Docket No. 50-315

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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

JAN 0 6 1977

Gentlemen:

The Commission has issued the enclosed Amendment No. 17 to Facility Operating License No. DPR-58 for the Donald C. Cook Nuclear Plant Unit No. 1 (D. C. Cook Unit No. 1). This amendment is in response to your two requests dated August 2, 1976. The amendment involves changes to the Appendix B Technical Specifications to substitute an annual Environmental Operating Report for the presently required semi-annual report and to discontinue certain beach erosion monitoring at the D. C. Cook site. In addition to these changes, several editorial changes have been made to reflect the current Commission organization. We have determined that your request to change the Environmental Operating Report from a semi-annual to an annual report conforms with the guidelines of Regulatory Guides 4.8 and 10.1 and to current regulatory practice for environmental reporting. In addition, we have reviewed your requirements for environmental reporting at D. C. Cook Unit No. 1 and concluded that the proposed change in reporting frequency would not reduce the type or amount of information presently required by your Technical Specifications. However, we have modified your proposed change to more closely conform with the report format of Regulatory Guide 4.8 by dividing the Environmental Operating Report into two sections, a radiological report and a non-radiological report. This modification has been discussed with and accepted by your staff. Based on the above, we conclude that your proposed change to the environmental reporting requirements, as modified, is acceptable.

By letter dated August 2, 1976, you also requested that those portions of the erosion monitoring program of Specification 4.1.1.3 which require lake bottom depth soundings and aerial shoreline surveys to determine the effects of plant discharges and pilings placed on shore, or in the lake, on beach and nearshore erosion be deleted

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DATE➤						

from the Appendix B Technical Specifications. To support your finding that beach and nearshore erosion conditions have stabilized and that the objectives of these monitoring programs have been fulfilled, you submitted a report entitled "Recommendations: Discontinue Monitoring of Shore Zone at Cook Plant" by Dr. J. L. Hough of the University of Michigan. We have reviewed Dr. Hough's report and have determined that the required monitoring by lake bottom soundings and aerial surveys has shown the measured erosion conditions to have stabilized and that continuing these programs would serve only to monitor a naturally-occurring erosion process. Therefore, the NRC staff concludes that the requirements for erosion monitoring by lake bottom soundings and aerial survey may be discontinued.

We have evaluated the potential for environmental impact of plant operation in accordance with the enclosed amendment. We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level, and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Since the amendment applies only to administrative details and the deletion of a non-radiological monitoring requirement which is no longer necessary, it does not involve significant new safety information of a type not considered by a previous Commission safety review of the facility. It does not involve a significant increase in the probability or consequences of an accident, does not involve a significant decrease in a safety margin, and, therefore, does not involve a significant hazards consideration. We have also concluded that there is reasonable assurance that the health and safety of the public will not be endangered by this action and such action will not be inimical to the common defense and security.

A copy of the related Notice of Issuance is also enclosed.

Sincerely,

Original Signed by:
James R. Ziemann

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Date held due to resolution of T.S.

OFFICE ➤	DOR:ORB-2	DOR:ORB-2	DOR:EEB	DSE:HMB	OELD	DOR:ORB-2
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DATE ➤	12/8/76	12/8/76	12/13/76	12/20/76	12/27/76	12/30/76

Enclosures:
1. Amendment No. 17 to
   License No. DPR-58
2. Notice

cc w/enclosures:
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U. S. Environmental Protection Agency
Federal Activities Branch
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Mr. Wade Schuler, Supervisor
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Honorable W. Mabry, Mayor
City of Bridgman, Michigan 49106

cc w/enclosures and cy of
 I&MECo filing dtd. 8/2/76:
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Division of Intergovenmental
  Relations
Lewis Cass Building, 2nd Floor
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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. 17
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 and Michigan Power Company (the licensees) dated August 2, 1976, 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.

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

FOR THE NUCLEAR REGULATORY COMMISSION

Original Signed by:
Dennis L. Ziemann

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: JAN 06 1977

ATTACHMENT TO LICENSE AMENDMENT NO. 17

FACILITY OPERATING LICENSE NO. DPR-58

DOCKET NO. 50-315

Replace the following pages of the Technical Specifications contained in Appendix B of the above-indicated license with the attached pages bearing the same numbers. The changed areas on the revised pages are identified by a marginal line. The page numbers with an asterisk are unchanged overleaf pages that are provided to maintain document completeness.

2.1-1	4.1-11
2.1-2*	4.1-12*
2.1-3*	4.1-13
2.1-4	4.1-14
2.2-1	4.1-15
2.2-2*	4.1-16*
2.2-3	4.1-25
2.2-4	4.1-26
2.2-5*	4.1-33
2.2-6	4.1-34*
4.1-3	4.2-1
4.1-4	4.2-2
4.1-5	5.3-1
4.1-6*	5.4-1
4.1-7	5.4-2
4.1-8	5.4-5*
4.1-9	5.4-6
4.1-10*	5.5-1

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°F + 1°F for Unit No. 1 and 17°F + 1°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°F or 24°F in excess of the intake temperature; the discharge temperature for Unit No.2 shall not exceed the smaller of 56°F or 18°F in excess of the intake temperature except as authorized in this specification. During the estimated one-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°F for Unit No. 1 or 20°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 separated 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 two minutes. The accuracy of the individual measurements shall be at least ± 1.0 °F considering the overall accuracy of the thermocuple and the recorder. The sensitivity of the measuring circuit shall be at least ± 0.2°F.

   If measurements cannot be made due to installed instrumentation system failure, intake and discharge temperatures shall be observed on thermometers or thermocuples 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.

   The alarm instrumentation is to be installed not later than November 1, 1975.

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 three 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 temperature 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

temperature drops below 35°F, the intake temperature will drop below 38°, and the limiting temperature will be established in terms of the condenser ΔT.

Operation with any malfunctioning circulating water pump out of service for either Unit will assure the ability to maintain the plant in operation for the relatively short period of time needed to reduce load to meet the specified maximum condenser ΔT and discharge temperature. The increased temperature will therefore be of short duration minimizing any adverse effects.

The temperature monitoring instruments located at each circulating pump discharge and at each condenser outlet will provide information sufficient for the determination of the condenser ΔT for each unit.

2.1.2 RATE OF CHANGE OF DISCHARGE TEMPERATURE

2.1.2.1 Objective

The purpose of this specification is to minimize the potential for thermal shock to the aquatic biota by limiting the rate of change of the discharge temperature.

2.1.2.2 Specification

The discharge temperature for each unit under normal operation, startup and shutdown (rapid shutdown is exempt from this specification) shall not change by more than 8°F in any hour, disregarding short time changes which are due to normal variations in circulating water flow. Violations shall be reported as required in Sections 5.4.1 and 5.4.2.1.

2.1.2.3 Monitoring Requirements

The rate of change of discharge temperature will be obtained from records of temperatures monitored and recorded as noted in 2.1.1.3 above.

2.1.2.4 Basis

The maximum discharge temperature change per hour (8°F) during normal operating conditions, and under normal startup and shutdown, will minimize the potential for thermal shock to fish of recreational and commercial importance. The immediate and rapid dilution of the circulating water at the discharge jets will reduce the plume water temperature to values well below 10°F above the ambient lake temperature. Thus, under normal startup and shutdown, the potential for thermal shock will be greatly reduced because of the combined effects of gradual discharge temperature changes and the fact that temperatures in most of the plume will be only slightly higher than ambient lake temperatures.

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 to the off-shore 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 if it was above 35°F.

3. Deicing shall be terminated when the ambient lake temperature is 36° or higher for a period of seven consecutive days. The method for measuring or calculating ambient lake temperature shall be submitted to the Regulatory staff.

4. Reporting of violations shall be as specified in Sections 5.4.2.1 and 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 buildup 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 periods 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 shall be included in the annual Operating Report. Any violations shall be reported 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 ninety days after Unit No. 1 has accumulated six months operation at a power level greater than 50%.

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, a 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.

2.2.2 CORROSION AND DEPOSITION INHIBITORS

2.2.2.1 Objective

The purpose of this specification is to limit the discharge to the lake of chemical corrosion and deposit inhibitors used in the steam and feedwater systems.

2.2.2.2 Specification

Chemicals in the steam generator blowdown liquid discharged to the lake shall be limited to the maximum annual quantities and maximum discharge concentrations below:

	Maximum Annual Discharge (lbs/yr)	Maximum Disch. Conc. ppm
Phosphate	7600	0.025
Morpholine	3100	0.006
Ammonia (from Hydrazine)	1800	0.031

Actual quantities of these chemicals used which are discharged to the lake shall be reported in the annual Operating Report. Any violations shall be reported as specified in Sections 5.4.1 and 5.4.2.1.

2.2.2.3 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). At least once a month during the initial operating period, a sample of each unit's cooling water discharge shall be collected and analyzed for control chemicals added to the steam cycle.

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

2.2.2.4 Basis

Hydrazine, morpholine and phosphate will be used for corrosion and deposit 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 20 gpm. When there is inleakage of primary coolant into the secondary coolant through the steam generator or when there is inleakage of circulating water (these are abnormal conditions) the phosphate content of the secondary coolant will intentionally be increased to a level no greater than 80 ppm and the blowdown rate will be increased to a level not greater than 250 gpm.

The maximum annual discharges of phosphate and morpholine permitted in the Specification correspond to normal operation 95% of the time of operation and operation at the maximum phosphate content and blowdown rate for 5% of the time. The morpholine concentration is expected to be maintained at 20 ppm in the blowdown at all times. Hydrazine will be added to the steam system as an oxygen-scavenging corrosion inhibitor. At the elevated operating temperature any of this chemical that has not reacted with oxygen will decompose to nitrogen and ammonia. The maximum annual discharge permitted in the specification is that corresponding to normal operation (0.02 ppm hydrazine) for 99% of the time of operation and the maximum concentration (96 ppm) for a maximum of 1% of the operating time for times just before and after shutdown. It is assumed the plant will operate 80% of the time in calculating maximum permitted releases.

Maximum discharge concentrations are calculated on the basis of a circulating water discharge rate that is the mean of those for Unit 1 and Unit 2.

No other plant corrosion or deposit inhibitors will be discharged to the plant environs.

2.2.3 OTHER CHEMICAL DISCHARGES

2.2.3.1 Objective

The purpose of this specification is to control or limit the release of chemicals, other than corrosion and deposit inhibitors, to the lake or the onsite absorption field to preclude or minimize potentially adverse impacts on aquatic or terrestrial biota due to plant operation.

2.2.3.2 Specification

The maximum quantities and discharge concentrations of other chemicals used in the plant which will be discharged to the lake and to the onsite absorption field shall be limited to the values specified in Table 2.2.1. Chemicals used in the plant shall be diluted and neutralized as required to give a pH in the range of 5.5 to 9 prior to discharge to the onsite absorption field. Excepting chlorine, no toxic chemical, e.g., chromates, mercury compounds, etc., shall be discharged to the lake or onsite absorption field. No oil or petroleum products shall be discharged to the lake or to the onsite absorption field. The composition and quantity of detergents (Table 2.2-1) used and discharged to the lake shall be reported in the annual Operating Reports.

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

TABLE 2.2-1

OTHER CHEMICAL DISCHARGES TO ENVIRONS

Chemical	Estimated Maximum Annual Discharge (per year)	Estimated Maximum Discharge Concentration (PPM)	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
Phosphate (2) (Tri- and Di-sodium)	11,700 lbs.	5,300	Used for preoperational cleaning of the Condensate and Feedwater Systems. (See Note 2)	Onsite absorption field
Detergents	3,000 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.

(2) Secondary System cleaning completed (7/73). Chemicals discharged were neutralized prior to pumping to onsite absorption field.

and hydrocarbons) that potentially could result from the cleaning operation. Actual quantities of the chemical species used in the cleaning operation, and the 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 in the next Section (2.2.3.3) that are discharged to the lake and to the onsite absorption field shall be reported in the annual Operating Report. Any violations of these specifications shall be reported as specified in Sections 5.4.1 and 5.4.2.1.

2.2.3.3 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 analyzed whenever any chemicals, other than spent regenerants, are drained to the sump.

2.2.3.4 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

(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% of rated load and continue until one year of plume measurements are obtained from Units 1 and 2 operating at at least 75% of rated loads. During each year the program shall consist of at least four (4) study periods 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

Each study period shall consist of a minimum of five (5) sampling days. During each sampling day, a minimum of two (2) plume resolutions shall be made. Plume studies are weather dependent, and the exact number of plume resolutions may vary dependent upon seasonal weather conditions.

Instrumentation and methodology for the thermal surveys shall be submitted to the NRC for approval and docketing prior to December 31, 1974. The description of the methodology shall include a detailed justification for the technique of determining the lake ambient temperature in those regions likely to be affected by the thermal plume. I

From these surveys, isotherm diagrams shall be prepared for the surface and depth profiles of the plume. The areas enclosed by the 3°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 3F degree 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.

Analytic and/or hydraulic models employed to predict the behavior of the plant discharge thermal plume (emanating from the discharge structures and the central intake structure) during deicing operation shall be reported to the NRC and referenced in the first Semiannual Operating Report. I

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. Detailed instrumentation and methodology shall be reported to the NRC for evaluation.

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 sand bars and offshore of the outer sand bar. 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. Initial instrumentation and methodology shall be reported to the NRC for approval. 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 two 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 sand bar, between the two sand bars, and offshore of the outer sand bar. 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. Methodology for the drogue surveys shall be reported to the NRC.

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 building mechanisms will operate to repair any ice-melting caused by the discharge plume. In addition, monitoring enables determination of beach and nearshore 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 three hundred feet south of the discharge scour bed to a point three hundred 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 1400 feet wide by 2400 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 six month intervals until at least one full year following the startup of Unit No. 2.

The licensee shall describe in one annual Operating Report, or reference published reports which describe, the hydraulic and/or analytic models, or studies, employed for predicting the effects of the Plant discharge, through the slot jet discharge ports, on the lake bottom in the vicinity of the Plant. 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.

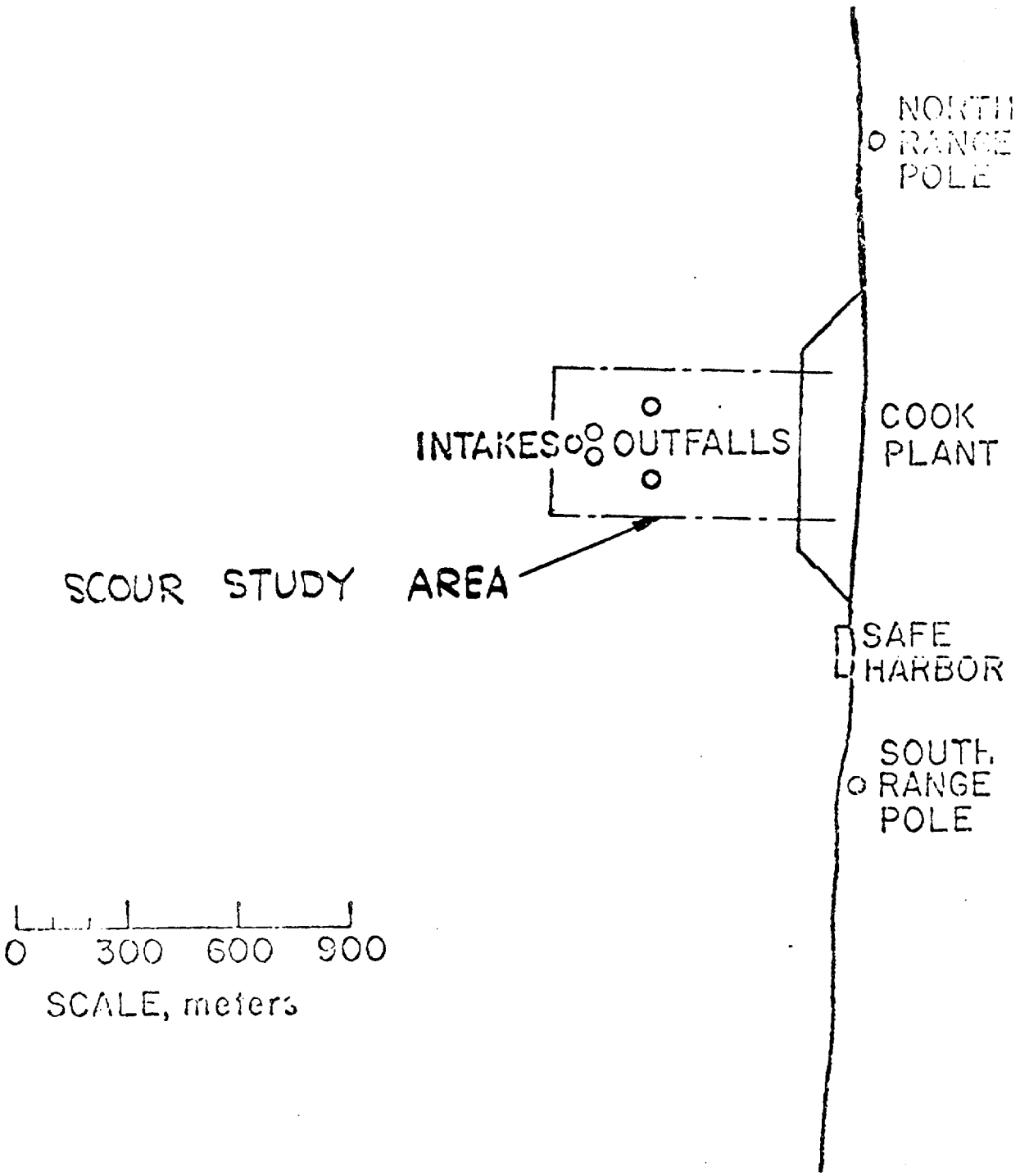

Figure 4.1.1.4-1 Map Showing The Location Of The Cook Plant Study Area

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 onsite absorption field by conducting flow-drawdown hydraulic pumping tests of the monitoring and observation wells at yearly intervals.

Water samples shall be taken from monitoring wells 1a, 2, 3, 6, 7, 8, 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 and 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 sampled shall be reported.

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.

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

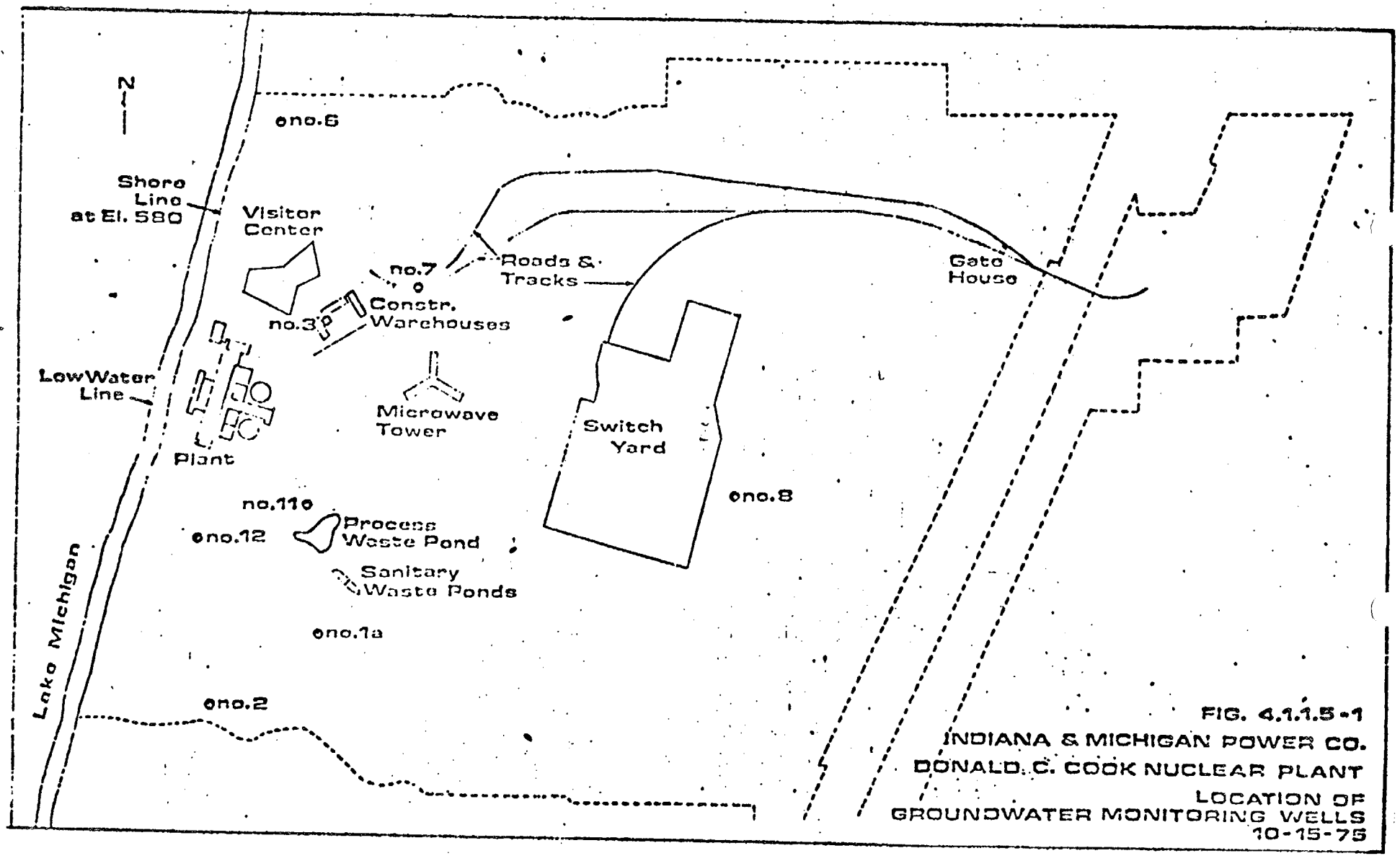

FIG. 4.1.1.5-1
INDIANA & MICHIGAN POWER CO.
DONALD C. COOK NUCLEAR PLANT
LOCATION OF
GROUNDWATER MONITORING WELLS
10-15-75

Basis

Periodic chemical analyses of groundwater samples will give adequate warning of any impending changes in water qualtiy 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 ground water onsite and what is the potential contribution of plant wastes to the lake.

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 post-operational (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, zooplankton, 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

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 eggs.

The licensee shall submit a plan describing alternative design modifications of the circulating cooling water system that could be implemented in the event that the present Plant circulating cooling water design is judged by the Regulatory staff to have an unacceptable impact on important fish species populations in the vicinity of the Plant.

These alternative designs shall be described in detail sufficient for staff evaluation of the merits and disadvantages of each design modification in relation to the probable success in minimizing mortality of different life history stages of important fish species known to occur in the vicinity of the Plant. This plan shall rank proposed modifications in order of priority choices for implementation and shall provide a basis for the sequence described. This plan shall be submitted to the Office of Nuclear Reactor Regulation, and must be approved, prior to December 31, 1974.

Subsequent to the granting of an operating license, the licensee shall continue to assess all appropriate concepts for minimizing potential adverse effect of Plant operation on lake wide 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 for 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 six 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 twenty-four hour period every fourth day after the initial six-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, 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 and 5.4.2.1.

Reporting Requirement

As specified in Section 5.4.

Until one 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

Reconnaissance surveys were carried out during the summer of 1973 to initially determine site habitat characteristics, to provide qualitative estimates of species present and their general distribution, and to establish sampling areas for future study.

The terrestrial ecology surveys are designed to establish a base line of site conditions at a time when modifications for construction will have been largely completed. Subsequent monitoring surveys will document company-sponsored reforestation and revegetation and their effects on flora and fauna, and also watch for possible ecological damage due to Plant operation.

While the outlined program utilizes advanced and statistically valid methodology, the licensee does not preclude a change in program methodology or scope, should improved techniques evolve or biological indicators emerge which in themselves adequately reflect any Plant induced ecological alterations. Changes in methodology will be reported in the annual Operating Report, whereas changes in scope must first be approved by the Office of Nuclear Reactor Regulation.

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 ft. 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 application shall be by selective techniques. Spray droplets for ground spraying shall be greater than 200 μm. 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 as required in Section 5.4.2.1 and 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 differrent 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.

4.2 RADIOLOGICAL ENVIRONMENTAL MONITORING

Objective

1. To establish a sampling schedule which will assure recognition of changes in radioactivity in the environment surrounding the plant.

2. To verify that offsite concentrations of radioactive materials and doses due to plant operation are within allowable limits.

Specification

1. Samples shall be collected and analyzed according to the schedule established by Table 4.2-1.

2. This program shall be continued until four years after licensing of Unit 2, at which time the licensee will evaluate the extent to which the program has met its objectives, and may request from the NRC permission to implement changes in the program.

3. Suitable analytical procedures shall be used to determine the radioiodine content of milk to a sensitivity of 0.5 picocuries per liter of milk at the time of sampling. Overall error (one sigma confidence level) of this analytical procedure will be within $\pm$ 25%.

4. Milk samples shall be obtained from those milk-producing cows actually in the area of highest dose potential. An annual survey shall be made during the grazing season to confirm that no milk producing cows are closer than the closest cow now sampled.

5. Deviations are permitted from the required sampling schedule if biological specimens are not obtained or if due to the malfunction of an automatic sampler. If the latter, corrective actions shall be completed prior to the end of the next sampling period. All deviations from the sampling schedule shall be described in the annual reports.

Reporting Requirements

A. Routine Reports

1. The annual report, specified in Section 5, shall contain:

a. A narrative summary of the results of offsite airborne environmental surveys performed during the report period.

b. For each medium sampled during the year, a list of the sampling locations, the total number of samples, and the highest, lowest, and the average concentrations for the highest location.

c. Figures showing locations of offsite and onsite sampling locations.

2. In the event that some results are not available within the 60 day period, the report should be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

3. If statistically significant variations of offsite environmental radionuclide concentrations with time are observed, a comparison of these results with effluent releases shall be provided.

4. Individual samples which show higher than normal levels (25% above background for external dose, or twice background for radionuclide content) will be noted in the report.

B. Non-Routine Reports

1. If a measured level of radioactivity in critical pathway environmental media samples indicates that the resultant annual dose to an individual from these levels could equal or exceed 4 times the design objective, a determination will be made as to whether or not such levels of radioactivity are attributable to plant operation. If attributable to plant operation, a report will be made to the Region III Office of Inspection and Enforcement within 24 hours and a plan will be submitted within one week advising the NRC of the proposed action to ensure the plant related annual doses will be within the design objective. If not attributable to plant operation, the rationale for this conclusion shall be included in the annual report.

2. If samples of critical pathway environmental media collected over a calendar quarter show total levels of radioactivity that could result in accumulated plant related doses to an individual for that quarter of 1/2 the annual design objective or for any 2 consecutive quarters of 3/4 the annual design objective a determination will be made as to whether or not such levels of radioactivity are attributable to plant operation. If attributable to plant operation, the results shall be reported and a plan submitted and implemented within 30 days to limit conditions so that the annual dose to an individual will not exceed the design objective. If not attributable to plant operation, the rationale for this conclusion shall be included in the annual report.

5.3 PROCEDURES

1. Detailed written procedures, including applicable check lists and instructions, shall be prepared and adhered to for all activities involved in carrying out the requirements of the Environmental Technical Specifications. Procedures shall include sampling, instrument calibration, analysis, and actions to be taken when limits are approached or exceeded. Testing frequency of any alarms shall be included. These frequencies will be determined from experience with similar instruments in similar environments and from manufacturer's technical manuals.

2. In addition to the procedures specified above, the Plant operating procedures shall include provisions to ensure that the Plant's systems and components are operated in compliance with the limiting conditions for operations established as part of the Environmental Technical Specifications.

3. The Plant procedures described above, and all changes thereto, will be reviewed and approved prior to implementation. Temporary changes to Plant procedures which do not change the intent or capability of the original procedure may be made, provided such changes are approved in writing by two members of the Plant management staff. Such changes will be documented and reported to the Regulatory staff. Any such changes which affect data required in the annual Operating Report shall be described in those Reports.

5.4 PLANT REPORTING REQUIREMENTS

5.4.1 ROUTINE REPORTS

A. Annual Environmental Operating Report

A report on all environmental surveillance programs for the previous 12 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 90 days after January 1 of each year. The first annual report shall be for the period ending December 31, 1977. The Annual Environmental Operating Report shall be divided into two volumes: non-radiological and radiological. The non-radiological volume shall include summaries, interpretations, and statistical evaluations as required in both the non-radiological environmental surveillance Technical Specifications and the environmental monitoring programs required by the limiting conditions for operation. The radiological volume shall include summaries, interpretations, and statistical evaluations as required in the radiological environmental surveillance Technical Specifications. Both volumes shall include, where required by individual Technical Specifications, comparisons with preoperational studies, operational controls, and previous environmental surveillance reports, and assessments of the observed impact of plant operations on the environment. Also included shall be a list of all violations of the limiting conditions for operation, details on the extent of each violation (including date, time, and duration) and reference to the written report required in Section 5.4.2.1. Approved changes in the Environmental Technical Specifications shall be described in the Annual Environmental Operating Report together with a reference to the documents requesting such changes.

In addition to information to be reported as specified in preceding Sections, certain data shall be reported for all periods during which condenser passage studies of fish and other organisms are conducted, as follows:

1. Plant operating data for the 24-hour period preceding sampling and during the 24-hour sampling period shall include:

   a. Volume of water pumped, number of circulating water pumps in operation and rated capacity of each pump.

   b. Temperature - intake and discharge.

   c. Intake water tempering or deicing-time started, duration and amount of warm water recirculated.

   d. Condenser cleaning - duration and concentration of total residual chlorine or other biocides in recirculating water.

   e. Current velocities at the intakes - for the range of water volumes used in plant operation.

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 below:

a. Gases

1. Quarterly sums of total curies of fission and activitation 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 releases 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.

i. Volumes

1. Quarterly sums, in liters, of total measured volume, prior to dilution, of liquid effluent released.

2. Quarterly sums of total determined volume, in liters, of dilution water used during the period of the report.

j. Solid Waste

The following information should be reported for shipments of solid waste and irradiated fuel transported from the site during the report period:

1. The semiannual total quantity in cubic meters and the semiannual total radioactivity in curies for the categories or types of waste.

   a) Spent resins, filter sludges, evaporator bottoms;
   b) Dry compressible waste, contaminated equipment, etc.;
   c) Irradiated components, control rods, etc.;
   d) Other (furnish description).

2. An estimate of the major nuclide composition in the categories of waste above.

3. The disposition of solid easte shipments. (Identify the number of shipments, the mode of transport, and the destination.)

4. The disposition of irradiated fuel shipments. (Identify the number of shipments, the mode of transport, and the destination.)

k. Radiological Impact on Man

Potential doses to individuals and populations should be calculated using measured effluent and meteorological data. A semiannual summary report should be submitted containing the following information:

1. Total body and significant organ doses to individuals in unrestricted areas from receiving-water-related exposure pathways.

2. Total body and skin doses to individuals exposed at the point of maximum offiste ground-level concentrations of radioactive materials in gaseous effluents.

3. Organ doses to individuals in unrestricted areas from radioactive iodine and radioactive material in particulate form from all pathways of exposure.

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 impingement (Section 4.1.2.1.2) shall be submitted to the Office of Nuclear Reactor Regulation.

5.4.2 NON-ROUTINE 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 made within 24 hours by telephone and telegraph to the Director, Region III, Office of Inspection and Enforcement, followed by a written report within one week to the Director, Region III, Office of Inspection and Enforcement (cc to Director of Office of Nuclear Reactor Regulation). 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 AEOs 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

concerned agency for approval, they shall also be submitted to the Director, Office of Nuclear Reactor Regulation, USNRC, for information. The submittal shall include an evaluation of the environmental impact of the change.

Request for changes in environmental technical specifications shall be submitted to the Director, Office of Nuclear Reactor Regulation, USNRC, for prior review and authorization. The request shall include an evaluation of the impact of the change, including a supporting benefit-cost analysis.

5.4.2.3 Radioactive Discharges

The reporting requirements for radioactive discharges are specified in Section 2.4 of the Environmental Technical Specifications.

5.5.2.4 Radiological Environmental Monitoring

Reporting involving radiological environmental monitoring is discussed in Section 4.2 of the Environmental Technical Specifications.

5.5 RECORDS RETENTION

5.5.1 RECORDS RETAINED FOR LIFE OF PLANT

Records and logs relative to the following areas will be retained for the life of the Plant:

a. Records and drawing changes reflecting Plant design modifications made to systems and equipment as described in Section 5.4.2.2.

b. Records of environmental surveillance data.

c. Records to demonstrate compliance with the limiting conditions for operation in Section 2.

5.5.2 RECORDS RETAINED FOR FIVE YEARS

All other records and logs relating to the Environmental Technical Specifications shall be retained for five years.

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-315

INDIANA AND MICHIGAN ELECTRIC COMPANY
INDIANA AND MICHIGAN POWER COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 17 to Facility Operating License No. DPR-58, issued to Indiana and Michigan Electric Company and Indiana and Michigan Power Company (the licensees), which revised the Technical Specifications for operation of the Donald C. Cook Nuclear Plant Unit No. 1 (the facility), located in Berrien County, Michigan. The amendment is effective as of the date of its issuance.

The amendment changed the Appendix B Technical Specifications to substitute an annual Environmental Operating Report for the presently required semi-annual report and to eliminate certain beach erosion monitoring requirements at the D. C. Cook plant site.

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

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

For further details with respect to this action, see (1) the August 2, 1976 letters of application for amendment, and (2) Amendment No. 17 to License No. DPR-58. Both 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 Preston Palinske Memorial Library, 500 Market Street, St. Joseph, Michigan 49085. A single copy of item (2) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 6th day of January, 1977.

FOR THE NUCLEAR REGULATORY COMMISSION

Original Signed by:
Dennis L. Ziemann

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors