and other phenomena occurring in the prototype. Thermal mapping of the prototype will be performed with one and two unit operation.

The results shall be reported to the Commonwealth of Pennsylvania Department of Environmental Resources as required under the Industrial Waste Permit No. 5681011. The results shall be reported to the NRC as per Section 7.4, except that reporting shall be on a monthly basis.

6.3.b. Erosion

Objective

To determine the amount of erosion near the discharge structure.

Specification

Detail drawings shall be provided showing survey data to define the location and elevations of the shore line and the river bottom with respect to the discharge structure prior to operation.

Bases

Post-operational surveys shall be conducted if annual visual inspection reveals excessive erosion. Results of these surveys shall be reported as per Section 7.4.

6.4 Radiological Study Program

Objective

An environmental monitoring program shall be conducted to evaluate the effects of station operation on the environs and to verify the effectiveness of the source controls on radioactive materials.

Specification

The environmental radiation monitoring program shall be conducted as specified in Table 6.4-1. Milk will be analyzed for I-131 such that at the level of 0.5 picocuries per liter of milk at the time of sampling, or as close to this sensitivity as can be achieved using proven commercial techniques, the overall one sigma counting error is equal to or less than 25 percent of the activity measure.

Bases

In connection with the high temperature gas-cooled reactor (HTGR) located at the Peach Bottom Atomic Power Station, a pre-operational environmental radiation survey was conducted between March 1960 and February 1966, at which time this reactor first achieved criticality. The objective of the program was to acquire quantitative data on the concentration of radioactivity in environmental media in the vicinity of the reactor site prior to the operation of the HTGR facility.

The environmental radiation monitoring program carried out prior to February 1966 has continued, with minor modifications from time to time in order to acquire similar data after the initial operation of Unit No. 1. A similar program will continue after initial operation of Units 2 and 3 in order to monitor environmental radioactivity levels in the Peach Bottom area.

TABLE 6.4-1

ENVIRONMENTAL RADIATION MONITORING PROGRAM

| Media | Type and Frequency of Analysis (a) | Type of Sample | Sample Collection Frequency (b) | Number of Samples Taken at a Location | Location |
|---|---|---|---|---|---|
| 1. Ambient Radiation | Gamma | Cumulative Dose | Quarterly | One each at any three on-site locations. One each at any four off-site locations. | Five locations on Peach Bottom Site and seven locations off-site. |
| 2. Airborne Particulate | Gross Beta | Continuous flow through filter paper | Filter paper collected weekly | One each from any five locations | Peach Bottom Site<br>Delta, Pa.<br>Holtwood Dam<br>Conowingo Dam<br>Wakefield, Pa.<br>Philadelphia, Pa. |
| | Gamma Spectrum | | Monthly on composite of weekly samples | | |
| 3. Water | | | | | |
| a. Fallout Water | Gross Beta | Collected continuously to form composite sample | Monthly | One at either location | Peach Bottom Site<br>Conowingo Dam |
| b. River Water | Gross Alpha<br>Gross Beta<br>Gamma Spectrum | Spot | Monthly | One from each location | Holtwood Dam<br>Conowingo Dam<br>Unit #2 and 3 Intake<br>Pond near Chester Water Intake |
| | Tritium | Spot | Quarterly | One from each location | Conowingo Dam<br>Holtwood Dam<br>Pond near Chester Water Intake |
| c. Discharge Water | Gross Alpha<br>Gross Beta<br>Gamma Spectrum<br>Tritium | Spot | Monthly | One | Discharge Canal Exit (c) |
| 4. Milk | Iodine-131 | Spot | Weekly during grazing period; Monthly during non-grazing period | One each from any six locations (d) | Eight Regional Farms |
| | Gross Beta | Spot | Quarterly | One each from any six locations (d) | Eight Regional Farms |
| 5. Vegetation | Gross Beta<br>Strontium-89 & 90 combined or separately<br>Cesium-137 | Stems, leaves and fruit; foods whenever available | Spring, Summer and Fall | One each from any three locations | Peach Bottom Site Area<br>Delta, Pa.<br>Holtwood, Pa.<br>Conowingo Dam<br>Wakefield, Pa. |
| 6. Fish | Gross Beta;<br>Gamma Spectrum (all fish of each species as one sample) | Two species (if available) | Quarterly (no sample when ice conditions prevail) | One per species | Conowingo Pond |
| 7. Game Animals | Gross Beta of edible portions.<br>I-131 of Thyroid<br>Strontium - 89 & 90 combined or separately of bone | Game Animals | Semi-annually | One | Peach Bottom Site Area |
| 8. Earth | Gross Beta<br>Gamma Spectrum | Spot | Semi-annually | One from each location | Peach Bottom Site Area<br>Delta, Pa. |
| 9. Silt | Gross Alpha<br>Gross Beta<br>Gamma Spectrum<br>Strontium - 89 & 90 combined or separately | Spot | Semi-annually | One from each location | Peach Bottom Site Area<br>Holtwood Dam Area<br>Conowingo Dam Area |

(a) Frequency of each type of analysis is the same as the frequency of sample collection except where noted.

(b) Sample collection frequency periods are defined as follows:

Weekly - 7 calendar days beginning on Sunday ± 3 days.
Monthly - a calendar month ± 15 days.
Quarterly - a three month calendar period beginning January 1, April 1, July 1, or October 1 ± 45 days.
Semi-Annually - a six month calendar period beginning January 1 or July 1 ± 90 days.
Annually - a calendar year ± 90 days.
Spring, Summer, Fall - the calendar quarters beginning April 1, July 1, and October 1 respectively ± 45 days.

(c) Sample is taken after radwaste discharge is diluted and mixed with the condenser circulating water discharge.

(d) Reasonable effort will be made to obtain one of the six samples from the farm which Philadelphia Electric Company calculations indicate can produce the highest annual average dose exposure via the cow-milk chain thus the milk originating from FARMS. Reasonable efforts should also be made to obtain one of the milk samples from the nearest farm having cow(s).



Amendment No. 26

LEFT BLANK INTENTIONALLY

LEFT BLANK INTENTIONALLY

LEFT BLANK INTENTIONALLY

LEFT BLANK INTENTIONALLY

LEFT BLANK INTENTIONALLY

## 7.4 Plant Reporting Requirements

### 7.4.1 Routine Reports

In addition to the environmental monitoring information required by Section 6.9.3.h of Appendix A to the Operating License, the following information shall be submitted in an annual report:

A. Records of special study programs data and analysis thereof.

B. Records of changes to the plant which affect the environmental impact of the facility.

C. Records of changes to environmental permits and certificates.

### 7.4.2 Non-Routine Reports

A. Environmental Deviation Reports

In the event of an environmental deviation as defined in the environmental technical specifications, notification shall be made within 24 hours by telephone or telegraph to the Director of the NRC Regional Inspection and Enforcement Office. A written report shall follow within 10 days to the Director of Nuclear Reactor Regulation (copy to the Director of Regional Inspection and Enforcement Office).

The written report on an environmental deviation, and to the extent possible, the preliminary telephone and telegraph notification, should: (a) describe, analyze, and evaluate implications, (b) determine the cause of the occurrence and (c) indicate the corrective action (including any significant changes made in procedures) taken to preclude repetition of the occurrence and to prevent similar occurrences involving similar components or systems.

B. Reporting of Changes to the Plant or Permits

A written report, including an evaluation of the environmental impact resulting from a change, shall be forwarded to the Director, Office of Nuclear Reactor Regulation (copy to the Director of the Regional Inspection and Enforcement Office) in the event of:

1. Changes to the plant that affect the environmental impact evaluation contained in the Environmental Report or the

Amendment No. 26

Environmental Statement. This requirement does not preclude making changes on short notice that are minor in terms of environmental impact.

2. Changes or additions to permits and certificates required by Federal, State, local and regional authorities for the protection of the environment. When submittals of changes are made to the concerned agency, a copy shall be submitted to the NRC.

3. Requests for changes in environmental technical specifications.

7.5 Records Retention

7.5.1 Records Retained for 5 Years

Records and/or logs relative to the following items shall be kept in a manner convenient for review and shall be retained for 5 years, unless a longer period is required by applicable regulations.

1. Records of principal maintenance activities of equipment pertaining to environmental impact.

2. Records of environmental deviations.

3. Records of periodic checks, inspections and/or calibrations performed to verify that environmental surveillance requirements are being met.

4. Records of any special study programs specified in Section 6.0.

5. Records of changes made to operating procedures, equipment, permits and certificates.

7.5.2 Records Retained for the Life of the Plant

The following records and/or logs will be retained for the life of the plant:

1. Records of off-site environmental radiation monitoring surveys.

Amendment No. 26

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

PHILADELPHIA ELECTRIC COMPANY
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-278

PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 25
License No. DPR-56

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Philadelphia Electric Company, Public Service Electric and Gas Company, Delmarva Power and Light Company, and Atlantic City Electric Company, (the licensees) dated September 15, 1975, complies with the standards and requirements of the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations; and

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Attachment:
Changes to the
Technical Specifications

Date of Issuance: September 24, 1976

ATTACHMENT TO LICENSE AMENDMENT NO. 25

TO THE TECHNICAL SPECIFICATIONS

FACILITY OPERATING LICENSE NO. DPR-56

DOCKET NO. 50-277/278

Replace cover page, pages i, ii, 13, 14 through 47, 51, and 52 with the attached revised pages (no change has been made on pages ii and 13). Delete pages 13a and 13b.

APPENDIX B

TO

FACILITY OPERATING LICENSE DPR-44 AND
FACILITY OPERATING LICENSE DPR-56

ENVIRONMENTAL

TECHNICAL SPECIFICATIONS AND BASES

FOR

THE FULL POWER FULL TERM

PEACH BOTTOM ATOMIC POWER STATION

UNITS NO. 2 & 3
OPERATION OF
PHILADELPHIA ELECTRIC COMPANY

DOCKET NOS. 50-277 & 50-278

APPENDIX B
REVISED

AUGUST 1976

Amendment No. 25

PBAPS

TABLE OF CONTENTS


| | | | | Page No. |
|---|---|---|---|---|
| 1.0 | Definitions, Abbreviations and Symbols | | | 1 |
| 1.1 | Definitions | | | 1 |
| 1.2 | Abbreviations | | | 2 |
| 1.3 | Symbols | | | 3 |
| 2.0 | Protection Limits | 3.0 | Monitoring Requirements | 5 |
| 2.1 | Thermal | | 3.1 | 5 |
| 2.2 | Chemical | | 3.[illegible] | 5c |
| 2.2.1 | Biocides | | 3.[illegible].1 | 5c |
| 2.2.2 | Suspended Solids | | 3.2.2 | 7 |
| 2.2.3 | pH | | 3.2.3 | 7 |
| 2.2.4 | Plant Chemical Usage | | 3.2.4 | 8 |
| 2.3 | Noise | | 3.3 | 10 |
| 4.0 | Report Levels | 5.0 | Monitoring Requirements | 11 |
| 4.1 | Impingement of Fishes | | 5.1 | 11 |
| 4.2 | Unusual Environmental Events | | 5.2 | 12 |
| 4.3 | Radiological | | 5.3 | 13 |
| 6.0 | Environmental Surveillance and Special Study Programs | | | 14 |
| 6.1 | Aquatic | | | 14 |
| | a. General Ecological Survey Program | | | 14 |
| | b. Impingement of Organisms | | | 34 |
| | c. Entrainment of Planktonic Organisms | | | 34 |
| | d. Thermal Tolerances of Organisms | | | 35 |
| 6.2 | Chemical | | | 39 |
| | a. Biocides | | | 39 |
| | b. Heavy Metals | | | 39 |
| 6.3 | Physical | | | 40 |
| | a. Thermal Plume Mapping | | | 40 |
| | b. Erosion | | | 41 |
| 6.4 | Radiological Study Program | | | 41 |
| 7.0 | Administrative Controls | | | 48 |
| 7.1 | Organization, Review and Audit | | | 48 |
| 7.1.1 | Organization | | | 48 |
| 7.1.2 | Review and Audit | | | 48 |

| | | Page No. |
|---|---|---|
| 7.2 | Action to be Taken if a Protection Limit or Report Limit is Exceeded or if Harmful Effects Detected | 49 |
| 7.3 | Unit Operating Procedures | 50 |
| 7.4 | Plant Reporting Requirements | 51 |
| 7.4.1 | Routine Reports | 51 |
| 7.4.2 | Non-Routine Reports | 51 |
| 7.5 | Records Retention | 52 |
| 7.5.1 | Records Retained for 5 Years | 52 |
| 7.5.2 | Records Retained for the Life of the Plant | 52 |

REPORT LEVELS (Continued)

4.3 Radiological

Objective

The purpose of this specification is to monitor radiological effects of station operation on the environment. The design objective for radioisotopes except halogens and particulates with half-lives greater than eight days is a dose rate at the site boundary of less than 10 mrem per year to the whole body or any organ. The design objective for I-131 is a dose rate of less than 5 mrem per year to the thyroid of a child through the grass-cow-milk chain; and for I-131 and other particulate radioisotopes with half lives greater than eight days is a dose rate at the site boundary of less than 5 mrem per year by breathing.

Specification

If a measured level of radioactivity in critical pathway environmental medium samples indicates that the resultant annual dose to an individual from those levels could equal or exceed four times the design objective, suitable action will be taken as per Section 7.2.

If samples of critical pathway environmental media collected over a calendar quarter show total levels of radioactivity that could result in accumulated plant related doses to an individual over that quarter of one-half the annual dose objective the results shall be reported and a plan submitted and implemented within 30 days so that the annual dose to an individual will not exceed the design objective.

Bases

Yearly dose levels to an individual within the design objectives from PBAPS releases meet the requirements of 10 CFR 20 and will result in negligible effects to man or his environment.

MONITORING REQUIREMENTS (Continued)

5.3 Radiological

Objective

The purpose of this monitoring requirement is to measure the radioactivity levels in the environment as a result of the operation of PBAPS.

Specification

An environmental monitoring program shall be conducted as detailed in Section 6.4.

Bases

To assure that man and his environment are not adversely affected by the operation of PBAPS, it is necessary to monitor the radioactivity levels in the environment.

## 6.0 Environmental Surveillance and Special Study Programs

Studies described in this section will be terminated upon agreement by Philadelphia Electric Company and the Nuclear Regulatory Commission that the intended purpose of the study has been satisfied.

### 6.1 Aquatic

### 6.1.a General Ecological Study Program

#### 6.1.a.1 Fisheries

Objectives

The principal objective of this study on fishes is to determine: (1) species composition, (2) distribution, (3) relative abundance, (4) annual and seasonal variations in numbers and biomass, (5) growth rates, (6) mortality rates, (7) food habits, (8) relative importance of the Peach Bottom Atomic Power Station site as the spawning areas for fishes, (9) reproductive potential and (10) movement. This data will be used to determine any detrimental effects on the Conowingo Pond ecosystem which may be the result of the normal operation of Peach Bottom Atomic Power Station, Units 2 and 3.

Objectives 1 through 4 will be routinely reported in the semi-annual report; objectives 5 through 10, pertaining to the biology of fishes, will be reported in the semi-annual reports as the results of studies become available.

Specification

Several types of gear are employed to monitor the fish populations since each type of gear is selective to some extent with regard to the size and species caught. Data on the fish populations of Conowingo Pond will be gathered using seines, trawls, trap nets and plankton nets. Location of the sampling sites and the efficiency of each gear is subject to several constraints imposed by local topographic and meteorological conditions.

The sampling stations for the various fisheries studies are listed in Tables 6.1-1 to 6.1-7 and are shown in Figures 6.1-1 to 6.1-7. Stations, other than plankton net, are sampled twice monthly* throughout the year unless unusual conditions such as an equipment malfunction or an act of nature (meteorological and/or hydrological)

* +7 days.

prevent the sample from being obtained or analyzed. Plankton net tows are made on a weekly* basis only during the spawning season when eggs and larvae of fishes are available. The diurnal distribution of young (larval) fishes is determined from transect stations.

Trap net, seine, trawl and plankton net catches are used to estimate the relative abundance of species on a seasonal and/or annual basis. Catches from each gear are converted to catch per unit of effort for that particular gear. Data on the catch per unit of effort are an index of abundance.

Fork length, weight and scale samples are taken from subsamples of fishes. Seine and plankton net samples are preserved in the field. Specimens from these samples are identified and counted in the laboratory.

Depth of water, air temperature and water temperature are recorded. Light penetration is measured at all but seine stations. Other physico-chemical parameters measured in the General Ecology Program are described in Section 6.1.a.2.

Many specimens of fishes which occur in Conowingo Pond have been preserved, identified, and stored for future reference. These reference specimens serve as a source for material from the preoperational period and are available for studies on the biology of fishes as required during the postoperational period.

Bases

Since the operation of the Peach Bottom Atomic Power Station will cause an input into the Conowingo Pond ecosystem which would not normally occur, it is desirable to monitor this ecosystem to determine whether any effects might be resultant from this input.

The various sampling locations were selected on the basis of their representative distribution throughout the pond. As the data from these stations is analyzed or changes in physiography occur, it is determined if new stations are needed or old stations should be abandoned. The frequency of sampling was established in much the same manner. As can be seen in Tables 6.1-1 and 6.1-3 to 6.1-7, stations for most gears have been sampled since 1967 or 1968.

The information from this portion of the monitoring program will be submitted on a semi-annual basis as per Section 7.4.

* ± 3 days.

TABLE 6.1-1

Location of Trap Net Stations in Conowingo Pond.

| Station | Location | Depth (feet) | Year Sampling Started |
|---|---|---|---|
| 102 | Mouth of Wissler Run | 4 | 1966 |
| 103 | Muddy Creek, approximately 25 yards upstream from mouth | 10 | " |
| 104 | Offshore from Peach Bottom Atomic Power Station Unit No. 1 | 13 | " |
| 106 | Approximately 200 yards downriver from the mouth of Peters Creek | 5 | 1967 |
| 107 | At the mouth of Broad Creek | 14 | " |
| 108 | Approximately 50 yards upriver from the mouth of Conowingo Creek | 20 | " |
| 109 | North shore of Hopkins Cove | 12 | " |
| 110 | Off Burkins Run (Stonewall Point) | 5 | 1970 |
| 136 | In Broad Creek | 12 | 1972 |
| 138 | In Conowingo Creek | 11 | " |
| 141 | Approximately 400 yards upriver from the mouth of Peters Creek | 17 | " |
| 142 | Approximately 600 yards upriver from the mouth of Peters Creek | 13 | " |

TABLE 6.1-2

Location of Trawl Zones 401-410 in Conowingo Pond. Trawl zones are sampled as listed in Table 6.1-3.

| Zone | Location |
|---|---|
| 401 | From a point off the mouth of Muddy Creek to a point off Rollins Point |
| 402 | From a point just downriver from Sicily Island to a point off the mouth of Fishing Creek |
| 403 | From a point off Rollins Point to a point just downriver from Mt. Johnson Island |
| 404 | From a point off the mouth of Fishing Creek to a point just downriver from Mt. Johnson Island |
| 405 | Off the Peach Bottom Atomic Power Station, from a point just downriver from Mt. Johnson Island to a point off Stonewall Point |
| 406 | From a point just downriver from Mt. Johnson Island to a point off the mouth of Peters Creek |
| 407 | From a point off Stonewall Point to a point off the mouth of Michael Run |
| 408 | From a point off the mouth of Peters Creek to a point approximately 800 yards downriver from Williams Tunnel |
| 409 | From a point off the mouth of Micael Run to a point off the mouth of Broad Creek |
| 410 | From a point approximately 800 yards downriver from Williams Tunnel to a point approximately 800 yards downriver from Wildcat Tunnel |

Amendment No. 25

TABLE 6.1-3

Location of Stations 451 to 456 in Trawl Zone 405, Stations 461 to 466 in Trawl Zone 406 and Stations 481 to 486 in Trawl Zone 408 in Conowingo Pond. Trawls made at nearshore stations are indicated by odd numbers and offshore stations by even numbers.

| Station | Location | Depth (feet) | Year Sampling Started |
|---|---|---|---|
| | **Zone 405** | | |
| 451 | From a point off Stonewall Point to the Peach Bottom Atomic Power Station Discharge | 16 | 1968 |
| 452 | | 20 | " |
| 453 | From a point approximately 50 yards upriver from the Peach Bottom Atomic Power Station Discharge to a point off Peach Bottom Atomic Power Station Unit No. 1 | 20 | " |
| 454 | | 17 | " |
| 455 | From a point off Peach Bottom Atomic Power Station Unit No. 1 to a point just upriver from Peach Bottom Atomic Power Station Unit Nos. 2 and 3 | 23 | " |
| 456 | | 20 | " |
| | **Zone 406** | | |
| 461 | From a point approximately 50 yards upriver from the mouth of Peters Creek | 25 | 1972 |
| 462 | | 26 | " |
| 463 | From a point approximately 500 yards upriver from the mouth of Peters Creek | 14 | " |
| 464 | | 18 | " |
| 465 | From a point approximately 700 yards upriver from the mouth of Peters Creek | 30 | " |
| 466 | | 28 | " |
| | **Zone 408** | | |
| 481 | From a point approximately 300 yards downriver from Peach Bottom Beach to a point off Peach Bottom Beach | 17 | 1968 |
| 482 | | 12 | " |
| 483 | From a point off Peach Bottom Beach to a point approximately 200 yards downriver from the mouth of Peters Creek | 7 | " |
| 484 | | 10 | " |
| 485 | From a point approximately 200 yards downriver from the mouth of Peters Creek to a point off the mouth of Peters Creek | 7 | " |
| | | 12 | " |

TABLE 6.1-4

Location of Trawl Transect Stations in Conowingo Pond.

| Transect | Location | Depth (feet) | Year Sampling Started |
|---|---|---|---|
| Transect 1 | | | |
| 312 | Mid-pond between Fishing Creek and Rollins Point | 16 | 1967 |
| 313 | Off Fishing Creek | 13 | " |
| Transect 2 | | | |
| 321 | Off Peach Bottom Atomic Power Station | 22 | " |
| 322 | Mid-pond between Mt. Johnson Island and the Peach Bottom Atomic Power Station | 20 | " |
| 323 | Just downriver from Mt. Johnson Island | 18 | 1967 (1973) |
| Transect 3 | | | |
| 331 | Off Michael Run | 13 | 1967 |
| 332 | Mid-pond between Michael Run and Williams Tunnel | 15 | " |
| 333 | Off Williams Tunnel | 35 | " |
| Transect 4 | | | |
| 341 | Off Broad Creek | 34 | 1968 |
| 342 | Mid-pond off Broad Creek | 35 | " |
| 343 | Off Wildcat Tunnel | 35 | " |
| Transect 7 | | | |
| 371 | Off Burkins Run (Stonewall Point) | 12 | " |
| 372 | Mid-pond off Burkins Run | 15 | " |
| 373 | Off the mouth of Peters Creek | 11 | " |

TABLE 6.1-5

Location of Seine Stations in Conowingo Pond.

| Station | Location | Year Sampling Started |
|---|---|---|
| 201 | Approximately 200 yards upriver from the mouth of the Fishing Creek | 1966 |
| 202 | Southeast shore of Sicily Island | " |
| 203 | West shore of Big Chestnut Island | " |
| 206 | At the mouth of Wissler Run | " |
| 207 | Approximately 100 yards downriver from Peach Bottom Atomic Power Station Unit No. 1 | 1967 |
| 208 | Peach Bottom Beach | " |
| 209 | Broad Creek at the boat launch | " |
| 210 | Conowingo Creek at the boat launch | " |
| 211 | North shore of Hopkins Cove | " |
| 212 | Fishing Creek at first road bridge upstream from mouth | 1968 |
| 213 | Peters Creek at third road bridge upstream from mouth | " |
| 214 | Beach at mouth of Burkins Run (Stonewall Point) | 1970 |

TABLE 6.1-6

Location of near-shore surface Plankton Net Stations in Conowingo Pond.

| Station | Location | Year Sampling Started |
|---|---|---|
| 529 | Broad Creek, near boat launch | 1970 |
| 531 | Broad Creek, towing downstream along northern shore beginning opposite Shangri-la cabin | 1970 |
| 539 | Glen Cove | 1968 |
| 540 | Hopkins Cove | 1968 |
| 542 | Conowingo Creek | 1972 |
| 543 | Muddy Creek | 1972 |

TABLE 6.1-7

Location of Plankton Net Stations on Transects in Conowingo Pond. Samples are taken at the surface and bottom.

| Station | Location | Year Sampling Started |
|---|---|---|
| 570* | Off Rollins Point | 1968 |
| 560 | Mid-pond between Fishing Creek and Rollins Point | " |
| 561 | Off Fishing Creek | " |
| 562 | Off the Peach Bottom Atomic Power Station | " |
| 563 | Mid-pond between Mt. Johnson Island and the Peach Bottom Atomic Power Station | " |
| 575* | Approximately 250 yards downriver from Mt. Johnson Island | 1973 |
| 576 | Approximately 700 yards downriver from Mt. Johnson Island | " |
| 564 | Off Burkins Run (Stonewall Point) | 1968 |
| 565 | Mid-pond between Burkins Run and the mouth of Peters Creek | " |
| 566 | Point off the mouth of Peters Creek | " |
| 567 | Off Coopers Rock Point | " |
| 568 | Mid-pond between Coopers Rock Point and Chester Water Authority intake | " |
| 569 | Off Chester Water Authority intake | " |

*Sampled only at surface because of too many bottom obstructions.

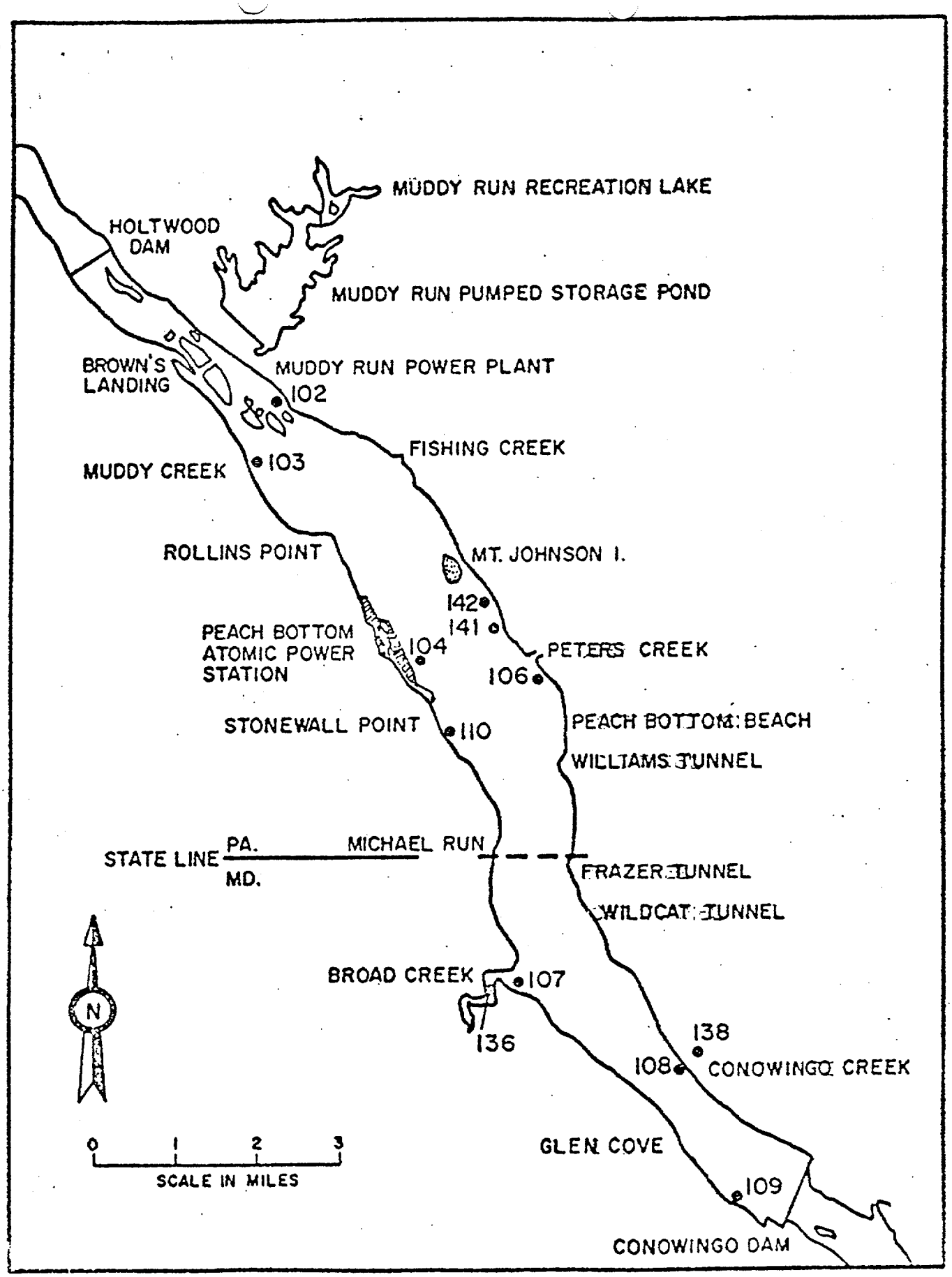



FIGURE 6.1-1 MAP OF CONOWINGO POND SHOWING THE LOCATION OF TRAP NET STATIONS.

Amendment No. 25

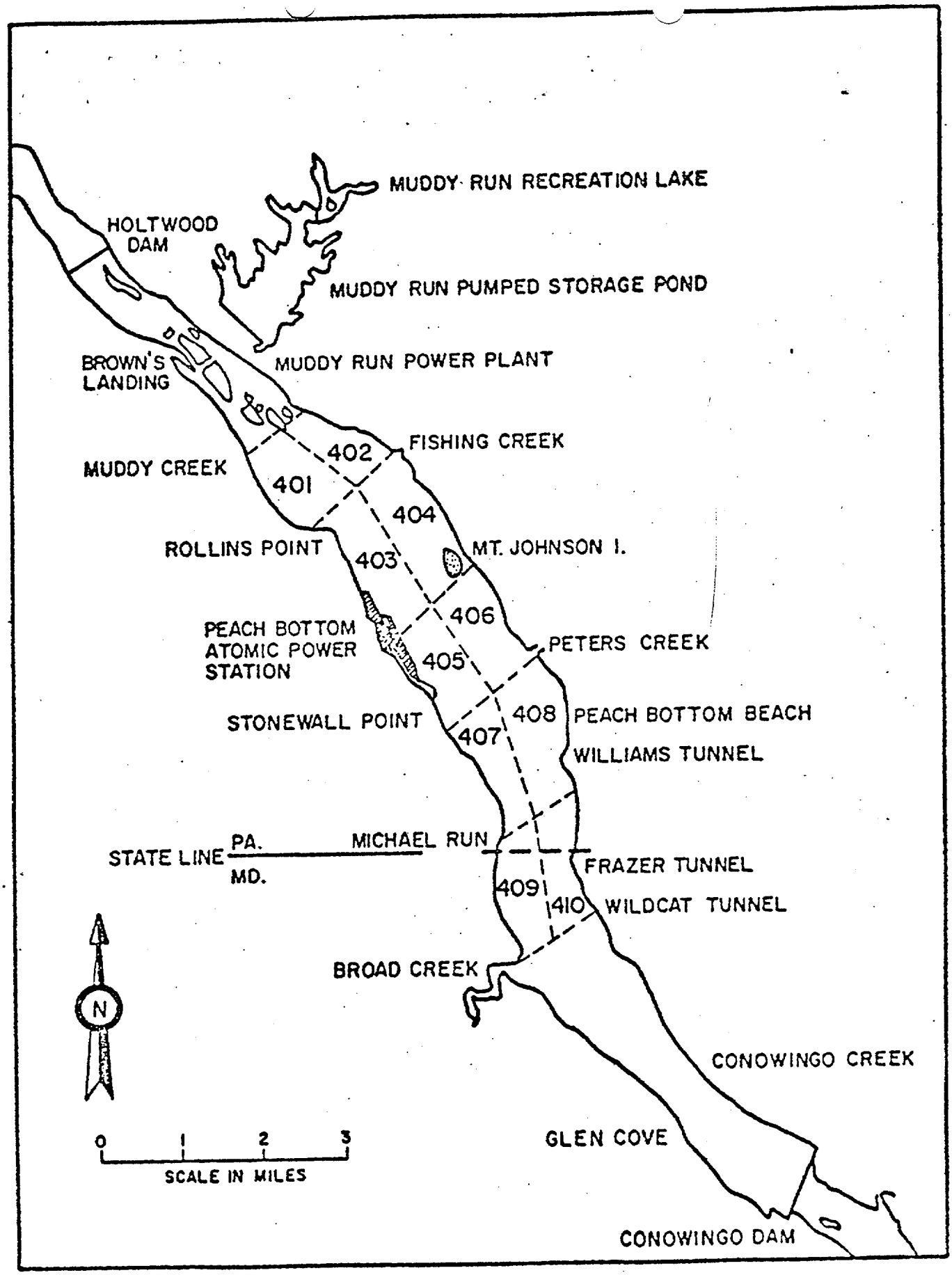



FIGURE 6.1-2 MAP OF CONOWINGO POND SHOWING THE LOCATION OF TRAWL ZONES 401-410. TRAWL ZONES ARE SAMPLED AS SHOWN ON FIGURE 6.1.3.

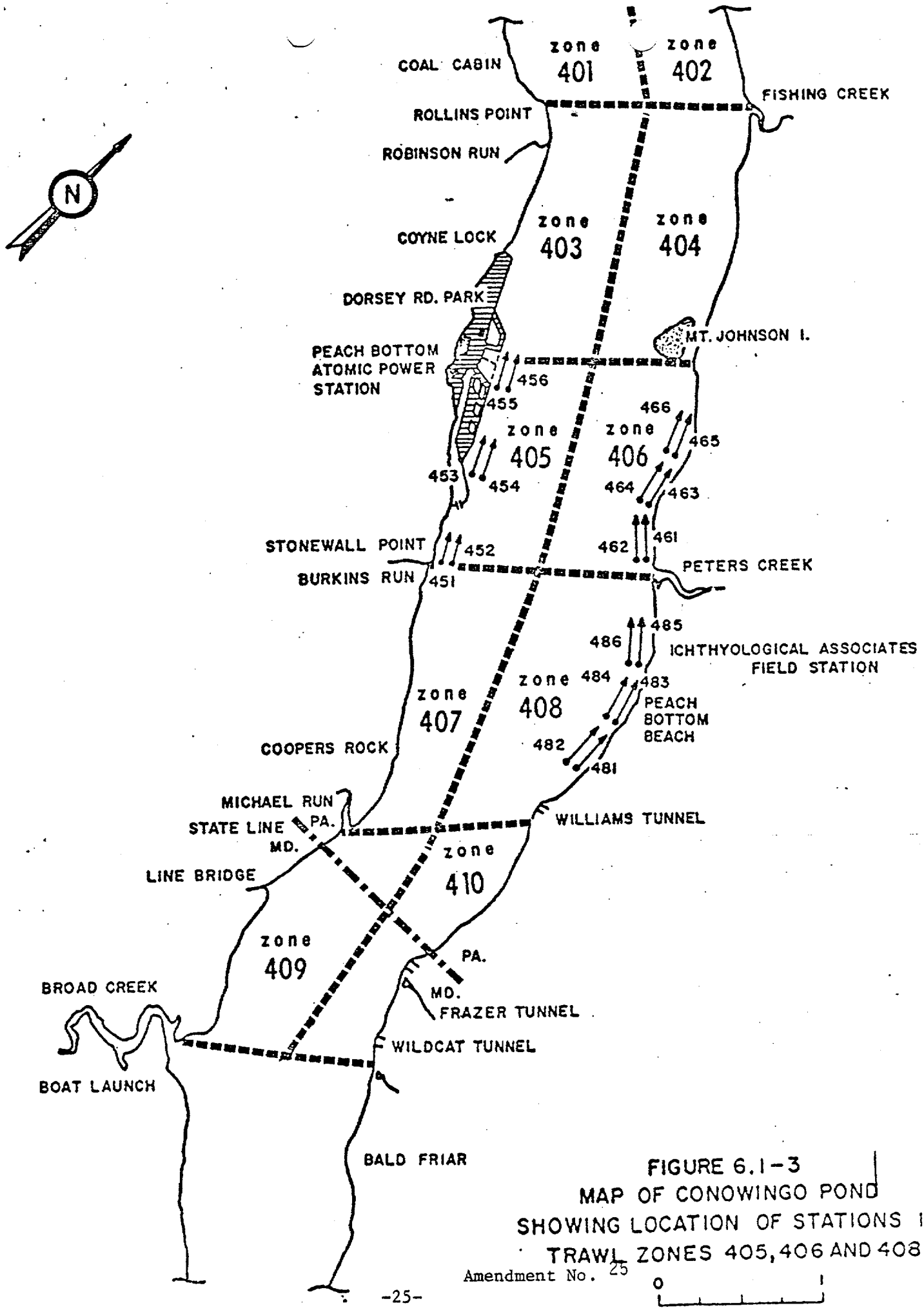



FIGURE 6.1-3
MAP OF CONOWINGO POND
SHOWING LOCATION OF STATIONS IN
TRAWL ZONES 405, 406 AND 408

Amendment No. 25

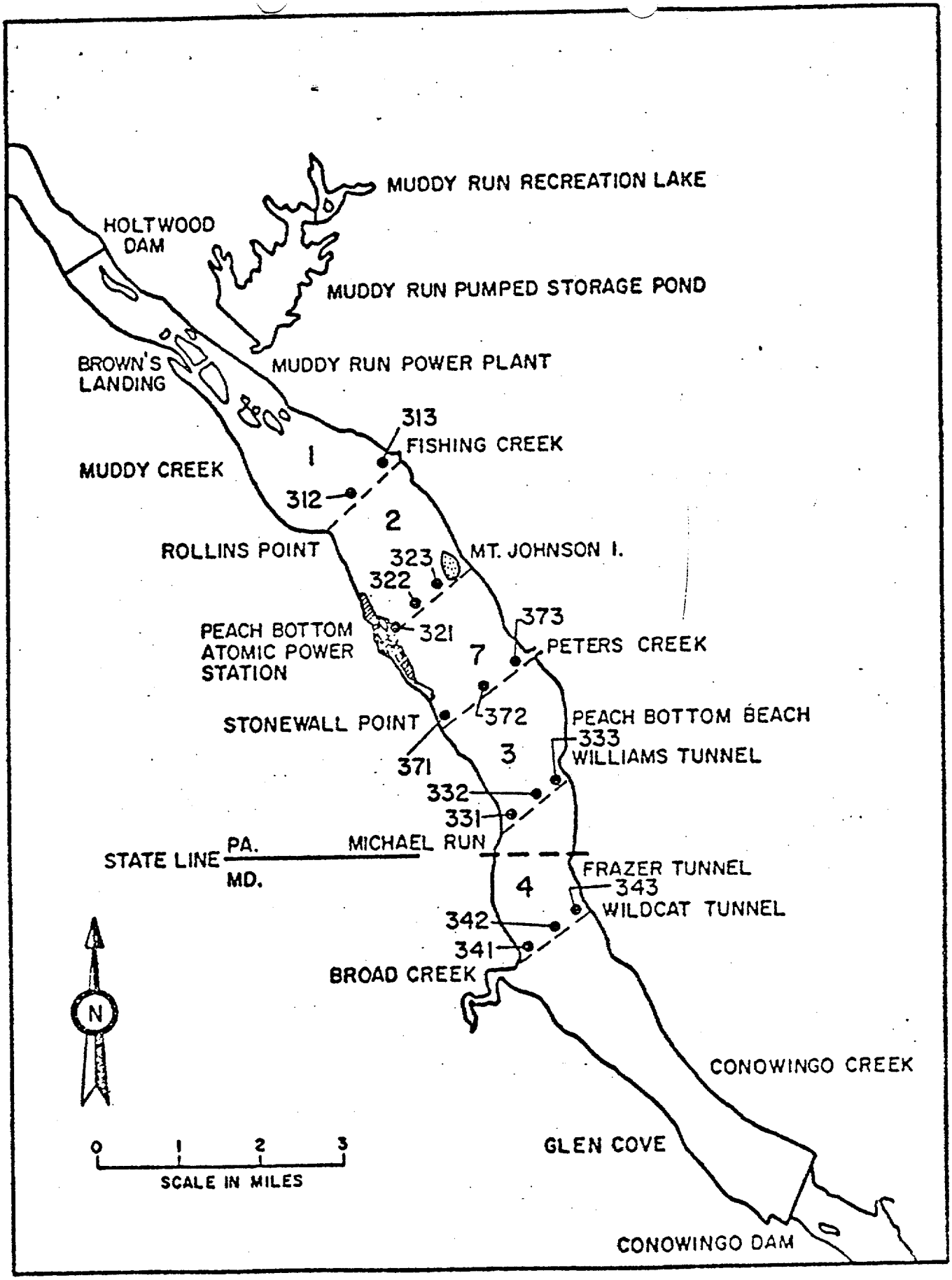



FIGURE 6.1-4 MAP OF CONOWINGO POND SHOWING THE LOCATION OF STATIONS C:
TRAWL TRANSECTS 1-4, AND 7 (DASHED LINES)

Amendment No. 25

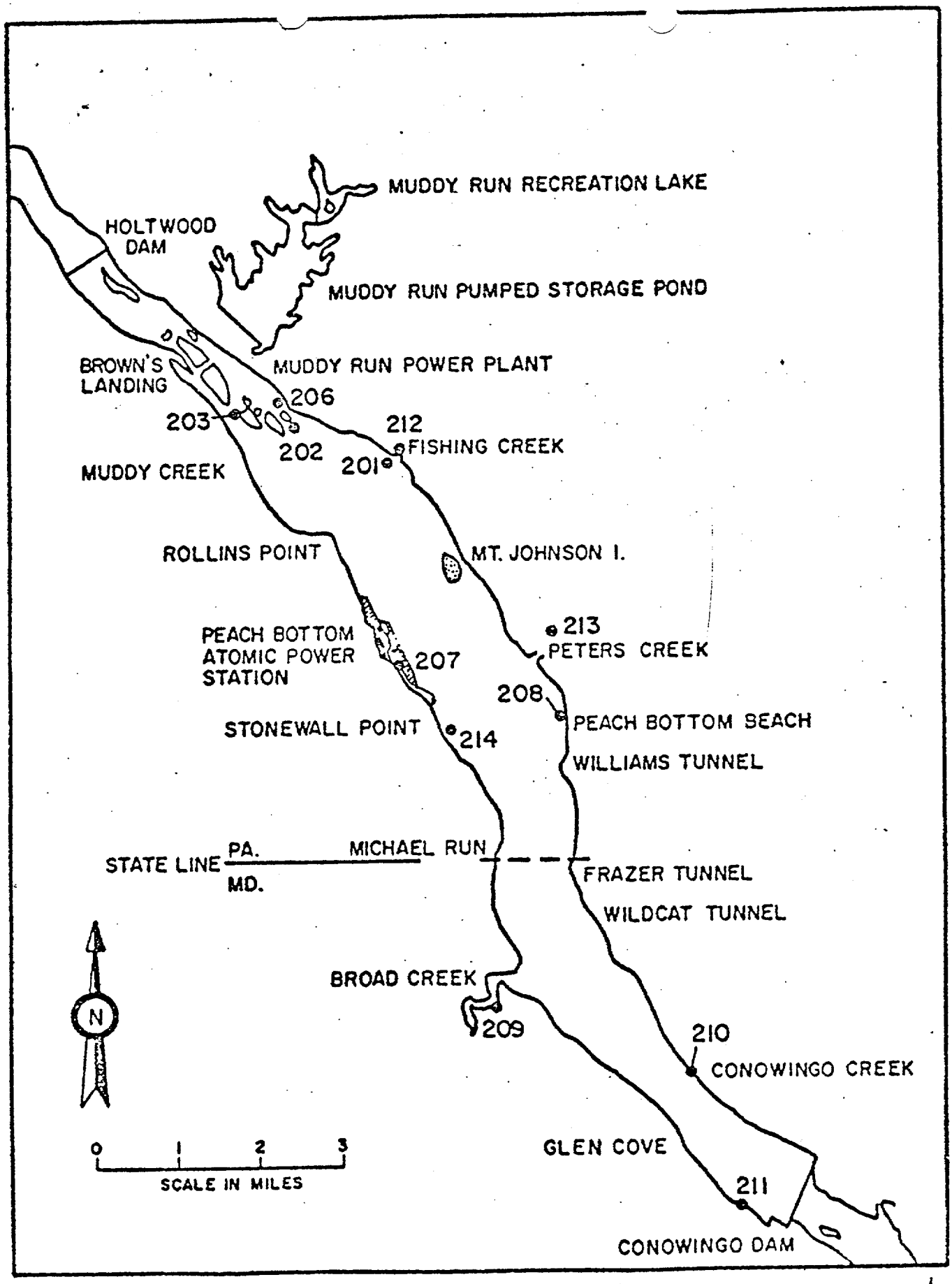



FIGURE 6.1-5 MAP OF CONOWINGO POND SHOWING THE LOCATION OF SEINE STATIONS.

Amendment No. 25

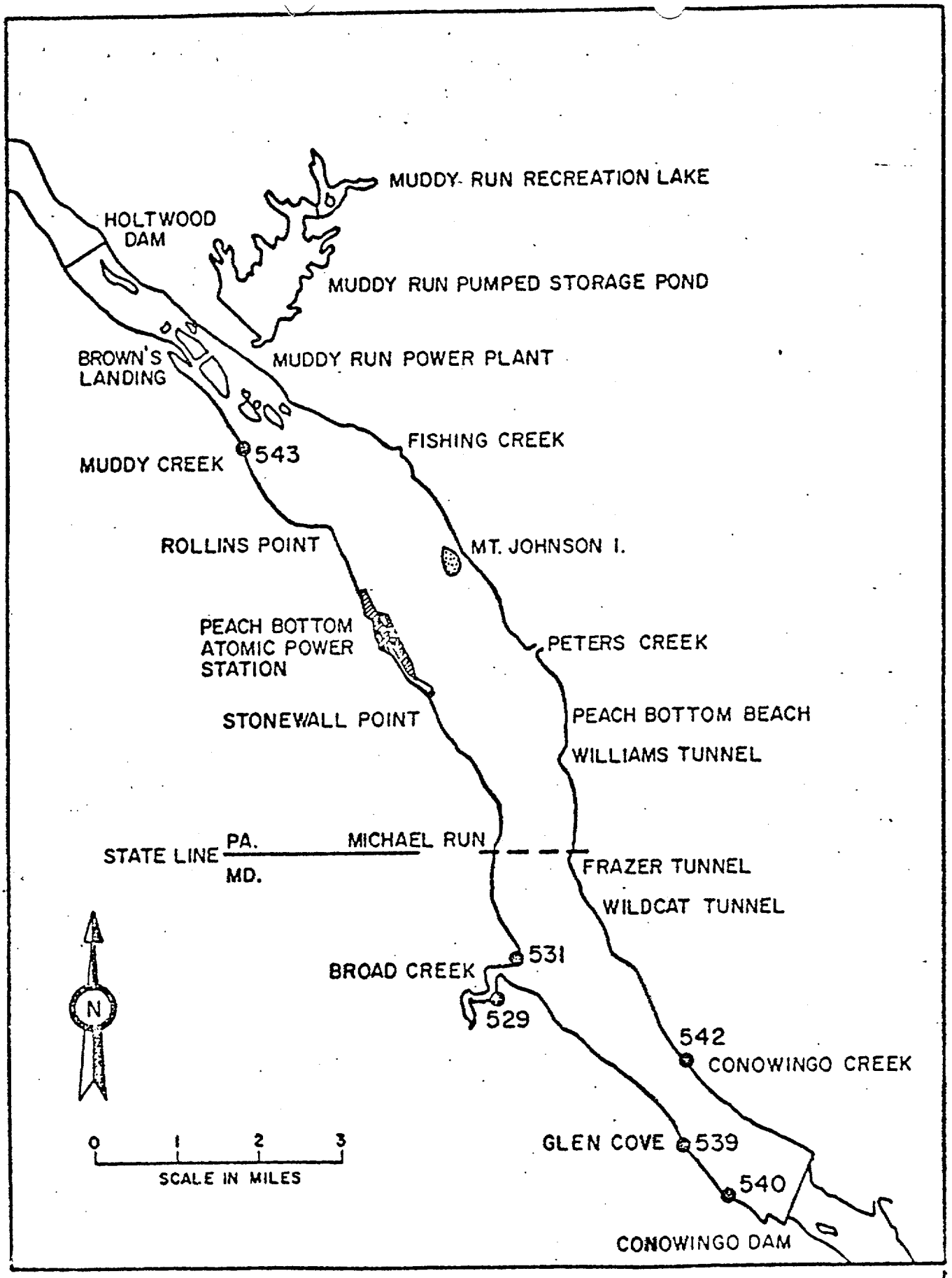



FIGURE 6.1-6. MAP OF CONOWINGO POND SHOWING THE LOCATION OF NEAR SHORE SURFACE PLANKTON NET STATIONS.

Amendment No. 25

6.1.a.2 Limnology

Objective

The objectives of the Limnological Studies portion of the General Ecology Study Program are as follows:

A. For benthic and Planktonic Organisms: to determine (1) the species composition, (2) distribution, (3) relative abundance, and (4) annual and seasonal variations in relative numbers and biomass.

B. For Water Quality: To monitor quantitatively and qualitatively the physical and chemical parameters of Conowingo Pond; to document and evaluate (1) the ecological effects (if any) of the operation of Peach Bottom Atomic Power Station, (2) the effects of natural phenomena on these parameters, and (3) to draw correlations between these parameters and the aquatic communities present in the Pond.

Specification

The description of limnological stations and parameters sampled at each are given in Table 6.1-8. The locations of limnological sampling stations in Conowingo Pond are shown in Figure 6.1-8. The stations are sampled for each parameter listed in Table 6.1-8 on a twice monthly* basis throughout the year, unless unusual conditions - such as an equipment malfunction or an act of nature (meteorological and/or hydrological) - prevent the samples from being obtained or analyzed.

Plankton samples are preserved for analysis and catalogued for a reference collection. Zooplankters are identified and counted. A subsample of the plankton is weighed (dry weight). Biomass is not determined on samples containing excessive detritus.

Benthos samples are washed and preserved for subsequent analysis. Organisms are identified, counted, and weighed (dry weights).

Concentrations of some plant pigments, including total chlorophyll a, are determined from water samples taken for chemical analysis (Table 6.1-8).

Organisms are identified by biologists of contracted consultants with the aid of standard reference works on the various groups encounted. When necessary, specimen identification is verified by recognized experts on the group(s) in question.

* ± 7 days

Amendment No. 25

Water samples are collected at the surface and bottom at five selected stations in Conowingo Pond. Samples are also taken at outlet pipes at Conowingo and Holtwood Dams (Table 6.1-8). Each water sample is analyzed for the following:

| | |
|---|---|
| pH | Bicarbonate |
| Conductivity | Chloride |
| Total Suspended Solids (Seaton) | Sulfate |
| Sodium | Reactive Silica |
| Potassium | Iron |
| Calcium | Nitrate |
| Magnesium | Nitrite |
| Carbonate | Phosphate (total) |

Methods of chemical analysis used are generally those described by the American Public Health Associated (1965), Golterman (1969) and/or those recommended by the Environmental Protection Agency (1971). If more acceptable methods become available the methodology will be updated.

Dissolved oxygen, water temperature, air temperature and light penetration measurements are made at selected stations in Conowingo Pond (Table 6.1-8). Dissolved oxygen and water temperature measurements are taken at the surface, 5 feet, 10 feet, and bottom. Dissolved oxygen, air temperature and light penetration are not measured at Conowingo and Holtwood Dams.

Bases

These studies were undertaken in order to obtain sufficient data to enable the determination of the effects on the pond ecology which may occur as a result of the operation of the Peach Bottom Atomic Power Station. Studies were initiated to establish baseline conditions and to determine the relative importance of the parameters monitored. Parameters will be compared to the baseline conditions to determine differences which may occur after operation of the station.

The sampling locations were selected on the basis of their representative distribution throughout the pond. The frequency of sampling was established at its current level in order to minimize redundancy but maintain sufficient data inflow to satisfy the objectives listed above.

The information from this portion of the monitoring program will be submitted on a semi-annual basis as per Section 7.4.

## REFERENCE MATERIAL

### Limnology

1. Anonymous. 1965. Standard Methods for the Examination of Water and Wastewater, Amer. Pub. Health Assoc., N. Y. 874 p. (or latest version).

2. Anonymous. 1971. Methods for Chemical Analysis of Water and Wastes. Environmental Protection Agency, Cincinnati, Ohio. (or latest version).

3. Golterman, H. L. (ed.). 1969. Methods for Chemical Analysis of Fresh Waters, Internat. Biol. Program Handbook No. 8, Blackwell Sci. Pub., Oxford. 166 p. (or latest version).

Table 6.1-8

Location of limnological stations and parameters sampled at each in Conowingo Pond. Key: a-zooplankton, b-benthos, c-chemistry, d-oxygen, e-temperature and f-light penetration. Depths are given in parentheses.

| Station | Description | Parameter Sampled |
|---|---|---|
| 630 | Holtwood Steam Electric Station - outlet pipe for circulating water pump 17-B | a,c,e |
| 601 | Mid-pond off mouth of Fishing Creek (16) | a,b,c,d,e,f |
| 602 | Point off Dorsey Road north of Peach Bottom Atomic Power Station (11) | a,b,e,f |
| 603 | Mid-pond just below towers off Mt. Johnson Island (18) | a,b,e,f |
| 604 | Point off east shore south of Mt. Johnson Island (10) | a,b,c,d,e,f |
| 605 | Point just below south end of discharge canal Peach Bottom Atomic Power Station (15) | a,b,c,d,e,f |
| 606 | Mid-pond off mouth of Peters Creek (9) | a,b,e,f |
| 607 | Point just upriver from mouth of Peters Creek (9) | a,b,c,d,e,f |
| 608 | West shore just north of Williams Tunnel (24) | a,b,e,f |
| 609 | Between west shore and mid-pond off Michael Run (26) | a,b,e,f |
| 610 | Mid-pond off Broad Creek (38) | a,b,e,f |
| 611 | Mid-pond off Hopkins Cove (68) | a,b,c,d,e,f |
| 640 | Conowingo Hydro-electric Plant - outlet pipe for Unit No. 1 | a,c,e |

Amendment No. 25

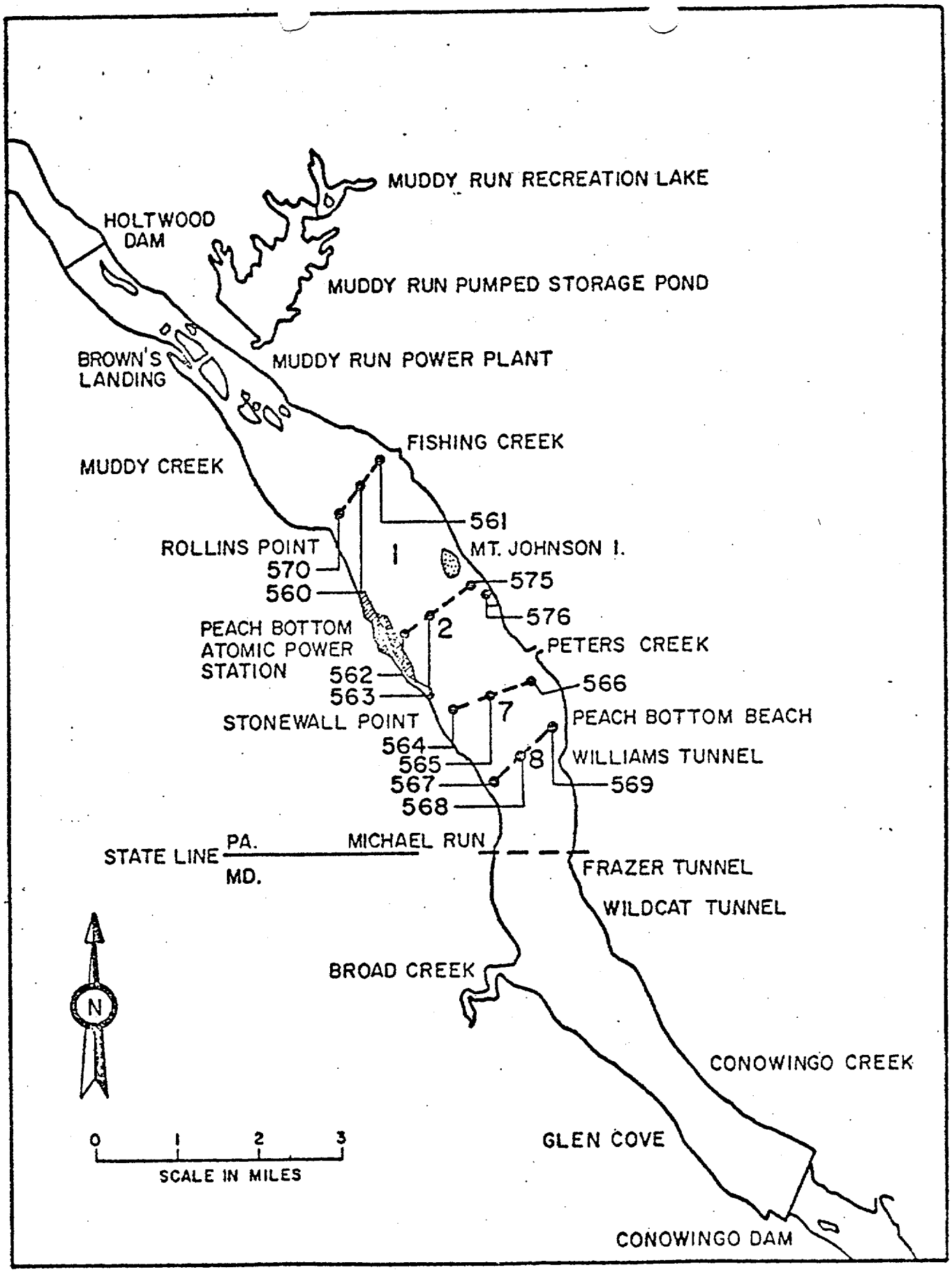



FIGURE 6.1-7 MAP OF CONOWINGO POND SHOWING THE LOCATION OF PLANKTON NET STATIONS ON TRANSECTS 1,2,7 AND 8 (DASHED LINES)

6.1.b Impingement of Organisms

Objectives

The principal objectives of the Impingement Study are to: (1) to determine the species composition, and (2) quantify the number of fishes which may become impinged on the circulating water intake screens.

Specification

The fish collected at the intake screen trash pit will be surveyed twice weekly for the first three months of Unit No. 2 operation. The number, species and size of each fish collected during the past two twelve hour periods will be catalogued. These data will then be compared to previous screen surveys and analyzed to determine the impact to the ecology of the pond caused by the intake screens.

During the first year of plant operation, a one time measurement of water velocities will be made across the face of the intake screens at the water surface, mid-water and bottom.

Bases

This survey and subsequent data analysis will aid in determining the effectiveness of the intake design in minimizing the environmental impact.. These data will be reported as per Section 7.4.

6.1.c Entrainment of Planktonic Organisms

Objective

The objectives of the entrainment studies are to determine (1) species composition, (2) abundance, (3) effects of entrainment on organisms and (4) impact to the pond ecology due to entrainment.

Specification

In order to obtain estimates of the amount of organisms passing through the circulating water system, a sampling program was established. The first phase of the studies will consist of sampling during the initial start-up of the circulating water system. This initial start-up will only circulate water through the various components of the system from the intake screens to the submerged discharge "jet" structure. Since there will be no heat added to the water at this time, it will allow an assessment

of mortalities due solely to mechanical damage. During the second phase, sampling will continue with varying heat load rejected to the circulating water system and varying station operating conditions. This will allow an estimation of organism mortalities relative to the various operating modes of the circulating water system.

Sampling locations have been established in the intake pond immediately before the service pump structure screen and near the southern end of the discharge canal. Sampling will be conducted twice a month* for zooplankton during the peak production period. During the spawning season, fish eggs and larvae will be sampled weekly**. The above sampling schedule will take place unless unusual conditions*** prevent the sample from being obtained. The studies will be terminated after the first year of Unit No. 3 operation (12 months after commercial operation begins).

Bases

One hundred percent mortality is assumed for planktonic organisms which pass through the condenser system, the cooling towers and the discharge canal. The cooling water intake will be carefully monitored under various operating conditions to quantitatively determine the extent of entrainment. Studies of the Conowingo Pond will continue for the purpose of assessing the effect of entrainment on the fish populations.

6.1.d Thermal Tolerances of Organisms

Objectives

The principal objectives of these studies are to determine: (1) temperature preference, (2) temperature avoidance, and (3) lethal temperatures for the various common species of fish in Conowingo Pond.

Specification

1. Temperature Preference Studies

The apparatus to be used for the preference study is illustrated in Figure 6.1-9. It consists of a trough having a stainless steel bottom. Water is introduced at one end of the trough from a temperature controlled circulating bath. As the water flows down the trough, it is heated by banks of infra-red bulbs beneath the stainless steel bottom to form a stationary horizontal thermal gradient. Each bank consists of bulbs connected to a dimmer switch and a temperature regulator. The intensity of each bank can be varied, as well as the length of time the bank is on. Upon reaching the other end of the trough, the water is returned to the circulating bath. Lighting is provided by "vita-Lites" which extend the length of the trough.

---

* ± 7 days

** ± 3 days

*** If Peach Bottom Atomic Power Station circulating pumps are not operating, no sampling will take place.

Amendment No. 25

The normal test procedure is as follows: initially the trough is filled with water of the acclimation temperature to a depth which will permit horizontal, but restrict vertical movement. Fish are then placed in the center of the trough and allowed free movement prior to establishment of a thermal gradient. Observations are made at regular intervals. The temperature at the position of each fish is recorded using thermistors (placed equidistant along the length of the trough) which are connected to a temperature readout. The test is concluded when the same temperature is selected continuously or if no preference is reached. Tests are terminated after approximately three hours because of reacclimation of fish to a temperature other than the original acclimation temperature.

2. Temperature Avoidance Studies

The avoidance design employed in these studies is a modification of that designed by Meldrim and Gift. In this design (Figure 6.1-10), temperature controlled circulating baths serve as a storage reservoirs. Water from the respective bath flows (via gravity-flow) into each end of the sub-troughs and drains from their centers, where it is recirculated to the temperature baths. Dye tests show a sharp boundary at the center drain. The apparatus is thus effectively divided into quadrants.

The normal test procedure is as follows: equal numbers of fish are placed into each quadrant. Two of the quadrants (on opposite ends of the respective subtroughs) contain water of the acclimation temperature ("T"), while the remaining two contain water of increased (or decreased) temperature "T+"). AFter the T+ quadrant stabilizes at a temperature above that of the T quadrant, Trial•Number 1 is initiated. The amount of time spent by each fish in each quadrant is measured (which constitutes a trial). The number of occurrences of fish in each quadrant is then multiplied by the amount of time they spent in the respective quadrants to give a frequency distribution for each quadrant. A t-test is then performed to determine if a significant difference exists between the distributions.

If no significant avoidance exists, the respective temperatures are then increased in a step-gradient fashion by increasing "T" and "T+" beyond their former points. The same fish are then tested at these new temperatures.

Oxygen and pH are measured at the end of each test. Oxygen is recorded in percent saturation (since the ppm value is temperature dependent) using temperature compensated oxygen analyzer probes. The pH is recorded using a pH meter. The thermal conditions are monitored by a temperature recorder connected to thermocouples along each sub-trough. Observations are made via closed-circuit television because the trough is enclosed for light level regulation.

3. Temperature Shock Studies

Response to rapid decreases and increases in temperature of approximately 10 to 21 F are usually determined for 96 hours. Responses noted are mortality and loss of equilibrium. Responses to temperature decreases are conducted in partitioned Plexiglass flow-through aquaria (Figure 6.1-11). The temperature in these aquaria generally fluctuates less than 1 F over a 96 hour period. All test containers are aerated. Fish are not fed prior to or during testing.

Temperature shock studies are normally conducted by exposing fishes to sudden temperature changes. The fish are transferred directly from water of their acclimation temperature into water 1 to 21 F cooler or warmer. Observations are made periodically over the first hour following introduction, and at 24-hour intervals over the 96-hour test period. Additional observations are generally made between one hour and 96 hours after a test has begun.

Bases

Bases portions of the Conowingo Pond will be affected by the heated discharge from Peach Bottom Atomic Power Station, it is desirable to have information about the thermal tolerances and preferences of the common fish found in the vicinity of the predicted plume.

The results of these studies will be presented in the semi-annual report as they become available.

## REFERENCE MATERIAL

### Thermal Tolerance Studies of Organisms

1. Meldrim, J. W. and J. J. Gift. 1971. Temperature preference, avoidance and shock experiments with estuarine fishes. Ichthyological Associates. Bull. 7. 75 p.

Amendment No. 25

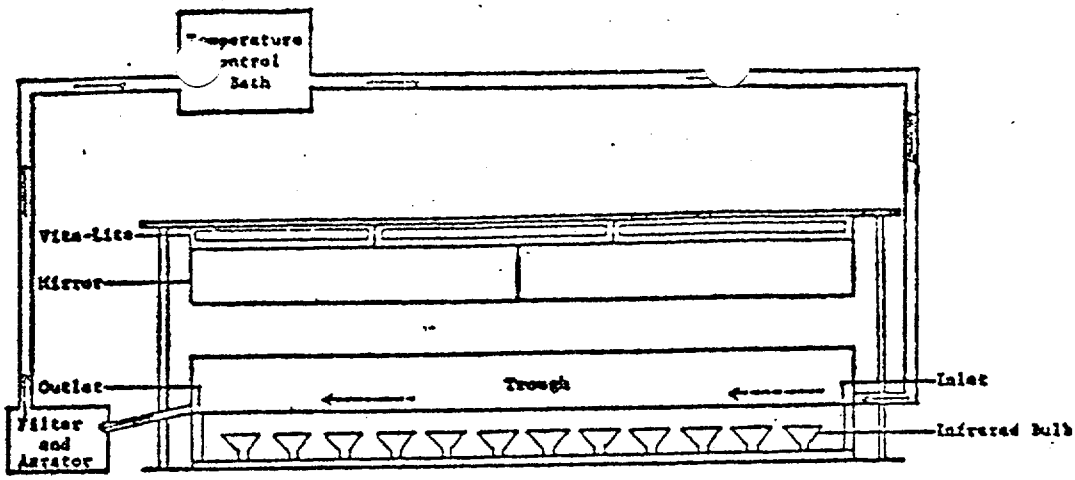



FIGURE 6.1-9

A schematic diagram of the modified Maldrin and Gift temperature preference unit. Arrows indicate direction of water flow.

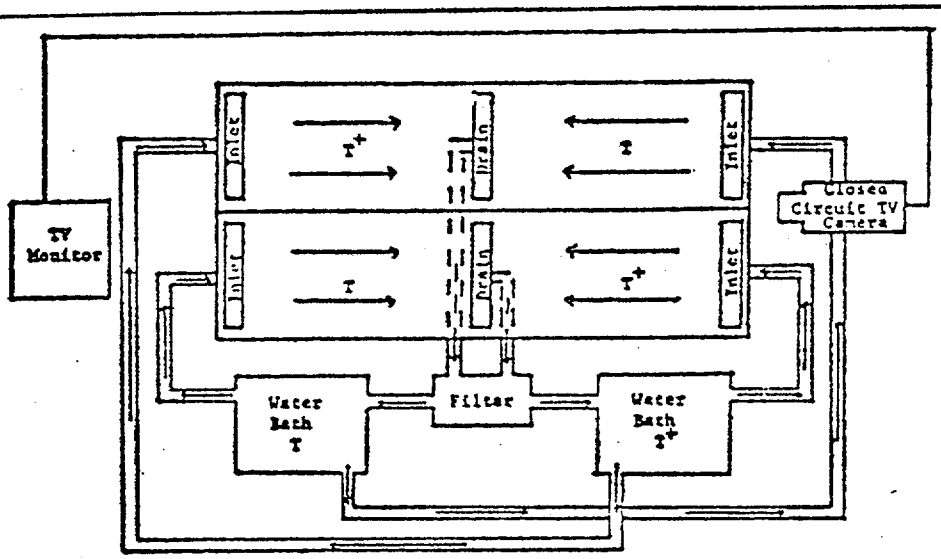
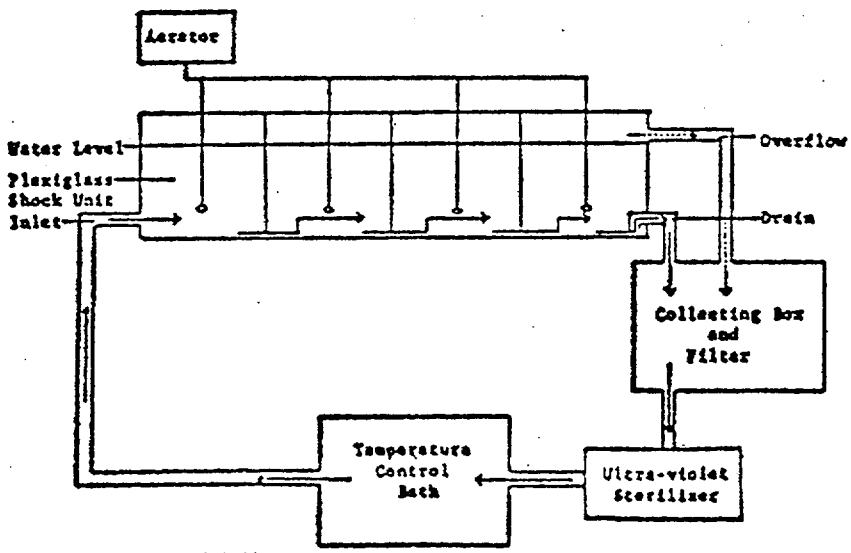



FIGURE 6.1-10

A schematic diagram of the modified Maldrin and Gift after Shelford-Allee avoidance design. Arrows indicate direction of water flow.




Amendment No. 25

FIGURE 6.1-11

A schematic diagram of the plexiglass shock unit. Arrows indicate direction of water flow.

Note: A small fish unit was 6" x 6" x 31" with eight evenly spaced compartments. The test unit had a screen 1½" from each end to prevent the escape of test specimens through inlet and drain.

A large fish unit (shown above) was 11"x12"x31" with four compartments

## 6.2 Chemical

### 6.2.a Biocides

Objective

To determine the optimum chlorination program which would minimize chlorine usage and releases, while keeping the heat exchanger equipment in serviceable condition.

Specification

A study will be made to determine minimum rates and duration of chlorine addition. The study will cover the period of the first year of one unit commercial operation.

During the study, the requirements for chlorine addition versus water quality will be monitored. The effectiveness and necessity of chlorine treatment will be gauged against heat exchanger performance.

Bases

The chlorine demand of the intake water does not normally change significantly from day to day, although significant seasonal variations do occur. Adequate monitoring can be achieved under steady state flow conditions by controlling the chlorine addition rate and daily monitoring of the residual chlorine in the discharge.

Results of this study will be reported as per Section 7.4.

### 6.2.b Heavy Metals

Objective

A monitoring program for heavy metals, such as copper, zinc, iron, cadmium, cobalt, nickel, chromium, and manganese, will be implemented. This study program will seek to determine if there is any heavy metal pick-up in the plant circulating water system.

Specification

At least once a month, samples will be collected at the station intake, upstream of the station intake, and at the circulating water system discharge to Conowingo Pond. These samples will be analyzed for the following metals: copper, zinc, cadmium, iron, cobalt, nickel, chromium, and manganese.

The water quality program as outlined above will continue for one year after Unit #2 begins commercial operation. At this time, the

collected data will be reviewed and those metal concentrations which are shown not to be significantly affected by plant operation will be eliminated from the program.

Bases

This study will provide information as to the degree and nature of heavy metal pick-up in the PBAPS circulating water system.

Data from this study will be reported as per Section 7.4.

6.3 Physical

6.3.a Thermal Plume Mapping

Objective

To determine the extent of the thermal plume in the Conowingo Pond and in the discharge canal resulting from the heated circulating water discharge, and to select a representative measurement that will accurately predict pond conditions.

Specification

A thermal monitoring program will be conducted essentially as described in Supplement No. 2 to "Applicant's Environmental Report-Operating License Stage" in the answer to question 24. Isothermal plots of the receiving waters shall be produced at 1°F intervals to show the results of plant operations under various conditions of load, stream flow, operations of hydroelectric plants, meteorological conditions and ambient stream temperatures. Such plots shall indicate both surface and depth temperature distribution and shall be determined by model tests and prototype monitoring. A minimum number of continuously monitoring temperature sensors shall be determined to accurately predict pond conditions. Twice a month, weather conditions permitting, data will be collected utilizing a motor boat mounted temperature recorder.

Discharge canal water temperatures shall be monitored monthly using the temperature measurement points at the outlet of the discharge pond into the discharge canal, at the discharge point of each cooling tower, and at the discharge point to Conowingo Pond.

Bases

Hydraulic model tests have been completed to predict the extent of the thermal plume. However, the model does not account for the effect of meteorological conditions and other phenomena occurring in the prototype. Thermal mapping of the prototype will be performed with one and two unit operation.

The results shall be reported to the Commonwealth of Pennsylvania Department of Environmental Resources as required under the Industrial Waste Permit No. 5681011. The results shall be reported to the NRC as per Section 7.4, except that reporting shall be on a monthly basis.

6.3.b. Erosion

Objective

To determine the amount of erosion near the discharge structure.

Specification

Detail drawings shall be provided showing survey data to define the location and elevations of the shore line and the river bottom with respect to the discharge structure prior to operation.

Bases

Post-operational surveys shall be conducted if annual visual inspection reveals excessive erosion. Results of these surveys shall be reported as per Section 7.4.

6.4 Radiological Study Program

Objective

An environmental monitoring program shall be conducted to evaluate the effects of station operation on the environs and to verify the effectiveness of the source controls on radioactive materials.

Specification

The environmental radiation monitoring program shall be conducted as specified in Table 6.4-1. Milk will be analyzed for I-131 such that at the level of 0.5 picocuries per liter of milk at the time of sampling, or as close to this sensitivity as can be achieved using proven commercial techniques, the overall one sigma counting error is equal to or less than 25 percent of the activity measure.

Bases

In connection with the high temperature gas-cooled reactor (HTGR) located at the Peach Bottom Atomic Power Station, a pre-operational environmental radiation survey was conducted between March 1960 and February 1966, at which time this reactor first achieved criticality. The objective of the program was to acquire quantitative data on the concentration of radioactivity in environmental media in the vicinity of the reactor site prior to the operation of the HTGR facility.

The environmental radiation monitoring program carried out prior to February 1966 has continued, with minor modifications from time to time in order to acquire similar data after the initial operation of Unit No. 1. A similar program will continue after initial operation of Units 2 and 3 in order to monitor environmental radioactivity levels in the Peach Bottom area.

TABLE 6.4-1

ENVIRONMENTAL RADIATION MONITORING PROGRAM

| Media | Type and Frequency of Analysis (a) | Type of Sample | Sample Collection Frequency (b) | Number of Samples Taken at a Location | Location |
|---|---|---|---|---|---|
| 1. Ambient Radiation | Gamma | Cumulative Dose | Quarterly | One each at any three on-site locations. One each at any four off-site locations. | Five locations on Peach Bottom Site and seven locations off-site. |
| 2. Airborne Particulate | Gross Beta | Continuous flow through filter paper | Filter paper collected weekly | One each from any five locations | Peach Bottom Site<br>Delta, Pa.<br>Holtwood Dam<br>Conowingo Dam<br>Wakefield, Pa.<br>Philadelphia, Pa. |
| | Gamma Spectrum | | Monthly on composite of weekly samples | | |
| 3. Water | | | | | |
| a. Fallout Water | Gross Beta | Collected continuously to form composite sample | Monthly | One at either location | Peach Bottom Site<br>Conowingo Dam |
| b. River Water | Gross Alpha<br>Gross Beta<br>Gamma Spectrum | Spot | Monthly | One from each location | Holtwood Dam<br>Conowingo Dam<br>Unit #2 and 3 Intake<br>Pond near Chester Water Intake |
| | Tritium | Spot | Quarterly | One from each location | Conowingo Dam<br>Holtwood Dam<br>Pond near Chester Water Intake |
| c. Discharge Water | Gross Alpha<br>Gross Beta<br>Gamma Spectrum<br>Tritium | Spot | Monthly | One | Discharge Canal Exit (c) |
| 4. Milk | Iodine-131 | Spot | Weekly during grazing period; Monthly during non-grazing period | One each from any six locations (d) | Eight Regional Farms |
| | Gross Beta | Spot | Quarterly | One each from any six locations (d) | Eight Regional Farms |
| 5. Vegetation | Gross Beta<br>Strontium-89 & 90 combined or separately<br>Cesium-137 | Stems, leaves and fruit; foods whenever available | Spring, Summer and Fall | One each from any three locations | Peach Bottom Site Area<br>Delta, Pa.<br>Holtwood, Pa.<br>Conowingo Dam<br>Wakefield, Pa. |
| 6. Fish | Gross Beta;<br>Gamma Spectrum (all fish of each species as one sample) | Two species (if available) | Quarterly (no sample when ice conditions prevail) | One per species | Conowingo Pond |
| 7. Game Animals | Gross Beta of edible portions.<br>I-131 of Thyroid<br>Strontium - 89 & 90 combined or separately of bone | Game Animals | Semi-annually | One | Peach Bottom Site Area |
| 8. Earth | Gross Beta<br>Gamma Spectrum | Spot | Semi-annually | One from each location | Peach Bottom Site Area<br>Delta, Pa. |
| 9. Silt | Gross Alpha<br>Gross Beta<br>Gamma Spectrum<br>Strontium - 89 & 90 combined or separately | Spot | Semi-annually | One from each location | Peach Bottom Site Area<br>Holtwood Dam Area<br>Conowingo Dam Area |

(a) Frequency of each type of analysis is the same as the frequency of sample collection except where noted.

(b) Sample collection frequency periods are defined as follows:

Weekly - 7 calendar days beginning on Sunday ± 3 days.
Monthly - a calendar month ± 15 days.
Quarterly - a three month calendar period beginning January 1, April 1, July 1, or October 1 ± 45 days.
Semi-Annually - a six month calendar period beginning January 1 or July 1 ± 90 days.
Annually - a calendar year ± 90 days.
Spring, Summer, Fall - the calendar quarters beginning April 1, July 1, and October 1 respectively ± 45 days.

(c) Sample is taken after radwaste discharge is diluted and mixed with the condenser circulating water discharge.

(d) Reasonable effort will be made to obtain one of the milk samples from the farm which Philadelphia Electric Company calculations indicate can produce the highest annual average human exposure via the cow-milk chain when the fall originating from fields. Reasonable efforts should also be made to obtain one of the milk samples from the nearest farm having cows.



Amendment No. 25

LEFT BLANK INTENTIONALLY

LEFT BLANK INTENTIONALLY

LEFT BLANK INTENTIONALLY

LEFT BLANK INTENTIONALLY

LEFT BLANK INTENTIONALLY

## 7.4 Plant Reporting Requirements

### 7.4.1 Routine Reports

In addition to the environmental monitoring information required by Section 6.9.3.h of Appendix A to the Operating License, the following information shall be submitted in an annual report:

A. Records of special study programs data and analysis thereof.

B. Records of changes to the plant which affect the environmental impact of the facility.

C. Records of changes to environmental permits and certificates.

### 7.4.2 Non-Routine Reports

A. Environmental Deviation Reports

In the event of an environmental deviation as defined in the environmental technical specifications, notification shall be made within 24 hours by telephone or telegraph to the Director of the NRC Regional Inspection and Enforcement Office. A written report shall follow within 10 days to the Director of Nuclear Reactor Regulation (copy to the Director of Regional Inspection and Enforcement Office).

The written report on an environmental deviation, and to the extent possible, the preliminary telephone and telegraph notification, should: (a) describe, analyze, and evaluate implications, (b) determine the cause of the occurrence and (c) indicate the corrective action (including any significant changes made in procedures) taken to preclude repetition of the occurrence and to prevent similar occurrences involving similar components or systems.

B. Reporting of Changes to the Plant or Permits

A written report, including an evaluation of the environmental impact resulting from a change, shall be forwarded to the Director, Office of Nuclear Reactor Regulation (copy to the Director of the Regional Inspection and Enforcement Office) in the event of:

1. Changes to the plant that affect the environmental impact evaluation contained in the Environmental Report or the

Amendment No. 25

Environmental Statement. This requirement does not preclude making changes on short notice that are minor in terms of environmental impact.

2. Changes or additions to permits and certificates required by Federal, State, local and regional authorities for the protection of the environment. When submittals of changes are made to the concerned agency, a copy shall be submitted to the NRC.

3. Requests for changes in environmental technical specifications.

7.5 Records Retention

7.5.1 Records Retained for 5 Years

Records and/or logs relative to the following items shall be kept in a manner convenient for review and shall be retained for 5 years, unless a longer period is required by applicable regulations.

1. Records of principal maintenance activities of equipment pertaining to environmental impact.

2. Records of environmental deviations.

3. Records of periodic checks, inspections and/or calibrations performed to verify that environmental surveillance requirements are being met.

4. Records of any special study programs specified in Section 6.0.

5. Records of changes made to operating procedures, equipment, permits and certificates.

7.5.2 Records Retained for the Life of the Plant

The following records and/or logs will be retained for the life of the plant:

1. Records of off-site environmental radiation monitoring surveys.

Amendment No. 25

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKETS NOS. 50-277 AND 50-278

PHILADELPHIA ELECTRIC COMPANY
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

Notice is hereby given that the U. S. Nuclear Regulatory Commission (the Commission) has issued Amendments Nos. 26 and 25 to Facility Operating Licenses Nos. DPR-44 and DPR-56, respectively, issued to Philadelphia Electric Company, Public Service Electric and Gas Company, Delmarva Power and Light Company, and Atlantic City Electric Company, which revised Technical Specifications for operation of the Peach Bottom Atomic Power Station, Units Nos. 2 and 3, located in Peach Bottom, York County, Pennsylvania. The amendments are effective as of the date of issuance.

The amendments will revise the provisions in the Technical Specifications relating to the Aquatic Environmental Surveillance and Special Study Programs conducted to monitor the effects of the operation of Units Nos. 2 and 3 on the aquatic community in Conowingo Pond.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental statement, negative declaration or environmental impact appraisal need not be prepared in connection with issuance of these amendments.

For further details with respect to this action, see (1) the application for amendments dated September 15, 1975 and (2) Amendments Nos. 26 and 25 to Licenses Nos. DPR-44 and DPR-56. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W. Washington, D. C. and at the Martin Memorial Library, 159 E. Market Street, York, Pennsylvania 17401.

A copy of item (2) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 24 day of September 1976.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors