50 - 315

NOV 8 1978

Docket Nos. 50-315
and 50-316

Indiana and Michigan Electric Company
Indiana and Michigan Power Company
ATTN: Mr. John Tillinghast
Vice President
Post Office Box 18
Bowling Green Station
New York, New York 10004

Gentlemen:

The Commission has issued the enclosed Amendment Nos. 26 and 8 to Facility Operating License Nos. DPR-58 and DPR-74 for the Donald C. Cook Nuclear Plant, Units 1 and 2. The amendment consists of changes to the Appendix B Environmental Technical Specifications and responds to your application dated March 1, 1978.

These changes are related to deicing measurements, water chemistry in plant systems, chemical discharges, thermal discharge surveillance, groundwater (well) monitoring, termination of biota monitoring, changes in reporting requirements to conform to NRC guides, deletion of one time requirements (equipment and reports) that have been met, automatic isolation of waste gas storage volume, milk background monitoring and miscellaneous minor editorial changes.

Your March 1, 1978 application contained a proposal which would change the allowable chlorine discharge limits (Section 2.2.1.2). This proposal will be resolved by the staff in a separate action at a later date.

These amendments also reflect certain changes or differences from your application. These changes have been discussed with and agreed to by your staff.

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Cont. 1
GD

OFFICE ➤						
SURNAME ➤						
DATE ➤						

NRC FORM 318 (9-76) NRCM 0240 ★ U.S. GOVERNMENT PRINTING OFFICE: 1978 - 265 - 769

Copies of the Environmental Impact Appraisal and the Notice of Issuance and Negative Declaration are also enclosed.

Sincerely,

Original Signed By

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 24 to DPR-58
2. Amendment No. 8 to DPR-74
3. Environmental Impact Appraisal and Safety Evaluation
4. Notice of Issuance/Negative Declaration

cc: w/enclosures
See next page

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and 50-316
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DATE	11/9/78	11/9/78		11/8/78	11/6/78	11/18/78

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

November 8, 1978

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and 50-316

Indiana and Michigan Electric Company
Indiana and Michigan Power Company
ATTN: Mr. John Tillinghast
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Post Office Box 18
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Sincerely,

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 26 to DPR-58
2. Amendment No. 8 to DPR-74
3. Environmental Impact Appraisal and Safety Evaluation
4. Notice of Issuance/Negative Declaration

cc: w/enclosures
See next page

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

INDIANA AND MICHIGAN ELECTRIC COMPANY

INDIANA AND MICHIGAN POWER COMPANY

DOCKET NO. 50-315

DONALD C. COOK NUCLEAR PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.26
License No. DPR-58

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

   A. The applications for amendment by Indiana and Michigan Electric Company and Indiana & Michigan Power Company (the licensees) dated March 1, 1978, comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and 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;

   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; and

   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 changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. DPR-58 is hereby amended to read as follows:

(2) Technical Specification

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 26 , are hereby incorporated in the license. The licensees shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 8, 1978

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

INDIANA AND MICHIGAN ELECTRIC COMPANY

INDIANA AND MICHIGAN POWER COMPANY

DOCKET NO. 50-316

DONALD C. COOK NUCLEAR PLANT UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 8
License No. DPR-74

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

   A. The applications for amendment by Indiana and Michigan Electric Company and Indiana & Michigan Power Company (the licensees) dated March 1, 1978, comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and 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;

   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; and

   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 changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. DPR-74 is hereby amended to read as follows:

(2) Technical Specification

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 8 , are hereby incorporated in the license. The licensees shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 8, 1978

50-315 11-8-78

* The correct page (4.2-10) is included in the amendment package. Page 4.2-9 was listed inadvertently.

Hazel Smith/
12/1/78 M Mylyniczak

MEMORANDUM OF CALL

TO:

☐ YOU WERE CALLED BY— ☐ YOU WERE VISITED BY—

OF *(Organization)*

☐ PLEASE CALL → PHONE NO. CODE/EXT. ☐ FTS

☐ WILL CALL AGAIN ☐ IS WAITING TO SEE YOU

☐ RETURNED YOUR CALL ☐ WISHES AN APPOINTMENT

MESSAGE

RECEIVED BY	DATE	TIME

63-109

STANDARD FORM 63 (Rev. 8-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.6

ATTACHMENT TO LICENSE AMENDMENT NOS. 26 AND 8

FACILITY OPERATING LICENSE NOS. DPR-58 AND DPR-74

DOCKET NOS. 50-215 AND 50-216

Revise Appendix B as follows:

Remove	Insert
iii	iii
iv	iv
1.1-1	1.1-1
2.1-1	2.1-1
2.1-2	2.1-2
2.1-4	2.1-4
2.2-1	2.2-1
2.2-3	2.2-2
2.2-4	2.2-3
2.2-5	2.3-1
2.2-5a	2.4-3
2.2-6	2.4-8
2.3-1	2.4-18
2.4-3	3.1-1
2.4-8	4.1-1 - 4.1-39
2.4-18	4.2-9 — 4.2-10 See note
3.1-1, 3.2-1, 3.3-1	5.4-2
3.3-2	5.4-2a
4.1-1 - 4.1-36	5.4-6
4.2-10	5.4-7
5.4-2	
5.4-6	

Table of Contents (Cont'd)

Table of Contents (Cont'd)

1 DEFINITIONS

The following terms are defined for uniform interpretation of these specifications.

1.1 ABNORMAL ENVIRONMENTAL OCCURRENCE (AEO)

An abnormal environmental occurrence is one that:

1.1.1 Results in noncompliance with, or is in violation of, the specifications section of a limiting condition for operation (section 2).

1.1.2 Results in uncontrolled or unplanned release of chemical, radioactive, thermal, or other discharges from the Donald C. Cook Nuclear Plant in excess of the applicable regulations of governing agencies, or

1.1.3 Results in a significant adverse environmental impact.

1.2 ABSORPTION FIELD

The area where plant waste water which includes sewage plant effluent is discharged on the ground and absorbed into it with no surface water runoff. This area is shown as sanitary waste ponds and process waste pond in Figure 4.1.1.5-1.

1.3 AMBIENT LAKE WATER TEMPERATURE

The temperature of the water in the upper one meter in the vicinity of the Plant in the absence of any influence of Plant Operation.

1.4 APPARENT AVERAGE MONTHLY GROWTH

Used with periphyton. The average of replicate monthly samples of periphyton growth. Essentially an estimate of net productivity minus some loss by wave action and grazing by herbivores.

1.5 AQUATIC LIFE

1.5.1 Benthos - macroscopic aquatic invertebrate animals living on or in the sediment.

1.5.2 Macrophyte - rooted aquatic plant.

2 LIMITING CONDITIONS FOR OPERATION

2.1 THERMAL

2.1.1 MAXIMUM CONDENSER ΔT AND MAXIMUM DISCHARGE TEMPERATURE DURING DEICING

2.1.1.1 Objective

The purpose of this specification is to limit the thermal stress to which aquatic organisms will be subjected during the travel time through the condenser outlet and to the point of discharge in the lake.

2.1.1.2 Specification

1. The maximum condenser ΔT shall not exceed $22^{o}F \pm 1^{o}F$ for Unit No. 1 and $17^{o}F \pm 1^{o}F$ for Unit No. 2 except as authorized in this specification.

2. Under conditions of deicing, the discharge temperature for Unit No. 1 shall not exceed the smaller of $62^{o}F$ or $24^{o}F$ in excess of the intake temperature; the discharge temperature for Unit No. 2 shall not exceed the smaller of $56^{o}F$ or $18^{o}F$ in excess of the intake temperature except as authorized in this specification. During the estimated 1-hour period needed to stabilize deicing flow, these limits shall not apply.

3. In the event any of the circulating water pumps for Unit No. 1 and/or Unit No. 2 is/are removed from service because of malfunction beyond control of the Plant operations, the Unit affected may continue to operate with a resultant condenser ΔT in excess of that specified in 2.1.1.2.1 and 2.1.1.2.2 for no longer than 72 hours following pump shutdown; the maximum condenser ΔT during this 72-hour period for the unit affected shall not exceed $27^{o}F$ for Unit No. 1 or $20^{o}F$ for Unit No. 2. All periods during which any circulating water pump is out of service because of malfunction shall be reported in the annual Operating Report.

4. In the event the condenser ΔT for either unit exceeds the above limits, action as required in sections 5.2 and 5.4.2.1 will be immediately initiated to determine the cause. Appropriate corrective action, including power reduction as required, shall be initiated to restore the temperature within limits. Violations shall be reported as required in Sections 5.4.2.1 and 5.4.1.

2.1.1.3 Monitoring Requirements

1. Intake and discharge temperatures for each unit shall be monitored by recording instrumentation. The individual temperature points shall be recorded at least once every 2 minutes. The accuracy of the individual measurements shall be at least $\pm$ 1.0°F considering the overall accuracy of the thermocouple and the recorder. The sensitivity of the measuring circuit shall be at least $\pm$ 0.2°F.

2. If measurements cannot be made due to installed instrumentation system failure, intake and discharge temperatures shall be observed on thermometers or thermocouples located at thermowells located in the condenser water outlets and circulating water pump discharges. The intake and discharge temperature and condenser ΔT shall be determined and recorded every hour for each unit. Temperature instrument failures shall be corrected within 72 hours and automatic monitoring of temperature shall be resumed immediately.

2. The installed instrumentation employed for monitoring intake and discharge temperatures shall be alarmed to indicate a ΔT greater than 22°F + 1°F for Unit No. 1 and 17°F + 1°F for Unit No. 2 during periods of no deicing. During plant operation in the deicing mode, the installed instrumentation employed for monitoring the intake and discharge temperature shall be alarmed either to indicate a condenser ΔT greater than 24°F for Unit No. 1 and 18°F for Unit No. 2, or a discharge temperature greater than 62°F for Unit No. 1 and 56°F for Unit No. 2.

2.1.1.4 Basis

The maximum condenser ΔT is fixed by the plant design power level, the design of the turbine-condenser combination, and the circulating water flow rate. Organisms will be subjected to the maximum ΔT for the travel time from the condenser outlet to the discharge jet located in the lake. This is about 3 minutes. Subsequent to discharge, there is a rapid reduction in the temperature of the discharged water due to entrainment of cooler lake ambient water by the discharge jet.

Condenser ΔT's for the deicing mode are 2°F and 1°F, respectively, higher for Unit No. 1 and Unit No. 2 than for normal operation in periods of no deicing because the flowrate is reduced from normal due to greater system pressure losses. Allowing a 3°F increase in intake temperature due to the intentional intake of warm water during operation in the deicing mode, the maximum discharge temperature for Unit No. 1 at a 35°F local lake ambient temperatur is 35+3+24=62°F and the maximum discharge temperature for Unit No. 2 is 35+3+18=56°F. When the local lake ambient

2.1.3 DEICING OPERATION

2.1.3.1 Objective

The purpose of this specification is to limit possible adverse effects on the lake biota due to deicing operation, while allowing the prevention of ice buildup on the intake structural frames and trash grills.

2.1.3.2 Specification

1. The deicing procedure of pumping heated water on the offshore intake structure may only be initiated when the intake temperature is 35°F or lower, or there is more than 1 foot of drawdown in the forebay (not caused by starting a pump).

2. Operation of the deicing mode shall be recorded and reported in the annual Operating Reports. The temperature when deicing was initiated shall be reported as if it was above 35°F.

3. Deicing shall be terminated when the intake temperature as measured at the circulating water pumps outlet is 36°F or higher for a period of 7 consecutive days.

4. Violations shall be reported within 30 days as specified in Section 5.4.2.1 and also in the annual Environmental Operating Report as specified in Section 5.4.1.

2.1.3.3 Monitoring Requirements

Recording of intake temperatures shall be as specified in Section 2.1.1.3.

2.1.3.4 Basis

The period when deicing is permitted is controlled to limit thermal stress to aquatic biota at times of the year when deicing operation is not required to maintain free flow of cooling water.

The temperature limitation for initiation of the deicing procedure is intended to minimize stress to the lake biota.

The criterion of an intake temperature of 35°F or lower prior to starting deicing was established to allow the plant operators sufficient latitude in initiating this operation since local lake temperatures can vary significantly in a relatively short period of time. Also, it is known that the phenomenon of frazil ice buildup can occur at water temperatures above 32°F. Prevention of ice buildup rather than removal of ice is desirable, since, once ice formation has been initiated, subsequent builup is rapid and there would be risk that flow would be interrupted or restricted.

The screenhouse forebay water level is automatically measured and transmitted to the control room to indicate possible icing conditions and effectiveness of deicing.

2.2 CHEMICAL

2.2.1 CHLORINE

2.2.1.1 Objective

The purpose of this specification is to limit potentially adverse effects on lake biota by limiting the release of chlorine to the aquatic environment while inhibiting slime growth and subsequent impairment of heat transfer capability in the main condensers and ancillary heat exchangers.

2.2.1.2 Specification

In the plant discharge to the lake, the total residual chlorine shall not exceed 0.1 ppm except, if the licensee selects option (b) of Section 2.2.1.3, total chlorine residuals may exceed 0.1 ppm for short perods during which supporting data are being collected. At no time, however, shall total chlorine residuals exceed 0.5 ppm at the lake discharge. Chlorination shall be restricted to only one unit at any time. The total time of chlorination shall not exceed 1-1/2 hours per day, per unit.

Records of all periods of chlorination and all chlorine concentrations measured in water discharged to the lake during periods of experimentation sahll be included in the annual Operating Report. Any violations shall be reported within 30 days as specified in Sections 5.4.2.1 and 5.4.1.

2.2.1.3 Monitoring Requirements

At the option of the licensee, the concentrations of the free and total residual chlorine discharged shall be (a) directly monitored or (b) calculated through the use of a method (to include indirect monitoring) that has been approved by the Regulatory staff. In either case, a permanent record shall be kept of the monitoring results.

If option (b) is selected, the calculation method and supporting data shall be submitted for approval by the Regulatory staff no later than 90 days after Unit No. 1 has accumulated 6 months operation at a power level greater than 50 percent.

Monitoring shall be done by the amperometric method or another method with equal or better accuracy. If option (b) is selected, accuracy and sensitivity of the monitoring method and the accuracy of the method of

calculation shall be included in the supporting data submitted to the Regulatory staff at the time that approval of the calculation method is requested. If option (a) is selected, the accuracy and sensitivity of the monitoring method shall be communicated to the Regulatory staff by the time the equipment is installed or the method is first used following the effective date of the operating license.

For either option monitoring shall be either (i) continuous for all periods of chlorination or (ii) total chlorine concentrations determined not less frequently than once each time each unit is chlorinated. This minimum-frequency determination shall be made when the total residual chlorine concentration is expected to be maximum. The time of determination shall be selected by the licensee and submitted to the Regulatory staff for approval, together with supporting data.

2.2.1.4 Basis

Based on an NRC staff review, the total chlorine concentration of 0.1 ppm intermittently in the discharge from the Cook Nuclear Plant for no longer than 1-1/2 hours per day from each unit is not expected to be damaging to the fish and fish-food organisms in Lake Michigan. There is restriction against discharging chlorine from both units at the same time in order to limit the size of the dilution-reaction zone for chlorine near the point of discharge.

It is expected that, during chlorination of either Unit, the level of chlorine at the discharge to the lake will be below that in the discharge from the condensers. If the level in the discharge to the lake is to be known, it must be measured (a) directly (requiring sampling at an impractical and, at times, inaccessible location) or (b) at some upstream position (e.g., at a condenser outlet) and calculation made of the loss of chlorine during passage from the point of sampling to the point of discharge. The basis of the calculation must be confirmed with actual data, probably on a periodic basis.

The actual chlorine feed rate must be established on the basis of preoperational and operational testing. If low levels of total chlorine residual cannot inhibit slime growth, then either the limit on the level of chlorine at the discharge will have to be raised or alternative means of controlling slime growth will have to be employed.

Pages 2.2.3, 2.2.4, 2.2-5, 2.2-5a, 2.2-6, Deleted.

Amendment No. 26, Unit 1
Amendment No. 8, Unit 2

2.3 HYDRAULIC

See Section 4.1.

Section 5.4 of these specifications. Estimates of the sampling and analytical errors associated with each reported value shall be included.

b. Prior to release of each batch of liquid waste, a representative sample shall be taken from that batch and analyzed for the concentration of each significant gamma energy peak in accordance with Table 2.4-1 to demonstrate compliance with Specification 2.4.1 using the flow rate of the stream into which the waste is discharged during the period of discharge.

c. Sampling and analysis of liquid radioactive waste shall be performed in accordance with Table 2.4-1. Prior to taking samples from a monitoring tank, at least two tank volumes shall be recirculated.

d. The radioactivity in liquid wastes shall be continuously monitored during release. Whenever these monitors are inoperable for a period not to exceed 72 hours, two independent samples of each tank to be discharged shall be analyzed and two plant personnel shall independently check valving prior to the discharge. If these monitors are inoperable for a period exceeding 72 hours, no liquid waste tank shall be released and any release in progress shall be terminated.

e. The flow rate of liquid radioactive waste shall be measured during release.

f. All liquid effluent radiation monitors shall be calibrated at least quarterly by means of a radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall also have a functional test monthly and an instrument check prior to making a release.

g. The radioactivity in steam generator blowdown shall be continuously monitored and recorded. Whenever these monitors are inoperable, the blowdown flow shall be diverted to the waste management system and the direct release to the environment terminated.

Bases: The release of radioactive materials in liquid waste effluents to unrestricted areas shall not exceed the concentration limits specified in 10 CFR Part 20 and should be as low as practicable in accordance with the requirements of 10 CFR Part 50.36a.

c. (2) If the average release rate of all iodines and radioactive materials in particulate form per site with half-lives greater than 8 days during any calendar quarter is:

$$7.3 \times 10^{6} Q_{\nabla} > 1$$

c. (3) If the amount of iodine-131 released during any calendar quarter is greater than 0.5 Ci/reactor.

d. During the release of gaseous wastes from the primary system waste gas holdup system the effluent monitors listed in Table 2.4-4 shall be operating and set to alarm and to initiate the automatic closure of the waste gas discharge valve prior to exceeding the limits specified in 2.4.3a, above. The operability of each automatic isolation valve shall be demonstrated quarterly.

e. The maximum activity to be contained in one waste gas storage tank shall not exceed 438,000 curies (considered as Xe-133).

2.4.4 Specifications for Gaseous Waste Sampling and Monitoring

a. Plant records shall be maintained and reports of the sampling and analyses results shall be submitted in accordance with Section 5.4 of these Specifications. Estimates of the sampling and analytical error associated with each reported value should be included.

b. Gaseous releases to the environment, except from the turbine building ventilation exhaust and as noted in Specification 2.4.4.c, shall be continuously monitored for gross radioactivity and the flow continuously measured and recorded. Whenever these monitors are inoperable, grab samples shall be taken and analyzed daily for gross radioactivity. If these monitors are inoperable for more than 7 days, these releases shall be terminated.

c. During the release of gaseous wastes from the primary system waste gas holdup system, the gross activity monitor, the iodine collection device, and the particulate collection device shall be operating.

d. All waste gas effluent monitors shall be calibrated at least quarterly by means of a known radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall have a functional test at least monthly and instrument check at least daily.

e. Sampling and analysis of radioactive material in gaseous waste, particulate form, and radioiodine shall be performed in accordance with Table 2.4-2.

Table 2.4-4

PWR-Gaseous Waste System

LOCATION OF PROCESS AND EFFLUENT MONITORS AND SAMPLES REQUIRED BY TECHNICAL SPECIFICATIONS

Process Steam or Release Point	Alarm	Auto Control to Isolation Valve	Continuous Monitor	Grab Sample Station	NG	Measurement I	Part	H-3	Alpha
Waste Gas Storage Tanks***	x		x	x	x	x	x	x	x
Condenser Air Ejector	x		x	x	x	x	x	x	x
Vent Header System*	x		x	x	x	x	x	x	x
Building Ventilation Systems	x								
Reactor Containment Building (whenever there is flow)	x	x	x	x	x	x	x	x	x
Auxiliary Building*	x	x***	x	x	x	x	x	x	x
Fuel Handling & Storage Building*	x		x	x	x	x	x	x	x
Radwaste Building*	x		x	x	x	x	x	x	x
Steam Generator Blowdown Tank Vent or Condenser Vent*	x		x	x	x	x	x	x	x
Turbine Gland Seal Condenser	x		x	x	x	x	x	x	x
Waste Evaporator Condenser Vent	x		x	x	x	x	x	x	x

*If any or all of the process streams or building ventilation systems are routed to a single release point, the need for a continuous monitor at the individual discharge point to the main exhaust duct is eliminated. One continuous monitor at the final release point is sufficient.

**In some PWR's the steam generator blowdown tank vent is routed to the main turbine condenser and the need for a continuous monitor at this release point is eliminated.

***The auxiliary Building ventilation monitor will isolate the Waste Gas Storage Tanks.

Section 3 Deleted, pp. 3.1-1 thru 3.3-2

Amendment No. 26, Unit 1
Amendment No. 8, Unit 2

4 ENVIRONMENTAL SURVEILLANCE

4.1 ECOLOGICAL SURVEILLANCE

Applicability and Objective of Environmental Surveillance

The nonradiological environmental monitoring program applies to the monitoring of lake water temperature distribution, Plant discharge of chemicals, lake bottom scouring, beach erosion, biological variables in Lake Michigan and on the Plant site itself, to the specifications for onsite and offsite restoration and maintenance of transmission line rights-of-way, and studies to demonstrate that mixing zone standards will be met.

The objectives of the program are to determine (1) the relationship between the thermal plant discharge and the physical and biological characteristics of the lake water masses in the vicinity of the Plant site; (2) the aquatic ecology of this portion of the lake (Southeastern corner of Lake Michigan from the St. Joseph River to Trail Creek in Michigan City, Indiana); (3) the effects of the operation of the Donald C. Cook Nuclear Plant on the physical, chemical, and biological variables of this portion of Lake Michigan and the Plant site including the beach; and (4) to minimize adverse impacts on terrestrial and aquatic biota within and adjacent to transmission rights-of-way.

4.1.1 ABIOTIC

4.1.1.1 Biocides

A program for measuring or calculating the chlorine residual at the point of discharge to the lake is given in Specification 2.2.1.

4.1.1.2 Thermal Characteristics

Applicability

Applies to measurements of the distribution of temperature in the treated effluent discharged from the D. C. Cook Station into Lake Michigan.

Objective

The objectives of monitoring the lake water temperature in the region near the plant are to:

(i) determine the thermal characteristics of the lake within the defined study area;

(ii) determine the size, shape, and location of the thermal plume under different wind and lake current conditions;

(iii) determine if the thermal discharge is in compliance with the thermal criteria of the Michigan Water Resources Commission.

Specification

The thermal discharges resulting from operation of D. C. Cook, Units 1 and 2 shall be limited so as not to exceed the appropriate thermal criteria of the Michigan Water Resources Commission which presently are:

Rule 1070. (1) The Great Lakes and connecting waterways shall not receive a heat load which would warm the receiving water at the edge of the mixing zone more than 3 degrees Fahrenheit above the existing natural water temperature.

(2) The Great Lakes and connecting waterways shall not receive a heat load which would warm the receiving water at the edge of the mixing zone to temperatures in degrees Fahrenheit higher than the following monthly maximum temperatures:

Lake Michigan south of a line due west from the city of Penwater:

J	F	M	A	M	J	J	A	S	O	N	D
45	45	45	55	60	70	80	80	80	65	60	50

Rule 1082. (1) "...For Lake Michigan, mixing zones shall not exceed a defined area equivalent to that of a circle of radius of 1,000 feet, unless the discharger can demonstrate to the Commission that the defined area for a thermal discharge is more stringent than necessary to assure the protection and propagation of a balanced indigeneous population of aquatic life and wildlife in the receiving water..." As determined by the Michigan Water Resources Commission, the mixing zone shall not exceed 570 acres $\pm$2.6%.

The spatial distribution of the thermal discharge plume under different wind and lake current conditions shall be determined during the first year of Station operation. The following elements of the discharge plume shall be measured:

(i) location of the centerline of the plume;

(ii) the rate of excess temperature decrease along the plume centerline;

(iii) the width of the plume;

(iv) the thickness of the plume;

(v) the depth of winter sinking of the plume.

Plume studies shall be initiated when Unit 1 begins operation at 75 percent of rated load and continue until 1 year of plume measurements are obtained from Units 1 and 2 operating at at least 75 percent of rated loads. During each year the program shall consist of at least four scheduled as follows:

1st study period:	15 February - 15 March
2nd study period:	15 April - 15 May
3rd study period:	15 June - 15 September
4th study period:	1 November - 1 December

Any of the above study periods is to be extended by 15 days whenever Unit outages such as refueling prevent completion of the desired number of plume resolutions. Each study period shall consist of a minimum of 5 sampling days. During each sampling day, a minimum of two plume resolutions shall be made. Plume studies are weather dependent, and the exact number of sampling days and plume resolutions will vary depending on seasonal weather conditions.

From these surveys, isotherm diagrams shall be prepared for the surface and depth profiles of the plume. The areas enclosed by the $3^{o}F$ excess temperature isotherm shall be determined. The areas and dimensions of these plume displays shall be compared with the results of the hydraulic and analytical models used to forecast the plume behavior. The effects of wind and other weather parameters shall be studied on the real plume and its behavior compared with that predicted by the models.

The areas within the $3^{o}F$ excess temperature isotherms determined by the thermal surveys shall be analyzed with concurrent meteorological and lake current data. From this analysis an attempt shall be made to determine frequency forecasts for plume areas. The areas from the actual plume surveys and from the frequency forecasts shall be compared with the limit set for this plant by the Michigan Water Resources Commission.

Monitoring of lake water temperatures to determine thermal and spatial characteristics of the plant discharge thermal plume shall (1) incorporate additional studies as necessary to verify the analytic and/or hydraulic models used to predict the behavior of the thermal plumes (resulting from plant discharges at the discharge structures and central intake) during deicing operation, and (2) determine the extent of recirculation necessary to prevent icing of the intake structural frames and trash grills during deicing operation. Results of these studies shall be reported in the annual Operating Report.

Wind

Wind speed and direction shall be continuously monitored from a permanently fixed meteorological tower throughout the thermal measurement program. The tower shall be of such height and so located that there is reasonable assurance that the wind velocities measured are representative of those affecting the water surface. Wind speed and direction data shall be obtained in the form of hourly averages.

Currents

(a) Recording current meters shall be deployed to provide continuous measurements of ambient lake currents throughout the thermal measurement program. Speed and direction of near-surface and near-bottom currents shall be measured between the sandbars and offshore of the outer sandbar. To the extent possible, the current meters shall be moored outside the current field induced by the intake and discharge flows. The averaging period and time base for the meters shall be chosen such that statistically reliable correlations between current and wind velocities may be obtained. The licensee reserves the right to alter the equipment specifications and measurement techniques as new technology becomes available; justification for any changes shall be provided in the annual Operating Reports.

(b) During each thermal survey period, drogue measurements of currents in the top 2 feet of water shall be made. The measurements shall be conducted so as to include as wide a range of wind and lake current conditions as possible. Drogues shall be deployed inshore of the inner sandbar, between the two sandbars, and offshore of the outer sandbar. Drogue tracking shall be done by shore or by aerial observations. The results of these measurements shall be correlated with measured wind velocities and current velocities obtained from moored sensors.

Reporting Requirements

If the area within the 3 F degree excess isotherm is found to exceed the area allowed by the Michigan Water Resources Commission, the NRC and the Michigan Water Resources Commission shall be notified by the licensee. These studies shall be reported in the annual Operating Reports regardless of the plume size found.

Bases

The mixing zone and thermal criteria applicable to D. C. Cook are defined in the Water Quality Standards of the Michigan Water Resources Commission. These standards were approved by the U. S. Environmental Protection Agency on December 12, 1973.

The temperature standards are specified to prevent excessive thermal stress to aquatic organisms and to reduce the volume of water which would be subjected to raised temperatures.

The flow conditions at the D. C. Cook site have not been defined for all seasons. However, the limited measurements available[1] suggest complex interactions between thermally- and wind-driven coastal flows. These interactions will be expected to vary with different seasonal and local weather conditions. The current field is further influenced by the topographic effects of the offshore sand bars.

Such complex flow conditions will cause large uncertainties in thermal plume behavior based on predictions of idealized mathematical models. Furthermore, attempts to construct a hydraulic model of the D. C. Cook discharge resulted in thermal plumes in which the major portion of the area within the 3 F degree isotherm lay outside the boundaries of the model.[2]

Actual thermal plume behavior and compliance with Michigan Water Quality Standards must be determined by a comprehensive field surveillance program designed to cover as wide a range of seasonal and local weather conditions as possible.

Determination of the effectiveness of reentrainment of heated water recirculated to the central intake during deicing will aid in determining (1) the potential influence of the intake plume on fish aggregation near the intake cribs, and (2) the potential for fish to acclimate to temperatures that might contribute to cold shock mortality during scheduled or rapid plant shutdown.

REFERENCES

1. Ayers, et. al.

   1967 a. Benton Harbor Power Plant Limnological Studies. Part I. General Studies, 1966 & 1967.

   1967 b. Benton Harbor Power Plant Limnological Studies. Part II. Studies of Local Winds and Along Shore Currents, 1967.

2. D. C. Cook, Final Environmental Statement, U.S.A.E.C., Docket Nos. 50-135 and 50-136, August 1973.

4.1.1.3 Erosion

Objective

A beach erosion monitoring program is to be conducted to determine the effects of the Plant's circulating water discharge, rip rap scour bed, and stationary shore pilings on the erosional and depositional processes affecting the stability of beaches in the vicinity of the site.

Specification

Visual and photographic observations are to be made each winter of the behavior of the ice masses and the attached ice barriers along the beach at the Plant site with particular regard to the possible effects of the discharge of circulating water from the Plant on these floating or attached ice barriers.

Profiles of the lake bottom by sounding and the aerial survey of the shoreline have been completed.

This program shall be continued until in the licensee's opinion, conditions have been stabilized, and the objectives have been met, after which the findings and a request for termination shall be presented to the Regulatory staff for review, and must be approved, prior to termination of monitoring.

Reporting Requirements

As specified in Section 5.4. Results of all monitoring and special studies shall be reported, or reference given to separate published or docketed reports, in the annual Operating Report.

Basis

The beach erosion monitoring program will attempt to verify the contention that ice buiding mechanisms will operate to repair any ice-melting caused by the discharge plume. In addition, monitoring enables determination of beach and near shore erosion direct effects of Plant discharges and direct or indirect effects of scour bed or protective pilings placed on shore or in the lake.

4.1.1.4 Scour Studies

Objectives

The scour monitoring program is intended to determine the adequacy of the riprap bottom protection and to ensure that significant long- or short-term scour does not result from the high velocity Plant discharge or from sediment displacement, by along-shore currents, in areas adjacent to the riprap scour bed.

Specification

A sounding study shall be conducted at 100 foot intervals from a point near the beach approximately 300 feet south of the discharge scour bed to a point 300 feet north of the extremity of the same scour bed. Sounding lines shall run parallel to the actual pipelines, essentially east-west, from the near shore, terminating about 400 feet west of the intake cribs. Readings shall be taken by a continuous recording fathometer (or instruments of equal or better accuracy) whose accuracy shall be at least to within a foot.

The sounding grid shall comprise a rectangle approximately 1,400 feet wide by 2,400 feet long, or shall encompass an area, larger or smaller, deemed necessary by the licensee to meet the objectives stated above. Baseline surveys shall be conducted following issuance of an operating license, but prior to testing of cooling water circulating pumps for Unit No. 1; thereafter a survey shall be run at approximately 6-month intervals until at least 1 full year following the startup of Unit No. 2.

Studies conducted to verify the adequacy of the scour bed in preventing bottom scouring by the high velocity Plant discharge shall also describe the effects of the scour

bed on any movement, or displacement, of material moved by alongshore currents in the vicinity and to the south and north of the riprap scour beds. Results of all monitoring or special studies necessary for model verification and demonstration of the effect of scour beds on along shore transport of sediment shall be reported in the annual Operating Reports.

If bottom scouring or erosion resulting from the high velocity discharge and/or implacement of the protective scour bed occurs, and if judged to be significant by the staff, 1) the licensee shall submit plans for corrective action to the staff for approval and 2) implementation of any approved action shall be met by the time schedule specified.

Should the scour study indicate movement of the riprap, the licensee would initiate an Engineering investigation to repair the bottom protection in an appropriate fashion. In the unlikely event that the filter cloth deteriorates, the Licensee believes that the addition of relatively fine stone can mitigate leaching or erosion of the sand below the protective bed. In either case the licensee shall submit plans for corrective action to the Office of Nuclear Reactor Regulation for review and approval.

A schematic view of the scour study area is shown in Figure 4.1.1.4-1.

Reporting Requirements

As specified above and in Section 5.4.

Basis

After extensive study, a jet diffuser system was developed, with a jet velocity of 13-ft/sec selected on the basis of experimentation with a hydraulic model, to reduce the temperatures in the thermal-affected zone and to minimize the exposure of entrained organisms to heated lake water. Because of the relatively high velocity of the cooling water at the exit ports of the discharge structure, an extensive scour protective bed has been installed. The subject scour studies are to verify that there are no scour problems resulting from Plant discharges or implacement of the riprap scour bed in the lake.

4.1.1.5 Groundwater

Objective

To monitor the movement of chemicals introduced into the groundwater from the onsite absorption field. The hydraulic properties of groundwater such as direction and velocity of flow will also be monitored.

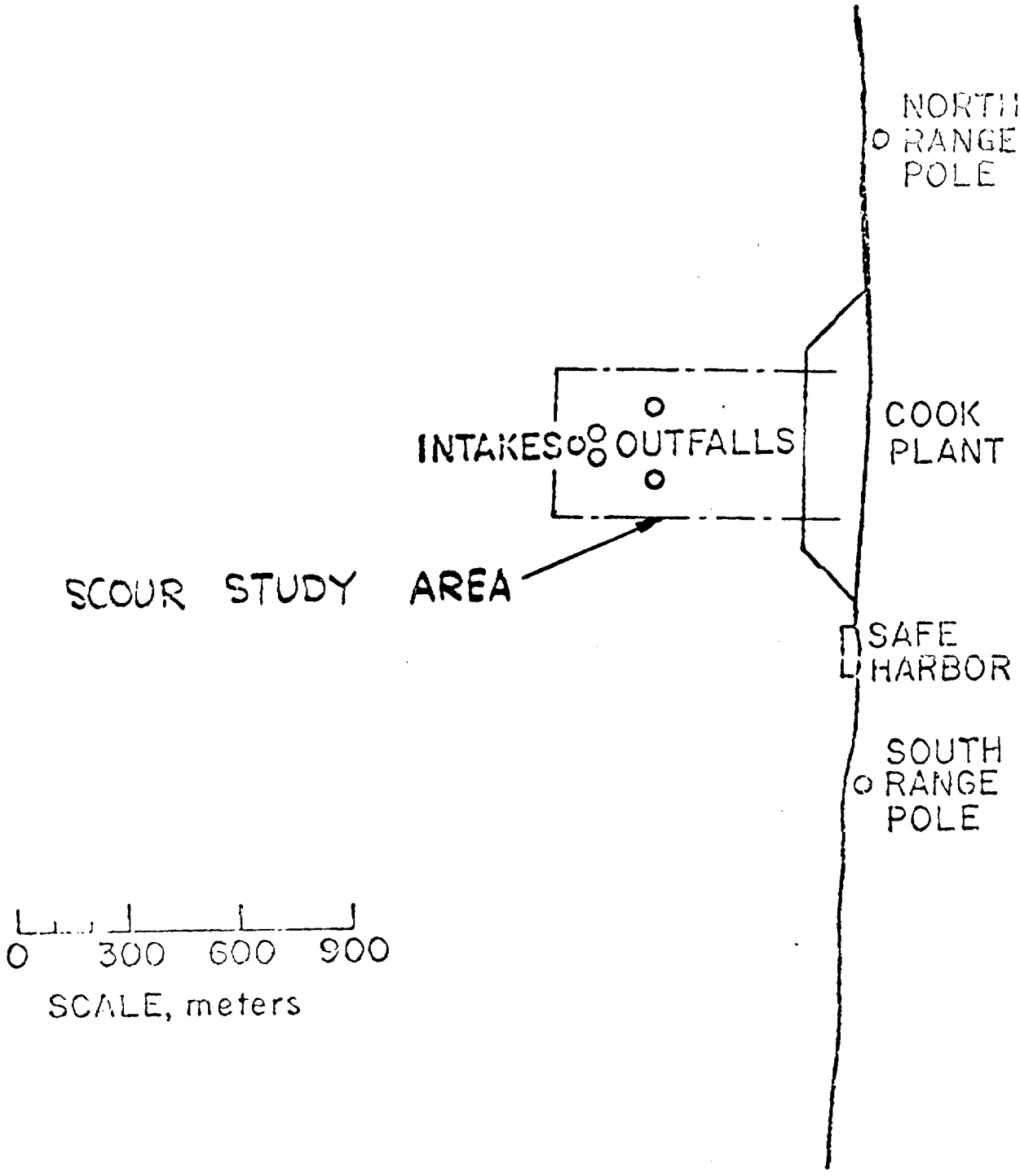

Figure 4.1.1.4-1 Map Showing The Location Of The Cook Plant Study Area

Specification

Chemical analyses of ground water samples taken from shallow groundwater aquifers in the vicinity of the onsite absorption field shall be monitored at 26 week intervals. Groundwater movements shall be monitored at the on-site absorption field by conducting flow-drawdown hydraulic pumping tests of the monitoring and observation wells at 2 year intervals.

Water samples shall be taken from monitoring wells 1a, 8, 11, and 12, shown on Figure 4.1.1.5-1, after a period of pumping sufficient to give constant conductivity as measured with a suitable analyzer. At the same time, samples of lake water which are free of chlorination shall be collected from the circulating water pump discharge or an equal source.

The well water samples and the lake water samples shall be analyzed for concentrations of sodium ion, sulfate ion, phosphate, pH, conductivity. These samples also shall be analyzed for nitrate, iron, copper or any other ions or toxic chemicals if such chemicals are known or suspected to have been discharged to the absorption field in concentrations that are not permitted in drinking water.[1]

Well depths and groundwater strata shall be reported on a one-time basis for wells that are altered or replaced, or for new wells. Groundwater levels shall be reported with each sample report for each well.

Chemical analyses are to be made in accord with the Plant Laboratory Procedure Manual. Monitoring data shall be analyzed in accord with the specifications in Section 4.1.2.4.

Groundwater movement shall be determined by calculating the velocity and direction of flow from data acquired during flow drawdown hydraulic pumping tests of the monitoring and observation wells.

Reporting Requirement

Monitoring data and their analyses shall be reported in the annual Operating Report.

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[1] As defined in the "Report of the National Technical Advisory Committee to the Secretary of the Interior, Water Quality Criteria, 1968."

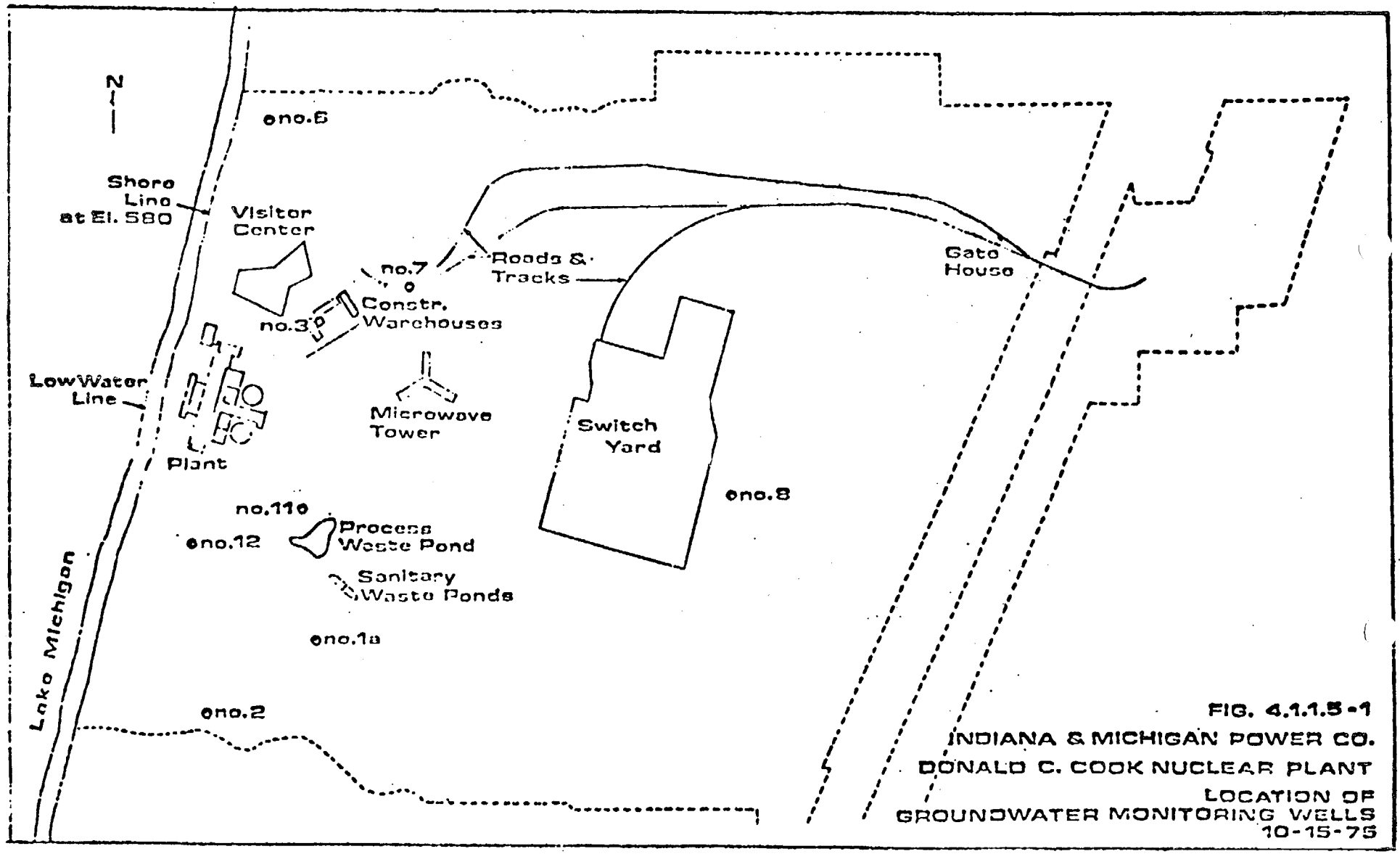

FIG. 4.1.1.5-1
INDIANA & MICHIGAN POWER CO.
DONALD C. COOK NUCLEAR PLANT
LOCATION OF GROUNDWATER MONITORING WELLS
10-15-75

Basis

Periodic chemical analyses of groundwater samples will give adequate warning of any impending changes in water quality, and groundwater flow monitoring will ensure that the time interval, as specified for monitoring of chemicals, is adequate for detection. This warning will serve to show whether there is any deterioration of quality of the groundwater onsite and what is the potential contribution of plant wastes to the lake.

4.1.1.6 CORROSION AND DEPOSITION INHIBITORS

4.1.1.6.1 Objective

The purpose of this specification is to provide NRC with information on the discharge to the lake of the corrosion inhibitors used in the stream and feedwater systems and the plant heating boiler.

4.1.1.6.2 Specification

The chemical in the steam generator blowdown liquid discharged to the lake should normally not exceed the maximum annual quantity and maximum discharge concentration below:

	Maximum Annual Discharge (lbs/yr)	Maximum Discharge Concentration (ppm)
Ammonium Hydroxide	5100	0.17

The quantities of chemicals used which are discharged to the lake shall be reported in the annual Operating Report. If the above values are exceeded or the following monitoring requirements not met, a report shall be made within 30 days as specified in Section 5.4.2.1 and such events shall also be reported in the annual Environmental Operating Report as specified in Section 5.4.1.

4.1.1.6.3 Monitoring Requirements

During operation, samples of blowdown liquid shall be taken a minimum of four times a week at each steam generator blowdown sample connection and analyzed for those chemicals added for corrosion and deposition control. A composite sample of the Unit's blowdown liquid shall be analyzed monthly for products of corrosion, i.e., iron, copper (corrosion products).

Whenever the plant heating boiler is operating, samples of this boiler's blowdown liquid shall be taken a minimum of once per day and analyzed for chemicals added for corrosion and deposition control.

Methods of analysis used for determination of the chemical additives and corrosion products shall be in the Plant Laboratory Procedures Manual.

4.1.1.6.4 Basis

Ammonium hydroxide and hydrazine are used for corrosion prevention in the steam cycle. These chemicals will be continuously blown down to and diluted by the condenser cooling water. Under normal operating conditions, the blowdown rate will average about 55 gpm. When starting up the unit, when there is an in-leakage of circulating water, or when there is inleakage of primary coolant into the secondary coolant through the steam generator (these are abnormal conditions) the blowdown rate will be increased to approximately 250 gpm.

Hydrazine is used as an oxygen scavenger to prevent corrosion of the steam and feedwater system components. Any of this chemical which does not react with oxygen will decompose to nitrogen and ammonium hydroxide in the steam generators. The maximum annual discharge of ammonium hydroxide permitted in this specification is that corresponding to normal operation (0.02 ppm hydrazine) for 90 percent of the time of operation and the maximum concentration (96 ppm hydrazine) for a maximum of 10 percent of the operating time plus addition of supplemental ammonium hydroxide as necessary to maintain a pH range of 8.5 to 9.3 in the steam generators. It also corresponds to normal operation of the blowdown 90 percent of the time and operation at the maximum blowdown rate for 10 percent of the time. It is assumed that the plant will operate 80 percent of the time in calculating maximum permitted releases.

Maximum discharge concentrations are calculated on the basis of a circulating water discharge rate equal to the flow of one circulating water pump.

Normally, the auxiliary heating boiler will be operated only when both reactors are shut down. At such periods, there will be blowdown (approximately 10 gpm) to the condenser circulating water. The boiler water contains 10-30 ppm of phosphate as a scale inhibitor and 20-50 ppm sulfite as an oxygen scavenger. The minute discharge of chemical from this infrequently operated boiler will have no significant adverse effect on the lake. The sulfite is oxidized rapidly to sulfate prior to release to the lake. The quantity of sulfate thus discharged is negligible considering the average sulfate concentration already in the lake water.

4.1.1.7 Other Chemical Discharges

4.1.1.7.1 Objective

The purpose of this specification is to provide information on the release of chemicals, other than corrosion and deposit inhibitors, to the lake or the on site absorption field to alert the staff to potentially adverse impacts on aquatic or terrestrial biota due to plant operation.

4.1.1.7.2. Specification

The maximum quantities and discharge concentrations of other chemicals used in the plant which will be discharged to the lake and to the on site absorption field should not normally exceed the values specified in Table 4.1-1. Chemicals used in the plant should be diluted and neutralized as required to give a pH in the range of 5.5 to 9 prior to discharge to the on site absorption field. Excepting chlorine, no toxic chemical, e.g., chromates, mercury compounds, etc. should be discharged to the lake or on site absorption field. No oil or petroleum products shall be discharged to the lake or to the on site absorption field. The composition and quantity of detergents (Table 4.1-1) used and discharged to the lake shall be reported in the annual Operating Reports. In the event that chemicals other than those specified in Table 4.1-1 are released, a report of the release shall be made as described in Section 5.4.2.1.2.

On those occasions when spent chemical cleaning solutions are to be discharged to the absorption field, samples of the sump waste water shall be collected and analyzed for all chemical species (including heavy metals and hydrocarbons) that potentially could result from the cleaning operation. Actual concentrations and estimated quantities of all other chemical species discharged shall be reported in the annual Operating Report.

Actual quantities of the species monitored per Section 4.1.1.7.3 below and discharged to the lake and/or to the on site absorption field shall be reported in the annual Operating Report. Discharge of chemicals in excess of Table 4.1-1 shall be reported within 30 days as specified in Section 5.4.2.1 and also in the annual Environmental Operating Report as specified in Section 5.4.1.

4.1.1.7.3 Monitoring Requirements

During operation, samples of a steam generator's blowdown liquid shall be analyzed for boron a minimum of four times a week whenever primary-to-secondary leakage occurs in that steam generator.

Samples of processed wastes from the radiological waste disposal system shall be analyzed for boron whenever these wastes are discharged to the lake.

During initial plant operation, the pH of the turbine building sump shall be monitored and composite samples of the sump discharge shall be collected and analyzed for sodium, calcium, magnesium, sulfate, chloride and total solids during ten regenerations of the makeup water system demineralizers. During normal plant operation, the pH of the sump discharge shall be determined and composite samples taken and analyzed for the same constituents once a week.

Samples of the sump discharge will be collected and anlyzed whenever any chemicals, other than spent regenerants, are drained to the sump.

4.1.1.7.4 Basis

The only discharges to the lake containing chemicals used in the plant are the steam generator blowdown liquid and the liquid from the radiological waste processing system.

Spent regenerant solutions are drained to the turbine room sump where they are diluted prior to pumping to the onsite absorption field. In addition, other waste water consisting of condensate and service water is drained to this sump. Monitoring sump water discharge pH during regeneration during plant startup will permit making adjustments to insure that the pH is within limits specified. The monitoring of the pH at the stated intervals will assure that sump discharge remains near the neutral pH point and that local ground water pH will not be strongly affected. The environs monitoring program (Section 4) will determine the effect of onsite absorption field discharges on local groundwater quality.

The analysis of the sump water samples during and subsequent to inital operation will provide guidelines for diluting sump water, as necessary, to reduce the concentration of spent regenerants.

There may be several occasions during the life of the plant when spent chemical cleaning solutions will be discharged to the absorption field.

TABLE 4.1-1

OTHER CHEMICAL DISCHARGES TO ENVIRONS

Chemical	Estimated Maximum Annual Discharge (per year)	Estimated Maximum Discharge Concentration (PPPM)	Use and Estimated Discharge Frequency	Discharged in
Sodium Sulfate(1)	480 tons	10,000	Product of makeup water demineralizer regenerations. Discharged over a 2-4 hour period twice per day.	Onsite absorption field
Boron	600 lbs.	0.03	a) Release caused by steam generator tube leak. Discharged during intermittent periods corresponding to primary to secondary steam generator leakage.	Lake
			b) Release caused by boron carryover into Liquid Radwaste Disposal System evaporator distillate. Discharged intermittently with plant liquid waste effluents.	Lake
Detergents	5,000 lbs.	0.15	Used for onsite laundry, decontamination of equipment and personnel. Discharged intermittently.	Lake

(1) Product from the reaction of sodium hydrozide and sulfuric acid used in regeneration of makeup demineralizers.

4.1.2 BIOTIC

4.1.2.1 Aquatic

Aquatic ecological studies have been underway at the D. C. Cook Plant since 1966, with a full scale preoperational general ecological survey, covering about 98 square miles of southeastern Lake Michigan, in progress since 1972.

Prior to plant operation, there will be a number of years of preoperational data available for subsequent Plant impact analysis. Such a comprehensive data base allows for periodic curtailment of certain general ecological survey programs without sacrifice of program objectives, so that greater attention can be given to preoperational (pumping only) and postoperational (pumping and temperature) entrainment and impingement studies.

Descriptions are given below of the number of samples to be collected, techniques used in sampling, and methods of sample analysis. A more detailed presentation of the specifics of the current program is given in Benton Harbor Power Plant Limnological Studies, Part XVII, Program of Studies Related to the Donald C. Cook Nuclear Plant. The licensee does not preclude a change in program methodology should improved techniques evolve or biological indicators emerge which in themselves adequately reflect any Plant induced ecological alterations. Changes in methodology shall be reported and justified in the annual Operating Report. Changes in scope or major changes in the program shall be presented to NRC for review and approval before they are initiated. Any such major changes will also be reported and justified in the annual Operating Report and reports of the Benton Harbor Power Plant Limnological Studies.

4.1.2.1.1 General Ecological Survey

A comprehensive aquatic ecological survey program is presently being conducted to determine preoperational conditions in the vicinity of the Donald C. Cook Nuclear Plant. When compared with operational conditions, these studies will enable determination of Cook Plant influence upon the studied biological systems. The biological systems examined shall include the general groups: phytoplankton, periphyton, zooplantken, benthic invertebrates, and fish.

Sampling frequency for each phase of the monitoring program is contingent on weather and seasonal conditions.

Techniques and schedules used to study each biological group differ, so that separate discussion is given to each of the groups. As mentioned previously, the relative intensity of effort given to the general ecological survey will vary but at no time will individual efforts on specific biological systems be curtailed below levels necessary for valid statistical data analysis. The statistical significance of any observed changes in natural populations will be tested using the analysis of variance. A discussion of the statistical procedure to be used in the data analysis and evaluation of Plant effects is given in Part XVIII of the Benton Harbor Power Plant Limnological report series. Further specification of statistical methodology is presented in Section 4.1.2.4.

A schedule of months and station designations used for the General Ecological Survey are given in Table 4.1.2-1, with differentiations made when necessary, between intensity of effort given in 1973, years during which entrainment and impingement studies are running concurrently, and years when no entrainment and impingement studies are scheduled. Station designations are further explained in Table 4.1.2-2. The total number of field samples for each year (1973-1978) for four categories, are shown in Table 4.1.2-3.

Unless otherwise specified and with the approval of NRC, the program will continue for a minimum of three years after Unit 2 is licensed to operate. No programs shall be discontinued without staff approval.

The general ecological survey at the Cook Plant is broad in scope and covers the range from algae to fish. Changes in the aquatic ecosystem may be measured by alterations in species composition, density, or species diversity. While different techniques are used for each study group to detect such changes, most techniques have certain common features, including:

1. Long-Term Study - the survey period covers several years.

2. Wide Study Area - including control and potentially affected areas.

3. Frequent Sampling - at least monthly at selected locations and seasonally at a larger number of locations.

4. Multiple Sample Analysis - in most studies, either several samples are taken, or single samples split for replicate analyses.

5. Low Level of Identification - when practical, identifications are made to species level.

When considered in concert, these features will enable determination of any significant long-term changes in species composition, abundance or species diversity.

Quality assurance of the ecological surveillance program will be accomplished by the following mechanisms. All hard data such as laboratory notebooks, field notes, photographs, and analytical results shall be retained. Second, a reference collection of biological specimens shall be retained for future reference. These shall include wherever possible, wet specimens and will be representative of the important species in the area.

The specifications in Section 4.1.2.1 related to specific methodology include field and laboratory equipment and techniques, number and location of sampling stations and degree of sample replication. These are meant to be illustrative of acceptable details, and may be changed by the licensee, provided that such substitutions or changes improve the licensee's capability to meet the program or survey objectives. All changes in the equipment, field and laboratory techniques, degree of sample replication, and number and location of sampling stations shall be reported and justified in the annual Operating Reports.

4.1.2.1.1.1 Zooplankton Surveys

Objective

Zooplankton surveys in the Cook Plant region are designed to give a broad background of spring, summer, and fall zooplankton numbers. They will also give compositions and diversities under preoperational conditions against which operational surveys, similarly conducted, may be contrasted to assess long-term changes in numbers, species composition, and diversities attributable to Cook Plant operation.

Specifications

Field Methods

Replicate zooplankton samples shall be collected at each of the 28 complete stations in the three major seasonal surveys (Figure 4.1.2-1), and at each of eleven stations (less DC-O) in the short surveys (Figure 4.1.2-2). At each station, a vertical haul from bottom to surface shall be made with a 1/2 meter diameter cone net of #10 nylon mesh (158 Micron apertures) with a flowmeter placed in the mouth of the net to estimate volume of water filtered. All samples should be preserved.

Laboratory Methods

Collected samples may be subsampled with each sample split as many times as necessary to yield duplicate random subsamples of manageable size which still permit statistical reliability. Each sample selected for counting contains several hundred of the most common forms. Larger subsamples may be examined for rarer forms. Subsamples of zooplankton will be counted in a chamber. Samples should be identified to species at DC 2, 5, 6. All other station identifications should be to genus; to species if practicable. Total zooplankton weights shall be determined by weighing oven dried counted subsamples.

Reporting Requirement

As specified in Section 5.4.

Basis

Zooplankton are primarily planktonic (drifting with the currents and having only limited ability to swim upward). Zooplankters are rather highly seasonal in dominant species, and in reproduction of copepods in spring as inshore water warms. Insofar as displacement of seasonal dominants toward the summer condition, and insofar as copepod reproduction inshore might be extended earlier into spring than usual, a study of zooplankters represents a means of determining the effects of Plant discharges from the Cook Plant on these organisms.

4.1.2.1.1.2 Phytoplankton Surveys

Objective

Phytoplankton surveys in the Cook Plant area are designed to give a broad background of spring, summer, and fall phytoplankton numbers. They will also give species composition and diversities under pre-operational surveys against which operational surveys, similarly conducted, may be contrasted to determine long-term changes in numbers, species composition, and diversities attributable to Cook Plant operation.

Specifications

Field Method

Phytoplankton in the vicinity of the Cook Plant shall be sampled monthly from April to November. During three of these months (April, July and October) phytoplankton samples shall be collected at each of the 36 major survey stations (Figure 4.1.2-1). During remaining months, samples

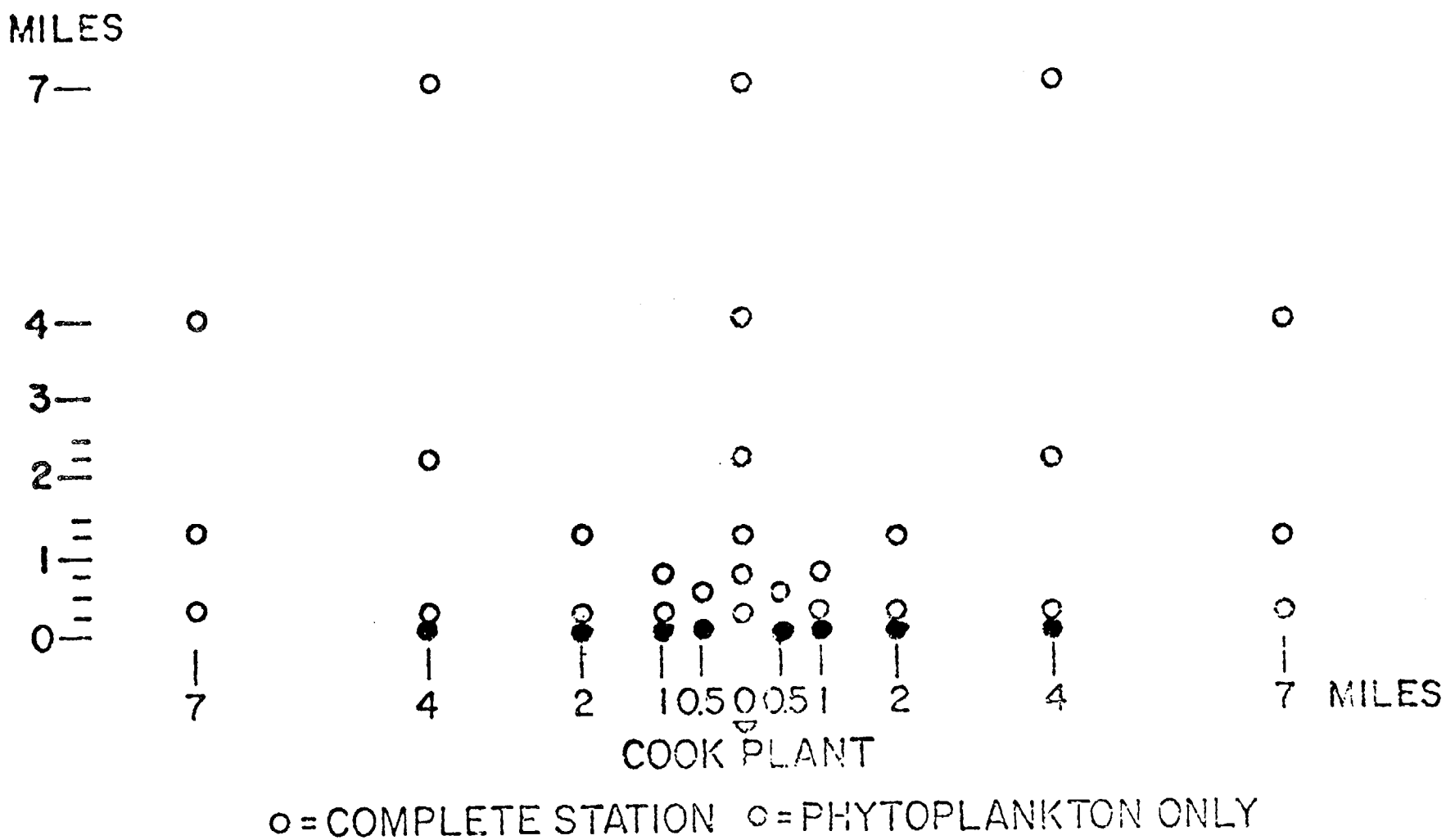

Fig. 4.1.2-1 The 36-Station Major Survey Grid to be Used in Seasonal Samplings during Cook Plant Surveys.

shall be collected from each of the short survey stations, i.e., seven stations in a perpendicular line from the Cook shoreline, two stations north of the plant, and two stations south of the Plant (Figure 4.1.2-2).

All samples, except from surf zone stations, can be collected with a Niskin bottle at a depth of 1 meter, and placed in a brown 1-liter polyethylene bottle and immediately fixed. Phytoplankton from surf zone stations (4 feet of depth), sampled only during major surveys, can be collected in 1-liter Nalgene bottles at a depth of 6 inches using the same preservation technique.

Laboratory Method

The method of phytoplankton concentration for species identification and enumeration may entail settling, decanting and preparation for a microscope slide. The remaining sample should be retained for possible future reference.

The phytoplankton specimens shall be counted to species when possible, otherwise to genus or group. Only those specimens that appear to have been viable at the time of collection shall be counted. At least two sweeps across the slide should be made, one vertical and one horizontal. This should provide an indication of the randomness of the species on the slide.

Reporting Requirement

As specified in Section 5.4.

Basis

Phytoplankton are wholly planktonic (drifters with no ability to swim) and laboratory experiments have shown they are able to respond to elevated temperatures by increased reproduction and species composition shifts toward dominance by green or blue-green forms. A study of the numbers and species composition of the phytoplankton represent a means for determining the impact of Cook Plant operation on phytoplankton.

4.1.2.1.1.3 Benthos Surveys

Objective

Benthos surveys are designed to determine whether the population of benthic animals is significantly different after the existence of the Cook Plant thermal plume and chemical discharges than it was before. Attention shall be given to the non-buoyant plume of winter as well as to the floating plumes of other seasons.

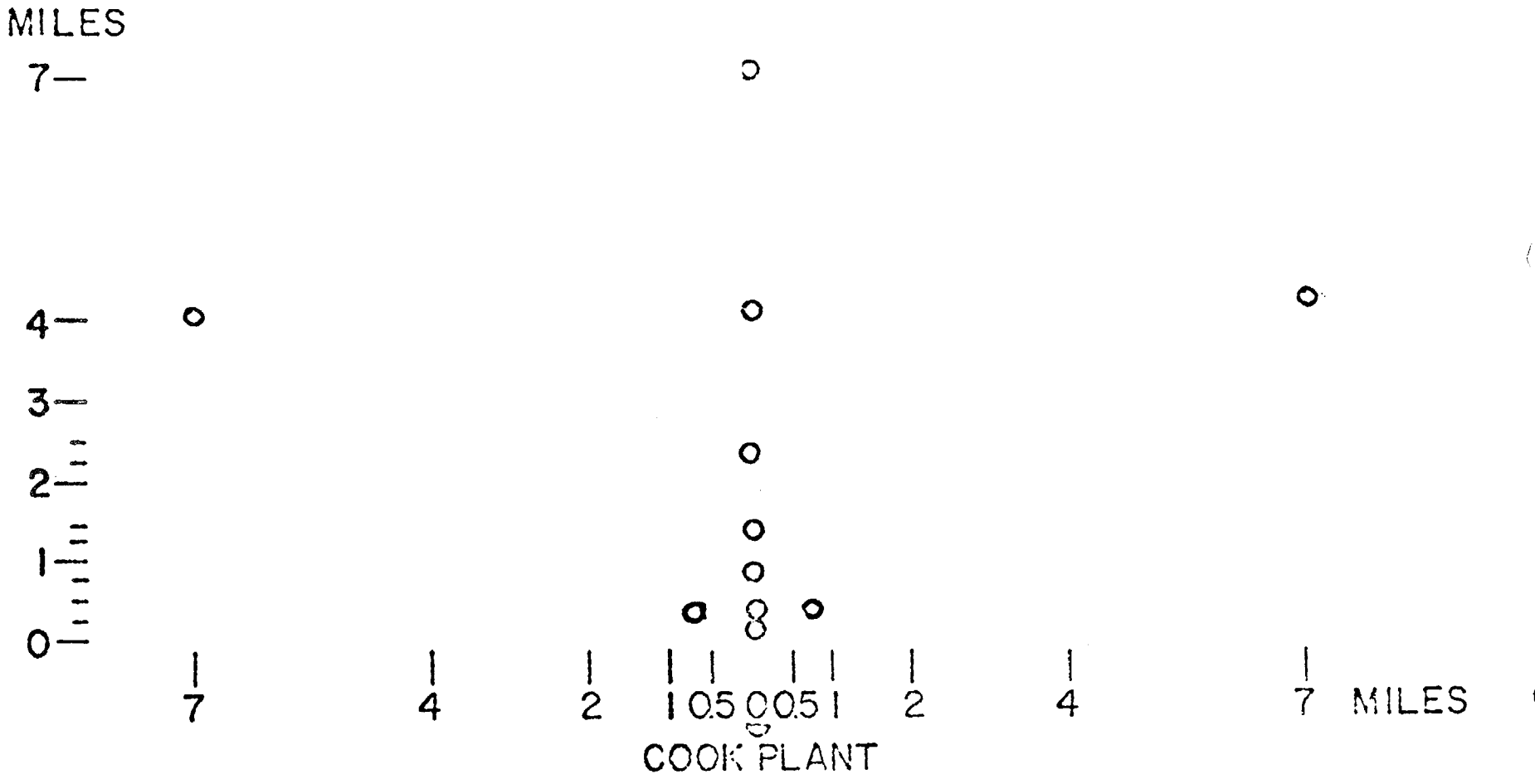

Fig. 4.1.2-2 The Minimal Cook Plant Survey Grid. Used in Months between Season Surveys.

Specification

Beginning in July 1974, benthos will be collected from the thirty stations of the regular sampling grid given in Table 4.1.2-1 during April, July and October. Each sample will be the contents of chamber #1 of a triplex ponar grab. In zone 0, four casts will be made at each sampling station. In zones 1 and 2, two casts will be made at each sampling station. Samples should be washed through a 0.5 mm screen and residues of sand and coarser materials discarded. In general, particles and animals larger than 0.5 mm in their least dimension can be retained, while active and elastic oligochaetes somewhat larger than this occasionally escape. The residue on the screen should be washed into a sample bottle and preserved.

Laboratory Method

In the laboratory, benthos samples will be sorted under strong light against a black background, usually with magnification. Oligochaeta and smaller Chironomidae shall be mounted on slides and identified at high magnification. The age and maturity of Pontoporeia affinis should be determined for each sample. For each survey, tables shall be compiled to show mean abundance of the major taxa (Amphipoda, Oligochaeta, Sphaeriidae, Chironomidae, Total Animals) at each station - for use in inner/outer comparisons. Tables and figures also shall be prepared showing mean abundance of more numerous and larger species by depth zones and regions, accompanied by statistical analysis of data.

Reporting Requirement

As specified in Section 5.4.

Basis

The benthos are relatively sedentary organisms upon which the variations of environmental conditions can produce effects. Like all aquatic invertebrates they have the capacity to respond to elevated temperature by increased or earlier reproduction, or by producing earlier stages of insect life-cycles. The benthos consequently represent test animal par excellence for determining effects of the Cook Plant operation on biota in the plant vicinity.

4.1.2.1.1.4 Periphyton

Objective

Periphyton monitoring is designed to ascertain the preoperational and operational abundances and characteristics of the local population of attached algae as an indicator of the effects of Cook Plant operation on the aquatic environment.

Specification

Field Method

Periphyton on the intake and discharge structures and the surrounding riprap shall be visually inspected and samples hand-collected during the months of April through October (see Specification 4.1.2.1.4.).

Monthly samples of entrained phytoplankton at the intake shall be examined for periphytic species and the abundances thereof obtained.

Preservation of samples shall be the same as for samples collected in the regular sampling scheme of the general ecological survey.

Labatory Method

The laboratory methods used shall be the same as those used for phytoplankton in the regular sampling scheme of the general ecological survey--see Specification 4.1.2.1.1.2.--except that each month from April through October a wet-mounted sample from the intake structure shall be examined also.

Reporting Requirement

As specified in Section 5.4.

Basis

Periphyton are attached algae growing upon solid substrates, consequently they are fixed in position. If their substrates are located where the Plant discharge can reach them, the periphyton may respond by abundance changes, changes in population composition, changes in diversity, or changes in other population parameters. Statistically significant differences between preoperational and operational population parameters will be noted and the relationship to Plant operation investigated.

4.1.2.1.1.5 Fish

Objective

To determine the environmental impact of Plant operation on the fish populations in the vicinity of the Plant and establish species composition, indices of abundance for fish at the site, seasonal and depth distribution, and the various development stages of fish present in the Plant area.

Specifications

Field Method

Stations:

At least 11 permanent stations shall be maintained in the area of the Cook Plant and Warren Dunes (control location). Two seining stations (A and B) north and south of the plant and three gillnetting, trawling stations and fish larvae (C and D south of the Plant, and R north of the Plant) in 20 and 30 feet of water shall be maintained in the vicinity of the Cook Plant. A gillnetting station (Q north of the Plant) in 30 feet of water shall be maintained. One fish larvae station (E) in 70 feet of water shall also be maintained. At Warren Dunes State Park (control location) one seining station(F), two stations (G and H) in water depths of 20 and 30 feet for gillnetting, trawling and fish larvae and one station (W) at 70 feet of water depth for fish larvae shall be maintained. Fish larvae tows shall be conducted at 10 stations. The fishing areas at the plant are shown in Figure 4.1.2-3. Warren Dunes State Park control stations are now shown on the figure.

Beach Seining:

Beach seining shall be conducted during periods of reduced wave height using a 38.0 meter x 1.8 meter (125 feet x 6 feet) nylon bag seine having 0.5 cm (0.25 inch) bar mesh. The seine shall be first stretched perpendicular to the shoreline and then pulled parallel to the shore, a distance of 61 meters (200 feet). Duplicate nonoverlapping collections shall be made in this manner during a day and a night once each month at the seining stations (A, B, F). The seine shall be pulled against the current, and southerly when no current is detectable. Fish captured by seine (also by trawl and gillnet) shall be bagged and frozen for future laboratory analysis.

Trawling:

Duplicate bottom tows of 10 minutes each shall be taken during both the day and night once per month at the five stations (C, D, G, H, R)

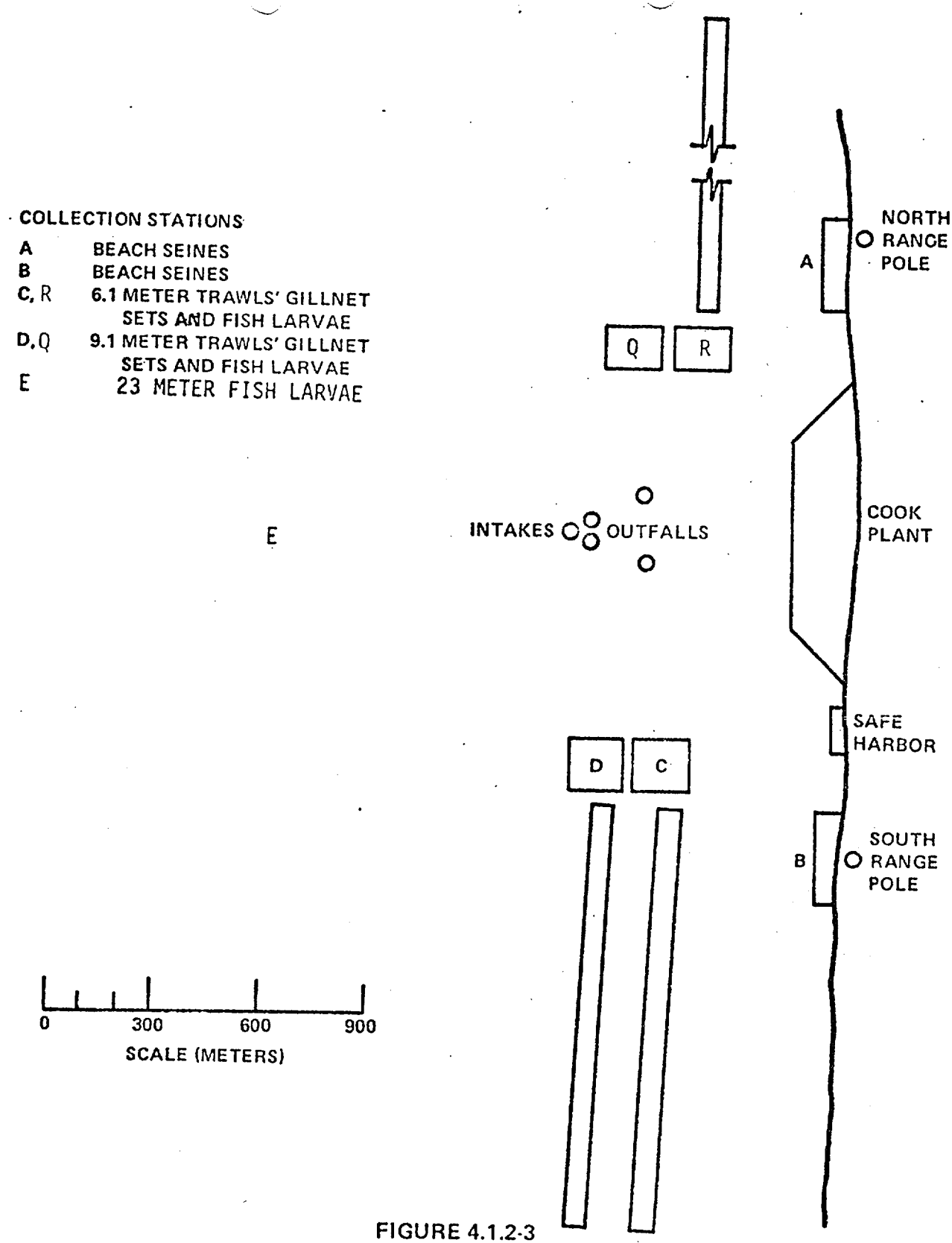

FIGURE 4.1.2-3

Map of the Area Showing Locations of the Cook Plant, Intake and Discharge Structures, and Seining (A, B); Trawling, Gill-netting and Fish Larvae (C, D, R) Stations; Gill-netting (Q) Station; and Fish Larvae (E) Station. Seining Station (F); Gill-netting, trawling and Fish Larvae Stations (G, H) and Fish Larvae Station (W) At Warren Dunes State Park (control location) Are Not Shown.

using a semiballon nylon trawl having a 4.9 m (16 feet) headrope and a 5.8 m (19 feet) footrope. The body of the net is composed of 3.8 cm (1.5 inches) stretch mesh, the cod-end of 2.3 cm (1.25 inches) stretch mesh, and the inner liner of 1.3 cm (0.5 inch) stretch mesh. All trawls shall be made at an average speed of 3 miles per hour. The trawl shall be towed parallel to the shore following the 20- and 30-foot depth contours, one replicate going approximately north to south and the other south to north.

Gillnetting:

Nylon experimental gillnets, 160.1 m x 1.8 m (525 feet x 6 feet) shall be set parallel to shore on the bottom at stations (C, D, G, H, R) at least once per month for approximately 12 hours during daylight and 12 hours during the night. The net is composed of 12 panels of netting as follows: three 7.6 m (25 feet) sections of the following bar mesh sizes--1.3 cm (0.5 inch), 1.9 cm (0.75 inch), and 2.5 cm (1.0 inch) and nine 15.3 m (50 feet) sections of bar mesh sizes starting at 3.1 cm (1.25 inches) and increasing to 3.1 m (9 feet) section of 10 cm (4 inches) mesh.

Fish Larvae:

A 0.5 m diameter plankton net of No. 2 mesh (351 micron aperture) shall be used to collect fish larvae samples. Samples from 10 stations shall be collected during the day and night. For the inshore stations (A, B F) a set of at least duplicate samples shall be obtained by towing two nets simultaneously by hand against the current a distance of 61 m (200 feet) once during the day and once during the night in water depth of 1-1.3 m (3 to 4 feet). At stations C, G and R (6 m stations) 5 minute tows shall be made at 0.5 m, 2 m, 4 m, and 5.5 m, the 0.5 m tow representing the 0-1 m, and the 2 m tow representing the 2-3 m, the 4 m tow representing the 4-5 m and the 5.5 m tow representing the 6 m depths. At stations D and H (9 m stations) 5 minute tows shall be conducted at 0.5 m (representing 0-1 m), 2.5 m (representing 2-3 m), 4.5 m (representing 4-5 m), 6.5 m (representing 6-7 m), and 9.5 m (representing 8-9 m). At stations E and W a 5 minute tow at 0, 7.5, 13.5, and 20.0 m will be conducted.

Laboratory Treatment of Fish

Fish from seines, gillnets and trawls shall be thawed as needed at the laboratory, separated by species, then grouped according to size classes. When large numbers of a particular species are present, a subsample shall be randomly selected, and a mass weight of the remaining fish of that species taken. Length, weight, sex, gonad condition, condition factor as well as fin clips, lamprey scars, and evidence of disease and parasites

shall be noted for these fish on a coding form which will go directly to a keypuncher for later data analysis. Preserved fish larvae shall be identified, counted and numbers per cubic meter determined. The same samples examined for larvae shall also be examined for fish egg.

Subsequent to the granting of an operating license, the licensee shall continue to access all appropriate concepts for minimizing potential adverse effect of Plant operation on lakewide or vicinity fish species populations. If, at any time, impingement, condenser passage, and Plant discharge effects of Plant operation are judged by the staff to have an unacceptable economic or ecological impact on lakewide or vicinity fish species populations, the licensee's proposed and staff approved corrective action shall be implemented within a time schedule specified by the staff, taking into account weather, materials availability, etc.

Reporting Requirement

As specified in Section 5.4.

Basis

Comparing preoperational and operational condition of the fish population the Plant and control site will provide a meaningful method of assessing potentially subtle impacts of Plant operation on the fish populations. Fish sampling will provide a means of determining changes in preoperational and operational characteristics of the fish populations in the Plant vicinity. this information shall be used to evaluate the effects of Plant discharges on the fish populations in the Plant's vicinity.

In the event that the effects of Plant operation are judged to have an unacceptable adverse impact on fish species in the vicinity of the Plant, a staff approved plan for appropriate design modifications of the circulating cooling water system will permit rapid implementation of corrective actions to minimize or eliminate further adverse impacts.

4.1.2.1.2 Impingement Studies of Fish

Objective

The impingement study is designed to monitor fish entrained in the three condenser cooling water intakes that are impinged on the traveling screens and trash racks, and to analyze these fish to provide short-term estimates of species composition, length, weight, and seasonal abundance of these impinged fish.

Specifications

All fish impinged on the traveling screens during startup and during periods of preliminary intermittent testing of pumps prior to sustained pump operation, following the effective date of issuance of an operating license, shall be reported in the annual Operating Report. Daily collection of fish impinged on the traveling screens shall be made for 6 months, starting with the first sustained operation of the circulating cooling water pumps in 1974. These data shall be analyzed statistically to determine if collection of samples every fourth day rather than daily would still be statistically valid. Should statistics verify the validity of the every fourth day sampling scheme, then fish shall be collected for a 24-hour period every fourth day after the initial 6-month test period.

Fish shall be collected in fish collection baskets and examined for species, life stages, and quantity (number and weight) collected. A statistically valid subsample of each species shall be counted, measured, weighed and sexed. Also, breeding and general condition will be determined. All fish removed from the trash rack shall be recorded and reported as specified in Section 5.4.1.

Reporting Requirement

As specified in Section 5.4.

Until 1 year after Unit No. 1 and Unit No. 2 begin operation, monthly reports on impingement of fish for each Unit are to be submitted to the Office of Nuclear Reactor Regulation.

Basis

Collection baskets serve as an excellent sampling tool for gathering all fish that enter the intake structures. Little is known about the number of fish that will be impinged at the Cook Plant because of the unique intake design. Therefore, this part of the ecological monitoring program should contribute to the furtherance of knowledge about the species and sex composition as well as the abundance, condition and seasonal occurrence of all fish species impinged by the Plant.

4.1.2.1.3 Study of Plankton, Benthos, and Fish Egg and Larvae Intake Entrainment

Objective

Those plankton, fish eggs and larvae, and benthos organisms drawn into the cooling water system which are small enough to pass through the 3/8 inch mesh on the traveling screens will be drawn through the Plant and exposed to a variety of stresses, including: pressure changes, mechanical abrasion, temperature elevation, and periodic chlorination. This study shall provide short-term data on the abundance and seasonality of this entrainment, and shall determine the effects of condenser passage on the species entrained in relation to its impacts on these species population in the Plant vicinity.

Specifications

Fish Entrainment and Entrainable Benthos

Fish, fish larvae, fish eggs, and benthos shall be sampled at two locations: in the intake forebay and discharge forebay following passage through the condensors. Testing shall be done during 1974, to determine existence or nonexistence of vertical stratification in the intake and discharge forebays; three depths shall be sampled: near the bottom, at mid-depth and near the surface. If vertical stratification is, or is not, observed, sufficient samples to meet statistical reliability shall be taken in each forebay.

Forebay samples shall be taken by pumping measured volumes of water with a 80 gpm diaphram pump into a 1/2 m plankton net (351 micron mesh). The net should be suspended in a barrel of water in an upright position to prevent damage to organisms from impingement against the net.

During all months of the year except June, July, and August, samples shall be collected twice monthly for each 8 hour segment during a twenty-four hour period. Fish eggs shall be enumerated and attempts at identification made. Fish larvae shall be sorted by species and enumerated, with living-dead distinctions anticipated. Methods for the rapid distinction (under

field conditions) between living and dead larvae are still in developmental stages. The same samples collected for fish eggs and larvae shall be inspected for benthic organisms. During the period through the first year of operation of Unit No. 2, samples of fish eggs and larvae shall be collected weekly for one and/or both Units for each 8 hour segment during a twenty-four hour period, in June, July, and August.

Zooplankton Entrainment

Zooplankton samples shall be collected in the intake forebay and in the discharge forebay following passage through the condenser. Within the intake and discharge forebays, the sample shall be collected by pumping water (with volume of water pumped being recorded) through a #10 plankton net suspended in a barrel of water.

After preliminary experiments to determine whether horizontal or vertical stratification exists and to choose a representative sampling position, statistically reliable (e.g., replicate samples) sampling shall be performed at least monthly. Testing shall be accomplished in 1974 when the Plant is pumping water without having a warm water plume. Simultaneous operation of all seven pumps of both units shall be accommodated at the earliest opportunity for such testing. Care shall be taken in the handling of the samples to preclude damage to organisms. The samples shall be collected during one twenty-four period a month at four times during the day: mid-mornign, mid-afternoon, late evening and midnight to determine diurnal variation. Sampling shall be lagged behind sunrise and sunset..

The laboratory techniques described in the preoperational monitoring program report #13* shall be employed for the zooplankton with the exception that statistically representative samples (2 replicate samples from the intake forebay and 2 replicate samples from the discharge forebay) shall, in addition, be counted for live and dead organisms as soon as possible after collection. Further studies shall use incubated samples to determine survivorship of entrained zooplankton over periods up to twenty-four hours after return to ambient water temperatures.

Phytoplankton Entrainment

Phytoplankton samples shall be collected in the intake forebay and in the discharge forebay following passage through the condenser. Sampling frequency shall be at least monthly. Samples shall be collected

*Benton Harbor Power Plant Limnological Studies. Part XIII. Cook Plant Preoperational Studies 1972. 281 p. March 1973.

at three times during one twenty-four hour period in early morning, at mid-day and in late evening. Sampling intensity is dependent on the presence of a diurnal pattern; should no diurnal pattern be observed in the samples during 1974 when the Plant is pumping water without having a warm water plume, statistically reliable (e.g., replicate samples) sampling at each of the above locations shall be proposed. Species composition and abundance, as well as chlorophyll a and phaeo-pigments shall be recorded for each sample.

The laboratory techniques in the preoperational monitoring program report # XIII shall be employed for phytoplankton with the exception that in addition chlorophyll a and phaeo-pigment investigations shall be performed (Strickland and Parsons, 1972*). The ratio of chlorophyll a to phaeo-pigment may be used to assess viability. Long and short-term effects of condenser passage on phytoplankton shall be studied using incubated samples to determine survivorship of entrained organisms over periods up to forty-eight hours. Comparison of samples from different locations should allow assessment of effects on phytoplankton due to condenser passage.

Reporting Requirement

As specified in Section 5.4.

Basis

The exact effect of Plant operation on zooplankton, fish eggs, and fish larvae is impossible to predict. It is therefore necessary to monitor the number of organisms passing through the cooling water system to estimate the probable effects. It will be necessary to establish numbers, species composition and data on biological viability so that gross environmental changes can be detected and total impact of Plant operation assessed. Comparison of samples from the different stations will allow assessment of condenser passage damage to species populations in the vicinity of the Plant.

4.1.2.1.4 Visual Observation of the Intake and Discharge Structure Areas

Objective

To provide firsthand knowledge of physical and ecological conditions as viewed through the eyes of trained divers in the areas about the structures and the adjacent lake bottom.

*Strickland, J. D. H. and T. R. Parsons (1972). A Practical Handbook of Seawater Analysis, Bulletin 167 Second Edition, Fisheries Research Board of Canada, 310 p.

Specification

A standard monthly underwater survey during April through October using divers shall be undertaken. Diving operations will be dependent on favorable weather conditions. The diving program shall be undertaken to provide visual observations of environmental conditions as viewed through the eyes of trained divers to complement segments of the general ecological survey.

Five dives are planned each month. Four of these dives shall be daylight dives; two shall be done in the area of the intake and discharge structures with the other two daylight dives being in control areas outside the plume. The intake and discharge locations shall be examined and sampled for algae, periphyton, decaying material, attached macrophytes, fish, mollusks and crayfish. In the area about the discharge, indications of bottom scouring shall be observed. The night dive shall be made in a depth of 30 feet and observations shall be made to compare day and night conditions (including fish). The preservation of samples and the laboratory techniques employed shall be the same as those employed for the samples collected on the regular preoperational sampling scheme of the general ecological survey.

Reporting Requirement

As specified in Section 5.4.

Basis

These dives will permit direct visual observations of the areas most subject to change, should changes occur due to Plant operation, and will supplement information obtained in the general ecological survey.

(Section 4.1.2.2 deleted)

4.1.2.3 Land Management

Objective

The restoration and maintenance programs for all onsite and offsite transmission line rights-of-way (ROW) are designed to minimize any adverse impact on terrestrial and aquatic biota within the ROW and to preclude use of maintenance and restoration practices that might result in potentially adverse impacts on biota or areas adjacent to the ROW.

Specification

1. Initial right-of-way preparation practices shall minimize soil disturbance. Bare areas shall be sown to grass and native shrub and herbaceous vegetation shall be encouraged, to minimize use of chemical control practices for ROW maintenance.

2. All herbicides shall be used in conformity with their legal registration. All local, state, and Federal regulations governing their selection and use shall be complied with.

3. If the phenoxy herbicides 2,4,5-T or Silvex (2,4,5-TP) are used:

   a. The guaranteed content of 2,3,7,8-tetrachlorodibenco-p-dioxin (TCDD) shall be less than 0.1 ppm.

b. No application closer than 100 feet to homes, bodies of water, recreation areas, or any area where there is significant likelihood of human exposure, unless authorized by approved label instructions.

c. Only low volatile ester or amine formulations shall be used.

4. All herbicide applications shall be by selective techniques. Spray droplets for ground spraying shall be greater than 200 m. These selective techniques shall not include foliar sprays for non-phenoxy herbicides closer than 50 feet to a body of water.

5. As soon as the Federal program for certification of professional pesticide applicators is implemented, all herbicide treatment of transmission line rights-of-way shall be performed by, or under the immediate supervision of, an individual so certified.

6. Aerial spraying should not be carried out in winds greater than 5 mph. Pilot certification should be in accordance with 14 CFR 137.

7. Violations of this specification shall be reported within 30 days as specified in Section 5.4.2.1 and also in the annual Environmental Operating Report as specified in Section 5.4.1.

Basis

Transmission line ROW restoration and maintenance programs will limit impacts on terrestrial and aquatic biota, and areas of human habitation, within and outside of the ROW. These programs also will result in ROW management procedures which implement updated restrictions on the application of biocides, and measures to minimize erosion, consistent with safe and reliable transmission of electrical energy.

4.1.2.4 Statistical Methods for Sampling and Data Analysis*

Objective

Statistical methods and procedures to be utilized for sampling and data analysis are employed to (1) provide a quantitative description of biological, chemical and physical parameters, onsite and in the lake, in the vicinity of the Plant, (2) enable statistical comparison of spatial and/or temporal differences between samples collected from different areas and/or at different times, and (3) establish sampling schedules which will assure recognition of gross changes in biological, chemical and physical conditions in the environment resulting from Plant operation.

Specification

1. Quantitative data shall be collected whenever possible. The licensee shall treat, statistically, both biological and chemical data collected in the environmental surveillance programs; these data must be analyzed to describe the effects of Plant operation on selected biological, physical and chemical parameters in the vicinity of the Plant.

2. For quantitative description of each area of interest and each time of interest, descriptive statistics shall include, unless justifiably omitted, the mean, standard error, and 95% confidence interval for the mean, and in each case the sample size shall be clearly indicated. If diversity indices are used to describe a collection of lake or terrestrial organisms, the specific diversity indices utilized shall be stated.

3. The general statistical procedure for spatial and/or temporal comparisons is "analysis of variance," which shall be used unless it is shown to te inappropriate and suitably replaceable in a given data analysis situation. When appropriate, more than one environmental factor shall be analyzed simultaneously (i.e., a "Factorial experimental design" will be employed), and factor interactions shall be considered for ecological interpretation. Following analysis of variance, the use of multiple comparison testing shall be engaged in where appropriate. In employing analysis of variance procedures, the use of data transformations shall routinely be considered in order to achieve improvement in satisfying the underlying statistical assumptions. If such assumptions can not be approximated by such considerations, then the use of nonparametric analysis of variance shall be considered as a last resort.

4. The amount of sample replication shall be determined by statistical criteria, unless otherwise approved by the regulatory staff. For spatial and temporal comparisons of each biological and chemical lake variable, it is to be estimated, where possible statistically, the magnitude of true difference which is detectable by the statistical procedure to be used (e.g., by analysis of variance).

   Unless otherwise justified, all statistical considerations shall take place at the 5% level of significance, using sufficient replication to achieve statistical power of at least 95%.

Basis

The use of standard statistical procedures, in analyses of data collected in the preoperational and operational monitoring programs for the Cook Plant, will permit objective conclusions to be drawn respecting actual differences in environmental conditions over time and space and will provide a strong quantitive description of biological, physical and chemical parameters studied. Replication of data is employed to ensure the applicability of statistical estimation and analysis.

*Underlined terms and procedures are found in biostatistics books, for example:

1) Zar, J. H. 1974. Biostatistical Analysis. Prentice-Hall Inc.
2) Sokal, R. R., and F. J. Rohlf. 1969. Biometry. W. H. Freeman Co.
3) Snedecor, G. W., and W. G. Cochran. 1967. Statistical Methods. Iowa State Univ. Press.
4) Steel, R. G. D., and J. H. Torrie. 1960. Principles and Procedures of Statistics. McGraw-Hill.

TABLE 4.2-1 (Continued)

RADIOLOGICAL
ENVIRONMENTAL MONITORING PROGRAM
DONALD C. COOK NUCLEAR PLANT

Sample Type	No. Stations Ind.	Bkg.	Collection Frequency	Analysis Frequency	Type Analysis	Remarks
Aquatic Organisms or Vegetation (as available)	2	2	2/year	2/year	Gama Spectral Sr-87, Sr-90	
Milk	4*	3**	Monthly	Monthly	I-131	
				Monthly	Gama Spectral Sr-89, Sr-90	
Sediment	2	2	2/year	2/year	Gama Spectral Sr-89, Sr-90	
TLD	6	4	Quarterly	Quarterly	Total Dose	
Human Food Crops			Annually	Annually	Gamma Spectral	

* The four indicator stations shall be within 5 miles of the Plant. If fewer than four locations meeting this requirement are available, the number of indicator stations may be reduced.

**The three background stations shall be between 5 and 20 miles of the Plant. If fewer than three locations meeting this requirement are available, the number of background stations may be reduced. At least one background station shall be established within 50 miles of the Plant, if available.

Amendment No. 26, Unit 1
Amendment No. 8, Unit 2

f. Number of times intake screens are cleaned between sampling intervals.

g. The distance from shore and depth from which the water is withdrawn.

2. Fish collection data shall include:

a. Number of eggs and fish larvae, expressed as number per cubic meter of intake water, for each species collected. Size of eggs and fish larvae shall be measured from all samples except subsampling will be used when catches are in excess of 100 per sample.

b. Numbers and, if possible, species determinations for all eggs collected.

c. Volume of water sampled.

d. Number, total length, and weight of all juvenile and adult fish for each species collected.

e. Sex and breeding condition for representative sample of each species collected.

f. The number of dead fish in the vicinity of the trash racks shall be noted once each month using visual estimation techniques. Dead fish should be removed from this area at the beginning of the sampling period.

g. The number of Mysis relicta and Pontoporeia affinis collected in the intake water when sampling for fish eggs and larvae quantified as above.

B. Radioactive Effluent Release Report

A report on the radioactive discharges released from the site during the previous 6 months of operation shall be submitted to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation) within 60 days after January 1 and July 1 of each year. The report shall include a summary of the quantities of radioactive effluents released as outlined in Regulatory Guide 1.21, with data summarized on a quarterly basis following the format of Appendix B thereof.

The report shall include a summary of the meterological conditions concurrent with the release of gaseous effluents during each quarter as outlined in Regulatory Guide 1.21, with data summarized on a quarterly basis following the format of Appendix B thereof. Calculated offsite does to humans resulting from the release of effluents and their subsequent dispersion in the atmosphere shall be reported in accordance with Regulatory Guide 1.21.

a. Gases

1. Quarterly sums of total curies of fission and activation gases released.

2. Average release rates (μCi/sec) of fission and activation gases for the quarterly periods covered by the report.

3. Percent of technical specification limit for release of fission and activation gases. This should be calculated in accordance with technical specification limits.

4. Quarterly sums of total curies for each of the radionuclides determined to be released based on analyses of fission and activation gases. The data should be categorized by (1) elevated releases, batch and continuous modes, and (2) ground level releases, batch and continuous modes.

4. Total body doses to individuals and populations in unrestricted areas from direct radiation from the facility.

5. Total body doses to the population and average doses to individuals in the population from all receiving-water-related pathways.

6. Total body doses to the population and average doses to individuals in the population gaseous effluents to a distance of 50 miles from the site. If a significantly large population area is located just beyond 50 miles from the site, the dose to this population group should be considered.

1. Meteorological Data

The report should include the cumulative joint frequency distribution of wind speed, wind direction, and atmospheric stability for the stability for the quarterly periods. Similar data should be reported separately for the meteorological conditions during batch releases.

Monthly reports on fish impingment (Section 4.1.2.1.2) shall be submitted to the Office of Nuclear Reactor Regulation.

5.4.2 NONROUTINE REPORTS

5.4.2.1 Abnormal Environmental Occurrence (AEO)

In the event of an AEO as defined in Section 1.1 a report shall be submitted under one of the report schedules described below.

1. Prompt Report. Those events requiring prompt reports shall be reported within 24 hours by telephone, telegraph, or facsimile transmission to the Director of the NRC Regional Office and within 10 days by a written report to the Director of the Regional NRC Office (with a copy to the Director, Office of Nuclear Reactor Regulation.

2. 30-Day Report. Those events not requiring prompt reports shall be reported within 30 days by a written report to the Director of the NRC Regional Office (with a copy to the Director, Office of Nuclear Reactor Regulation).

   The reporting schedule for reports concerning limiting conditions for operation and report levels are specified in the technical specifications. Reports concerning unusual or important AEO's shall be reported on the prompt schedule. The significance of an unusual or apparently important event with regard to environmental impact may not be obvious or fully appreciated at the time of occurrence. In such cases, the NRC shall be informed promptly of changes in the licensee's assessment of the significance of the event and a corrected report shall be submitted as expeditiously as possible.

The written report, and to the extent possible the preliminary telephone and telegraph report, shall: (a) describe, analyze and evaluate the AEO, including extent and magnitude of the impact, (b) describe the cause of the AEO, and (c) indicate the corrective action (including any significant changes made in procedures) taken to preclude repetition of the AEO and to prevent similar AEO's involving similar components or systems.

5.4.2.2 Changes

When a change to the Plant design, to the Plant operation, or to the procedures described in Section 5.3 is planned which involves an environmental matter or question not previously reviewed and evaluated by the NRC, a report on the change shall be made to the Office of Nuclear Reactor Regulation prior to implementation. The report shall include a description and evaluation of the change.

Changes or additions to permits and certificates required by Federal, state, local and regional authorities for the protection of the environment shall be reported. When the required changes are submitted to the

ENVIRONMENTAL IMPACT APPRAISAL AND SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NOS. 26 AND 8

TO FACILITY OPERATING LICENSE NOS. DPR-58 AND DPR-74

*

INDIANA AND MICHIGAN ELECTRIC COMPANY

INDIANA AND MICHIGAN POWER COMPANY

*

DOCKET NOS. 50-315 AND 50-316

INTRODUCTION

By letter dated March 1, 1978, the Indiana and Michigan Power Company (IMPC) requested changes to the Environmental Technical Specifications for D. C. Cook, Units 1 and 2 (Cook). The proposed changes include:

1. A change in the location of the measurements taken for determining the temperature at which deicing must commence. (Section 2.1.3.2)

2. A change in the type and amount of chemicals added to the water of the steam and feedwater systems and the plant heating boiler. (Section 2.2.2)

3. An increase in the annual limit of detergent discharged from the plant, and a modification of the section so that the limits on chemical discharge covered by this section become reporting requirements. (Section 2.2.3)

4. The deletion of Section 3, which deals only with descriptions of the plant that are already covered in other reference sources.

5. A modification to Section 4.1.1.2 which would increase duration of the four surveillance intervals for conducting thermal plume studies.

6. A deletion of the requirement to report well depths and groundwater strata of wells on an annual basis, and an addition of a requirement to monitor the groundwater level in each well. (Section 4.1.1.5)

7. A reduction in the number of wells that must be monitored. (Section 4.1.1.5)

8. A reduction in the frequency of groundwater flow tests. (Section 4.1.1.5)

9. Deletion of the requirement for monitoring terrestrial biota (on the basis that the survey has been carried out). (Section 4.1.2.2)

10. Replacement of the radioactive effluent release report requirements described in Section 5.4.1.B with a reference to Regulatory Guide 1.21.

11. Revision of Section 5.4.2.1 so that this section conforms to Draft Regulatory Guide 4.8 (Reporting Requirements). Several other sections which deal with reporting requirements have also been modified accordingly.

12. Certain requirements for installing equipment and submitting reports which were included in Appendix B are deleted because these requirements have been met. The sections affected are: 2.1.1.2, 2.1.3.2, 2.4.2.g, 2.4.4.b, 4.1.1.2, 4.2.2.4, 4.1.1.4 and 4.1.2.1.1.5.

13. Editorial changes to Sections 2.1.1.2.4, 2.4.3.d and 4.1.2.1.1.5.

14. The replacement of the waste gas storage tank effluent radiation monitor with the Auxiliary Building ventilation system radiation monitor for the purpose of automatically isolating the waste gas storage tanks. (Table 2.4-4)

15. A reduction in the number of milk background stations in the event that less than three such stations become available for use. (Table 4.2-1)

A proposal was included in the IMPC submittal which would change the allowable chlorine limits (Section 2.2.1.2). This action remains open, and will be handled in a separate action at a later date.

Also we considered certain changes from the IMPC proposal appropriate. These changes have been discussed with and agreed to by the IMPC's staff.

DISCUSSION AND EVALUATION - ENVIRONMENTAL CHANGES

1. Deicing Temperature Location (Section 2.1.3.2)

Because of ice cover and frequent equipment-damaging conditions, a change is proposed for the location of measuring the temperature at which deicing must terminate. The present limit refers to ambient lake temperature whereas the proposed limit will refer to intake temperature. During deicing operation, the intake temperature increases more than the ambient lake temperature. Thus, we find the proposed change to be more conservative from an environmental impact standpoint and, therefore, acceptable.

2. Steam and Feedwater Chemistry (Section 2.2.2)

IMPC has proposed to change the type and amount of chemicals added to the water of the steam and feedwater systems and the plant heating boiler. The following table depicts the chemicals and concentrations that are currently in use and those proposed.

Chemical	Current ppm	Proposed ppm
Phosphate	.025	.007
Morpholine	.006	none
Ammonium-OH from Hydrazine	.031	.17
Sulfite	none	.036

IMPC is proposing this change as it will improve the efficiency of the water treatment procedure. The staff has proposed that the subject be moved from this section to a new Section 4.1.1.6, pp. 4.1-13 and 4.1-14. The result of this will be to convert the limits of chemicals controlled by this section to report requirements.

Evaluation: The D. C. Cook Final Environmental Statement (FES) did not predict that these chemicals would have an adverse impact on the environment. Operational data support a conclusion of no significant adverse impact. Thus, it is no longer necessary to include them as limiting conditions for operation. Including them as report requirements will provide the staff the information to take action if necessary.

The concentrations of phosphate and morpholine used in these systems will be lower than that now used, and as such, will have less potential environmental impact; however, the concentrations of ammonium hydroxide and sulfite will be greater than that now used. We find the change in the limits (now report requirements) to be acceptable on the following basis:

(1) Hydrazine reacts to form ammonium hydroxide, which in turn, reacts to form ammonia. It is the ammonia which can have destructive environmental effects. The chemical equilibrium between the ammonium hydroxide and the ammonia is such that, at a discharge concentration of ammonium hydroxide of 0.17 ppm, the equilibrium concentration of ammonia would be about 0.002 ppm. This is 10 percent of the EPA "Red Book" limit for toxicity to aquatic life. Thus, we expect the discharge to have an insignificant environmental impact.

(2) Under worst case conditions the discharge of sulfite will be less than 0.036 ppm. Sulfite reacts quickly in the natural environment to form sulfate. The concentration of sulfate in the lake is around 20 ppm, thus, the natural lake sulfate concentration and the equilibrium chemical kinetics between sulfate and sulfite will determine the equilibirum sulfite concentration. The sulfite released from the plant will be low, consequently we conclude that it will have a negligible effect on the concentration of sulfate or sulfite.

3. Detergent Discharge Limit (Section 2.2.3)

This section deals with chemical discharges other than chlorine and corrosion and deposition inhibitors. The staff has proposed that the subject be moved from this section to a new Section 4.1.1.7, pp. 4.1-15 through 4.1-17. The result of this will be to convert the limits on chemicals controlled by this section to report requirements. IMPC has also proposed an increase for the annual limit (now report level) of detergent discharged from the plant. The present limit is 3,000 lbs/year and the proposed report level is 5,000 lbs/year. IMPC also requested that the specification allowing a one-time discharge of detergent to the cleaning pond be deleted as the cleaning has been completed.

Evaluation: The FES did not predict that these chemicals would have an adverse impact on the environment. Operational data supports this conclusion of no significant adverse impact. Thus, we conclude that it is no longer necessary to include them as limiting conditions for operation. Including them as report requirements will provide the staff the information to take action if necessary.

The environmental concern of the change of the limit (now report requirement) of detergent usage is the phosphate content. The detergent used at this facility contains 0.7 percent phosphate. Thus, under the proposed level, 35 lbs/year of phosphate would be discharged to the lake. If the detergent were discharged uniformly and continuously, we calculate that the level will still be well below the natural level of about 40 ppb, and, therefore, that there will be an insignificant environmental impact. On this basis, we find the change to be acceptable.

4. Deletion of Section 3

IMPC has requested deletion of Section 3 of Appendix B on the basis that it contains only descriptions and specifies no monitoring requirements and no operating limits.

Evaluation: This section gives background information on the station and its operation. Since this information has been placed in the NRC docket files under oath or affirmation, we conclude that the section may be deleted without effect on the environmental impact of the station.

5. Thermal Plume Studies Surveillance Intervals (Section 4.1.1.2)

IMPC is required to conduct thermal plume studies during at least four specified periods annually. The four periods are one month in duration and begin on February 15, April 15, June 15, and November 1. During each of these periods a minimum of 5 days of data collection, with at least two thermal plume resolutions per day, are required. IMPC has requested that a 15-day extension be allowed when unit outages prevent completion of the data collection during the specified 1-month period.

Evaluation: In view of the following facts, we find this change to be acceptable.

(1) To collect data, weather conditions must not be extreme and the total plant power output must be greater than 75 percent. Occasionally both of these conditions do not exist during a sampling period.

(2) The intent here is to get data that represents seasonal averages. The extra 15-day period will not invalidate the results.

6. Monitoring and Reporting Requirements for Wells (Section 4.1.1.5)

IMPC is now required to annually report well depths and groundwater strata of wells that are samples. IMPC has proposed to delete this reporting on the basis that this information does not change, and has proposed this information will be submitted on a one-time basis.

In addition, a requirement to monitor the groundwater level in each well has been proposed.

Evaluation: We agree with the above basis for this change and, therefore, find it acceptable. We are of the opinion that subsurface rock and soil layers are not likely to change such that water strata would change. We find IMPC's proposal to provide new data on new wells or modifications to existing ones acceptable. Also, we conclude that groundwater level measurement is necessary information related to potential radioactive spills and should be included in the ETS to assure periodic updating.

7. Number of Wells to be Monitored (Section 4.1.1.5)

IMPC proposes to eliminate the groundwater sampling from four wells: 2, 3, 6 and 7 on the basis that samples from wells 1a, 8, 11 and 12 will be sufficient for determining possible groundwater contamination.

Evaluation: Monitoring wells 1a, 8, 11 and 12 are located South, East, North and West, respectively, of the process sanitary waste ponds. These ponds are the only source of possible chemical contamination to the groundwater. We examined the locations, depths and distances of these wells from this potential source and conclude that the proposed remaining four monitoring stations will be adequate to detect significant contamination.

8. Frequency of Groundwater Flow Tests (Section 4.1.1.5)

The present specification requires that groundwater flow tests be made each year. The proposed specification requires them to be done once every 2 years instead.

Evaluation: The purpose of these flow (or propagation) tests is to ensure that the interval between well-water sampling tests (26 weeks) is short enough to detect potential contaminants from the onsite absorption field at an early stage of propagation from the point of introduction. The groundwater velocities are low and have been exhibiting a decreasing trend. We have considered the low propagation rate that would be associated with the low measured values and conclude that future measurements of flow rate at two year intervals will, essentially accomplish the desired purpose of assuring that the well water is sampled at an appropriate frequency.

9. Deletion of Terrestrial Biota Monitoring (Section 4.1.2.2)

IMPC has requested deletion of the requirement for monitoring terrestrial biota on the basis that the survey has been carried out.

Evaluation: We have reviewed the annual reports for 1975 and 1976 and conclude that the applicant has met the objectives of ETS 4.1.2.2. No significant adverse changes were found in the terrestrial flora and fauna and the data indicate that none are likely to occur. We, therefore, conclude that the requirement has been satisfied and that deletion of ETS 4.1.2.2 is acceptable.

10. Radioactive Effluent Release Reports (Section 5.4.1.B)

The radioactive effluent release report requirements are described in detail in this section. IMPC proposes to delete this description and to replace it with reference to NRC Regulatory Guide 1.21. Also, IMPC has proposed an editorial change to delete the monthly fish reporting requirement from this section as it already appears in Section 4.1.2.1.2.

Evaluation: This change is acceptable because Regulatory Guide 1.21 represents the most up-to-date reporting requirements established by the staff. We also concur with the licensee's basis for deleting the fish reporting requirement from this section and find it acceptable.

11. Reporting Requirements (Section 5.4.2.1 and Related Sections)

IMPC proposes to revise this section (5.4.2.1) to conform to NRC Draft Regulatory Guide 4.8. The proposed wording distinguishes between two types of nonroutine reports, a prompt and a 30-day report and proposed the new wording on the basis that the existing wording does not distinguish between the two clearly enough. To make this consistent with other parts of the ETS, wording would be added in the different sections of the ETS to refer to the appropriate type of report. These sections are Section 2.1.3.2, p. 2.1-4; Section 2.2.1.2, p. 2.2-1; Section 2.2.2.2., p. 2.2-3; Section 4.1.1.6, p. 4.1-13; Section 4.1.2.1.2, p. 4.1-31; and Section 4.1.2.3.7, p. 4.1-37.

Evaluation: We find that these proposed changes are consistent with the intended purpose of these specifications, provide only clarification impact changes and, therefore, are acceptable.

12. Deletion of Satisfied Equipment and Report Requirement

IMPC has informed NRC of methodology for making certain measurements, installed certain equipment and has submitted certain reports as required by various sections of the ETS. Following is a list of these satisfied requirements:

Requirement	Section	Page
Deadline for installing thermal discharge alarm instrumentation	2.1.1.2	2.1-2
Method for calculating ambient temperature	2.1.3.2	2.1-4
Deadline for installing equipment for monitoring radioactivity in steam generator blowdown	2.4.2.g	2.4-3
Deadline for installing equipment for monitoring gaseous release of radioactivity	2.4.4.b	2.4-8
Deadline for submitting methodology for thermal surveys	4.1.1.2	4.1-3
Report models that are used to predict thermal plumes	4.1.1.2	4.1-3
Report methodology for measuring wind and lake currents	4.1.1.2	4.1-4
Report methodology used in drogue surveys	4.1.1.2	4.1-4
Describe hydraulic models and studies	4.1.1.4	4.1-8
Submit alternative intake designs	4.1.2.1.1.5	4.1-25
Deadline for installing turbine gland seal condenser	Table 2.4-4	2.4-18

Evaluation: Since it is already a matter of record that these requirements have been satisfied, we conclude that it serves no purpose to retain them in the ETS. Therefore, we find their removal to be acceptable. No environmental evaluation is necessary for this action.

With the above requirement to Section 2.1.3.2 satisfied, we find that reference to this section in definition 1.3 on page 1.1-1 is no longer appropriate and should be deleted.

13. Editorial Changes (Section 2.1.1.2.4, 2.4.3d and 4.1.2.1.1.5)

IMPC has proposed minor editorial changes to Section 2.1.1.2.4 and Section 2.4.3d. As these changes simply correct grammatical errors, we find these changes to be acceptable, and no environmental evaluation is necessary.

On pages 4.1-27 through 4.1-29 of Section 4.1.2.1.1.5, IMPC has proposed the replacement of labels I, J and M with the labels Q, R and W, respectively, which designate fish sampling stations. The reason is to eliminate a discrepancy that exists between the identification of these three sampling stations in the field sampling program and in the Environmental Technical Specifications. Recognizing the necessity for consistency, we concur with this editorial change. No environmental evaluation is necessary.

DISCUSSION AND EVALUATION - SAFETY-RELATED CHANGES

14. Selection of Another Radiation Monitor to Isolate the Waste Gas Storage Tanks (Table 2.4-4)

IMPC proposes to substitute the auxiliary building ventilation system radiation monitor for the waste gas storage tank effluent radiation monitor to automatically isolate the waste gas storage tanks. This automatic isolation is to terminate releases of radioactivity from these tanks should they exceed Technical Specification limits.

IMPC has experienced difficulties operating the waste gas storage tanks with the waste gas storage tank effluent radiation monitor. The monitor is located in a high background radiation area which has caused frequent spurious isolation of the tanks when the radioactivity of the gas being released is actually below the limits in the Technical Specifications. IMPC has proposed to rectify this problem through the use of the auxiliary building ventilation system monitor to automatically isolate these tanks. This monitor is not in a high background radiation area and thus will not be subject to these spurious isolation actions.

We have reviewed and evaluated the data given in the D. C. Cook 1 and 2 FSAR on the auxiliary building ventilation system monitor. Effluents leaving the waste gas storage tank must travel through the auxiliary building ventilation system. This means that the monitor located in the auxiliary building ventilation system will register the radioactivity of the gas discharged from the waste gas storage tanks. We conclude that the auxiliary bulding ventilation system monitor is capable of being calibrated and set to automatically terminate releases from the waste gas storage tanks should they exceed Technical Specification limits. In addition, this change is consistent with the requirements set forth in Standard Review Plan 11.5, which governs the monitoring requirements for radioactive effluents. Therefore, we conclude that this proposed change to Table 2.4-4 is acceptable.

15. Milk Background Stations (Table 4.2-1)

IMPC proposes to add a footnote to Technical Specifications Table 4.2-1 to allow fewer than three control stations within 20 miles of the plant for collecting milk samples when fewer than three such stations are available. These stations provide milk samples for establishing background radioactivity in milk for comparison with the indicator samples. The current NRC guidance on radiological environmental monitoring is given in a Radiological Assessment Branch "Position on Radiological Environmental Monitoring". This technical position is an update draft of Regulatory Guide 4.8 and states the staff guidance on radiological environmental monitoring programs necessary to implement the requirements of Appendix I to 10 CFR Part 50. This technical position recommends at least one station to collect control milk samples if available. Therefore, we conclude that the proposed change to Table 4.2-1 is acceptable provided it calls for the use of at least one control station within 50 miles of the plant to collect milk samples, if available. IMPC has agreed to addition of this provision.

ENVIRONMENTAL CONCLUSION AND BASIS FOR NEGATIVE DECLARATION

On the basis of the foregoing evaluations, it is concluded that there would be no significant environmental impact attributable to the proposed action. Having made this conclusion, the Commission has further concluded that no environmental impact statement for the proposed action need be prepared and that a negative declaration to this effect is appropriate.

CONCLUSION

We have also concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

7590-01

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-315 AND 50-316

INDIANA AND MICHIGAN ELECTRIC COMPANY

INDIANA AND MICHIGAN POWER COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY

OPERATING LICENSE

AND NEGATIVE DECLARATION

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 26 and 8 to Facility Operating License Nos. DPR-58 and DPR-74 issued to Indiana and Michigan Electric Company, which revised the Appendix B Technical Specifications for operation of the Donald C. Cook Nuclear Plant, Unit Nos. 1 and 2 (the facilities), located in Berrien County, Michigan.

These changes related to deicing measurements, water chemistry in plant systems, chemical discharges, thermal discharge surveillance, groundwater (well) monitoring, termination of biota monitoring, changes in reporting requirements to conform to NRC guides, deletion of one time requirements (equipment and reports) that have now been met, automated isolation of waste gas storage volume, milk background monitoring and miscellaneous minor editorial changes.

The application for the amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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 amendments.

The Commission has prepared an Environmental Impact Appraisal and Safety Evaluation for the revised Technical Specifications and has concluded that an environmental impact statement for this particular action is not warranted because there will be no environmental impact attributable to the action other than that which has already been predicted and described in the Commission's Final Environmental Statement for the facilities, dated August 8, 1978.

For further details with respect to this action, see (1) the application for amendments dated March 1, 1978, (2) Amendment Nos. 26 and 8 to Facility Operating License Nos. DPR-58 and DPR-74, and (3) the Commission's Environmental Impact Appraisal and Safety Evaluation. 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 Maude Reston Palenske Memorial Library, 500 Market Street, St. Joseph Michigan 49085. A copy of items (2)

and (3) 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 8th day of November, 1978.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors