

MAY 12 1972

Docket Nos. 50-254
and 50-265

Commonwealth Edison Company
ATTN: Mr. Byron Lee, Jr.
Assistant to the President
P. O. Box 767
Chicago, Illinois 60690

Gentlemen:

In response to your applications, as amended, and your letter dated April 12, 1972, and supplement thereto dated April 28, 1972, enclosed are Amendments Nos. 3 and 1 to Facility Operating Licenses Nos. DPR-29 and DPR-30, respectively. These amendments authorize operation of the Quad-Cities Nuclear Power Station Units 1 and 2 each at steady state power levels up to 2260 MWt (90% of rated power) to meet emergency power demands. Nonradiological specifications have been incorporated in each license as part of the Technical Specifications.

Prior to operation at 90% of rated power, Units 1 and 2 shall be tested at this power level in all modes stipulated for the 100% power tests in the Startup Test Program of the FSAR and amendments. Deviations from the program must be approved by the Commission. Testing at 100% power in accordance with the above test program shall be performed prior to commencing operation at 100% rated power unless you can justify to the Commission's satisfaction that test data at 100% power are not required.

A copy of each of the following items also is enclosed:

1. A Notice of Issuance of Amendments to Facility Operating Licenses, which is being filed with the Office of the Federal Register for publication, and
 2. The Discussion and Conclusions of Environmental Impact by the USAEC Directorate of Licensing concerning the Proposed Issuance of Licenses for Emergency Operation of Quad-Cities Nuclear Power Station Units 1 and 2.
-

MAY 12 1972

The amendments are effective immediately and will expire October 1, 1972, unless extended for good cause shown or upon the earlier issuance of superseding licensing actions.

Sincerely,

15/

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Enclosures:

- 1. Amendment No. 3 to License No. DPR-29
- 2. Amendment No. 1 to License No. DPR-30
- 3. Federal Register Notice
- 4. Discussion and Conclusions

cc w/enclosures:

John W. Rowe, Esquire
Isham, Lincoln & Beale
Counselors at Law
One First National Plaza, 42nd Floor
Chicago, Illinois 60670

Mr. Charles Whitmore
President and Chairman
Iowa-Illinois Gas and Electric
Company
206 East Second Avenue
Davenport, Iowa 52801

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- ~~R. W. Sliger~~
- ~~G. G. Long~~
- A. Giambusso

*advised Byron Lee of
Commonwealth by
teletype on 5/12/72
at 11:25PM that the
Quod actis wants 182
license amendments
had been signed and
would be dated 5/12/72.
The restrictions in the
license related to max
power level were
read to Mr Lee -
DR Ziemann*

OFFICE ▶	L:ORA #2 RMD:egs:dc	L:ORA #2	L:ADOR	L:EP	OGC	L:DDRP H.C. signed
SURNAME ▶	JIRiesland	DLZiemann	DJSkovholt	MGrotenhuis	TEngelhardt	AGGiambusso
DATE ▶	5/11/72	5/11/72	5/ /72	5/ /72	5/ /72	5/12/72

12/5/72

MAY 12 1972

RECORD NOTE RE: QUAD-CITIES EMERGENCY POWER AMENDMENTS

on May 9, 1972

In accordance with Commission Decision, the term of license ends September 15, 1972. Paragraph B(3) was revised to reflect exhausting reasonable alternates. The exact language was approved by Commissioners Doub and Ramey. As agreed at the Commission meeting* this constitutes final Commission approval.

Paragraph B(2) was revised to reflect the Commission's guidance at the meeting, i.e., the license should not contain more authorization than requested. The wording was subject to varied interpretation, so language more nearly similar to applicant's request was used.

A. Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

*Held May 9, 1972.

*In addition I consulted with
the CEQ (Bill Burk) and EPA (Bill
Holmberg) concerning plans to issue
the license. No objections raised*

AGJ
5/24/72

UNITED STATES ATOMIC ENERGY COMMISSION

DOCKET NOS. 50-254 AND 50-265

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

(QUAD-CITIES UNITS 1 AND 2)

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

Notice is hereby given that the Atomic Energy Commission (the Commission) has issued Amendments Nos. 3 and 1 to Facility Operating Licenses Nos. DPR-29 and DPR-30, respectively. These licenses previously authorized the Commonwealth Edison Company and the Iowa-Illinois Gas and Electric Company to possess, use and operate the Quad-Cities Nuclear Power Station Units 1 and 2 (both single-cycle, boiling water reactors and located in Rock Island County, Illinois) at steady state power levels up to 502 megawatts (thermal) per unit (20% of each Unit's rated power).

The amendments that are the subject of this notice authorize Commonwealth Edison Company (acting for itself and Iowa-Illinois Gas and Electric Company) to operate the Quad-Cities Nuclear Power Station, during the startup testing program, at power levels up to 2260 megawatts (thermal) when operating a single unit or at power levels up to 2511 megawatts (thermal) when operating both Units 1 and 2 simultaneously. After completion of the startup testing program, the amendments authorize

operation of each Unit singly or simultaneously with the other Unit at steady state power levels up to (1) 620 megawatts (thermal) at any time; (2) 1550 megawatts (thermal) when, in the judgment of the system load dispatcher, total demand is likely to exceed available capacity and other power sources are not available to meet system load demand; and (3) 2260 megawatts (thermal), if after exhausting all means reasonably available, system load demand requires the facility to exceed 1550 megawatts (thermal). Incorporated in the license amendments and issued therewith are Nonradiological Technical Specifications which govern activities at the Station related to protection of the environment. The license amendments for Unit 1 and Unit 2 revise the licenses in their entirety and are effective upon their date of issuance. The amended licenses will expire on September 15, 1972, unless extended for good cause shown or upon the earlier issuance of superseding licensing actions.

The Commission has found that the applications, as amended, comply with the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Chapter I, and has made the remainder of the findings as set forth in the amendments and has concluded that the issuance of these license amendments will not be inimical to the common defense and security or to the health and safety of the public. The Commission also has found that (1) considering and balancing the factors as described in the Commission's regulations in 10 CFR Part 50, Appendix D, Section D.3, the balance of such factors warrants the issuance of these amendments, and (2) the emergency demands for

power in the area served by the Station warrant the issuance of these amendments.

Notice of AEC Consideration of Issuance of Facility Operating License for operation of each of the Quad-Cities Units 1 and 2 at 2511 megawatts (thermal), full-power, was published in the Federal Register on March 16, 1971 (36 F.R. 5008). However, licenses for full-power have not been issued pending review of the additional environmental considerations, including the balancing of factors, required by the September 9, 1971 revision of Appendix D to 10 CFR Part 50. On March 9, 1972, the Commission's Draft Detailed Statement on Environmental Considerations was published in the Federal Register (37 F.R. 5073), and thereafter on March 24, 1972, a Supplementary Notice of AEC Consideration of Issuance of Facility Operating Licenses was published in the Federal Register (37 F.R. 6142). The supplementary notice provided 30 days for intervention on the environmental aspects of the operation of Quad-Cities Units 1 and 2. No request for a hearing by the applicants or petition for leave to intervene by any interested person have been filed following publication of the Notice of Consideration of Issuance of Facility Operating Licenses on March 16, 1971, and the publication of the Supplementary Notice on March 24, 1972, thereby permitting the licensing actions that are herein being noticed.

For further information concerning these actions, see copies of the following items which are available for public inspection at the

Commission's Public Document Room at 1717 H Street, N. W., Washington, D. C., and at the Moline Public Library at 504-17th Street, Moline, Illinois 61265: (1) Amendment No. 3 to Facility Operating License No. DPR-29 and Amendment No. 1 to Facility Operating License No. DPR-30, (2) the Technical Specifications dated October 1, 1971, and Nonradiological Technical Specifications, issued as part of Amendments 3 and 1, (3) Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company's applications, as amended, including the letter from Commonwealth Edison Company dated April 12, 1972, and supplement thereto dated April 28, 1972, (4) the Division of Reactor Licensing's Safety Evaluation for the Quad-Cities Units 1 and 2 dated August 25, 1971, (5) the report of the Advisory Committee on Reactor Safeguards dated March 9, 1971, (6) the Discussion and Conclusions of Environmental Impact by the USAEC Directorate of Licensing concerning the Proposed Issuance of Licenses to the Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company for Emergency Operation of Quad-Cities Nuclear Power Station Units 1 and 2 dated May 4, 1972, (7) the Discussion and Conclusions pursuant to Appendix D to 10 CFR Part 50 dated January 24, 1972, and supplement 1 thereto dated March 31, 1972, and (8) the Commission's Draft Detailed Statement of Environmental Considerations dated March 6, 1972. A copy of each of the above items, except for item (3), may be obtained, as supply last, upon request addressed to the Atomic Energy

Commission, Washington, D. C. 20545, Attention: Deputy Director
for Reactor Projects, Directorate of Licensing.

Dated at Bethesda, Maryland, this 12th day of May 1972.

FOR THE ATOMIC ENERGY COMMISSION

A. Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

May 12, 1972

Docket Nos. 50-254
and 50-265

Commonwealth Edison Company
ATTN: Mr. Byron Lee, Jr.
Assistant to the President
P. O. Box 767
Chicago, Illinois 60690

Gentlemen:

In response to your applications, as amended, and your letter dated April 12, 1972, and supplement thereto dated April 28, 1972, enclosed are Amendments Nos. 3 and 1 to Facility Operating Licenses Nos. DPR-29 and DPR-30, respectively. These amendments authorize operation of the Quad-Cities Nuclear Power Station Units 1 and 2 each at steady state power levels up to 2260 MWt (90% of rated power) to meet emergency power demands. Nonradiological specifications have been incorporated in each license as part of the Technical Specifications.

Prior to operation at 90% of rated power, Units 1 and 2 shall be tested at this power level in all modes stipulated for the 100% power tests in the Startup Test Program of the FSAR and amendments. Deviations from the program must be approved by the Commission. Testing at 100% power in accordance with the above test program shall be performed prior to commencing operation at 100% rated power unless you can justify to the Commission's satisfaction that test data at 100% power are not required.

A copy of each of the following items also is enclosed:

1. A Notice of Issuance of Amendments to Facility Operating Licenses, which is being filed with the Office of the Federal Register for publication, and
2. The Discussion and Conclusions of Environmental Impact by the USAEC Directorate of Licensing concerning the Proposed Issuance of Licenses for Emergency Operation of Quad-Cities Nuclear Power Station Units 1 and 2.

May 12, 1972

The amendments are effective immediately and will expire September 15, 1972, unless extended for good cause shown or upon the earlier issuance of superseding licensing actions.

Sincerely,

A Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Enclosures:

1. Amendment No. 3 to License
No. DPR-29
2. Amendment No. 1 to License
No. DPR-30
3. Federal Register Notice
4. Discussion and Conclusions

cc w/enclosures:

John W. Rowe, Esquire
Isham, Lincoln & Beale
Counselors at Law
One First National Plaza, 42nd Floor
Chicago, Illinois 60670

Mr. Charles Whitmore
President and Chairman
Iowa-Illinois Gas and Electric
Company
206 East Second Avenue
Davenport, Iowa 52801



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

FACILITY OPERATING LICENSE

Amendment No. 3
License No. DPR-29

The Atomic Energy Commission (the Commission) having found that:

- a. The application, as amended, complies with the requirements of the Atomic Energy Act of 1954, as amended (the Act), and the regulations of the Commission set forth in 10 CFR Chapter I;
- b. Construction of the Quad-Cities Nuclear Power Station Unit 1 (the facility) has been substantially completed in conformity with Provisional Construction Permit No. CPPR-23 and the application, as amended, the provisions of the Act, and the rules and regulations of the Commission set forth in 10 CFR Chapter I;
- c. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission;
- d. There is reasonable assurance (i) that the activities authorized by this operating license, as amended, can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the Commission;
- e. The Commonwealth Edison Company and the Iowa-Illinois Gas and Electric Company are technically and financially qualified to engage in the activities authorized by this operating license, as amended, in accordance with the rules and regulations of the Commission;
- f. The Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company have satisfied the applicable provisions of 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements";

- g. The issuance of this amended license will not be inimical to the common defense and security or to the health and safety of the public;
- h. Considering and balancing the factors as prescribed in the Commission's regulations in 10 CFR Part 50, Appendix D, Section D.3, the balance of such factors warrants the issuance of this amended license; and
- i. The emergency demands for power in the area served by the facility warrant the issuance of the amended license in accordance with the provisions of 10 CFR Part 50, Appendix D, Section D.3,

Facility Operating License No. DPR-29, as amended, issued to Commonwealth Edison Company (Commonwealth Edison) and Iowa-Illinois Gas and Electric Company (Iowa-Illinois) is hereby amended in its entirety to read as follows:

1. This license applies to the Quad-Cities Nuclear Power Station Unit 1, a single cycle, boiling, light-water reactor, and electric generating equipment (the facility) which is jointly owned by Commonwealth Edison and Iowa-Illinois. The facility is part of the Quad-Cities Nuclear Power Station located in Rock Island County, Illinois, and is described in the application for construction permit and facility license dated May 31, 1966, and subsequent amendments thereto, including the request for emergency power operation in excess of 20% station rated power dated April 12, 1972, and supplement thereto dated April 28, 1972 (the application).
2. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses Commonwealth Edison and Iowa-Illinois, pursuant to Section 104b of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities", to own the facility, as their interests appear in the application, and hereby licenses Commonwealth Edison, acting for itself and as agent for Iowa-Illinois:
 - A. Pursuant to Section 104b of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities", to possess, use, and operate the facility as a utilization facility at the location designated in the application, in accordance with the procedures and limitations described in the application and in this license;
 - B. Pursuant to the Act and 10 CFR Part 70, "Special Nuclear Material", to receive, possess and use at any one time up to 3000 kilograms of contained uranium 235 in connection with operation of the facility;

- C. Pursuant to the Act and 10 CFR Part 30, "Rules of General Applicability to Licensing of Byproduct Material", to receive, possess, and use in connection with operation of the facility:
- (1) any byproduct material with Atomic Numbers between 3 and 83, inclusive, as external contamination on fuel bundles, in any form not to exceed 500 millicuries per fuel bundle,
 - (2) three sealed sources of five curies each of cesium 137,
 - (3) three sealed sources of five microcuries each of cesium 137,
 - (4) ten sealed sources of strontium 90, each source not to exceed 0.3 millicurie,
 - (5) 1 millicurie each of cobalt 60 and cesium 137 in any form,
 - (6) six curies of americium 241 as a sealed source,
 - (7) twenty-eight sealed sources of 1530 curies each of antimony 124,
 - (8) twenty-five sealed sources of strontium 90, with no source to exceed 1.2 microcuries, and
 - (9) two sealed sources of 350 microcuries each of cobalt 60.
- D. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear materials as may be produced by operation of the facility.
3. This license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below:
- A. Maximum Power Level During Startup Testing Program
- Commonwealth Edison is authorized to operate Quad-Cities Unit No. 1 at steady state power levels not in excess of 2260 megawatts (thermal) when operating singly. Steady state power levels for Unit 1 shall be limited when operating jointly with Unit 2 such

that the aggregate station steady state power level shall not exceed 2511 megawatts (thermal) during the startup test program.

B. Maximum Power Level Subsequent to Completion of the Startup Test Program

Commonwealth Edison is authorized to operate Quad-Cities Unit No. 1 singly or simultaneously with Unit No. 2 at steady state power levels up to:

- (1) 620 megawatts (thermal) at any time;
- (2) 1550 megawatts (thermal) when, in the judgment of the system load dispatcher, total demand is likely to exceed available capacity and other power sources are not available to meet system load demand;
- (3) 2260 megawatts (thermal), if after exhausting all means reasonably available, system load demand requires the facility to exceed 1550 megawatts (thermal).

C. Technical Specifications

The Technical Specifications contained in Appendix A to this license that were issued October 1, 1971, Change No. 1 thereto dated April 19, 1972, and the Nonradiological Technical Specifications issued herewith as Appendix B are hereby incorporated in this license as the Technical Specifications. Commonwealth Edison shall operate the facility at the power levels specified in Conditions 3.A and 3.B of this license in accordance with these Technical Specifications. Commonwealth Edison may make changes in the Technical Specifications only when authorized by the Commission in accordance with the provisions of Section 50.59 of 10 CFR Part 50.

4. This amended license is issued without prejudice to subsequent licensing action which may be taken by the Commission with regard to the environmental aspects of the facility. Issuance of this amended license shall not preclude subsequent adoption of alternatives in facility design or operations of the type that could result from the environmental review called for by 10 CFR Part 50, Appendix D.

5. This license is effective as of the date of issuance, and shall expire at midnight, September 15, 1972, unless extended for good cause shown or upon the earlier issuance of a superseding licensing action.

FOR THE ATOMIC ENERGY COMMISSION

A. Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Enclosures:

1. Appendix A - Technical Specifications issued 10/1/71
2. Appendix B - Nonradiological Technical Specifications

Date of Issuance: May 12, 1972



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

FACILITY OPERATING LICENSE

Amendment No. 1
License No. DPR-30

The Atomic Energy Commission (the Commission) having found that:

- a. The application, as amended, complies with the requirements of the Atomic Energy Act of 1954, as amended (the Act), and the regulations of the Commission set forth in 10 CFR Chapter I;
- b. Construction of the Quad-Cities Nuclear Power Station Unit 2 (the facility) has been substantially completed in conformity with Provisional Construction Permit No. CPPR-24 and the application, as amended, the provisions of the Act, and the rules and regulations of the Commission set forth in 10 CFR Chapter I;
- c. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission;
- d. There is reasonable assurance (i) that the activities authorized by this operating license, as amended, can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the Commission;
- e. The Commonwealth Edison Company and the Iowa-Illinois Gas and Electric Company are technically and financially qualified to engage in the activities authorized by this operating license, as amended, in accordance with the rules and regulations of the Commission;
- f. The Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company have satisfied the applicable provisions of 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements";

- g. The issuance of this amended license will not be inimical to the common defense and security or to the health and safety of the public;
- h. Considering and balancing the factors as prescribed in the Commission's regulations in 10 CFR Part 50, Appendix D, Section D.3, the balance of such factors warrants the issuance of this amended license; and
- i. The emergency demands for power in the area served by the facility warrant the issuance of the amended license in accordance with the provisions of 10 CFR Part 50, Appendix D, Section D.3,

Facility Operating License No. DPR-30 issued to Commonwealth Edison Company (Commonwealth Edison) and Iowa-Illinois Gas and Electric Company (Iowa-Illinois) is hereby amended in its entirety to read as follows:

1. This license applies to the Quad-Cities Nuclear Power Station Unit 2, a single cycle, boiling, light-water reactor, and electric generating equipment (the facility) which is jointly owned by Commonwealth Edison and Iowa-Illinois. The facility is part of the Quad-Cities Nuclear Power Station located in Rock Island County, Illinois, and is described in the application for construction permit and facility license dated May 31, 1966, and subsequent amendments thereto, including the request for emergency power operation in excess of 20% station rated power dated April 12, 1972, and supplement thereto dated April 28, 1972 (the application).
2. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses Commonwealth Edison and Iowa-Illinois, pursuant to Section 104b of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities", to own the facility, as their interests appear in the application, and hereby licenses Commonwealth Edison, acting for itself and as agent for Iowa-Illinois:
 - A. Pursuant to Section 104b of the Act and 10 CFR Part 50, "Licensing of Production and Utilization Facilities", to possess, use, and operate the facility as a utilization facility at the location designated in the application, in accordance with the procedures and limitations described in the application and in this license;
 - B. Pursuant to the Act and 10 CFR Part 70, "Special Nuclear Material", to receive, possess and use at any one time up to 3000 kilograms of contained uranium 235 in connection with operation of the facility;

- C. Pursuant to the Act and 10 CFR Part 30, "Rules of General Applicability to Licensing of Byproduct Material", to receive, possess, and use in connection with operation of the facility:
- (1) any byproduct material with Atomic Numbers between 3 and 83, inclusive, as external contamination on fuel bundles, in any form not to exceed 500 millicuries per fuel bundle,
 - (2) three sealed sources of five curies each of cesium 137,
 - (3) three sealed sources of five microcuries each of cesium 137,
 - (4) ten sealed sources of strontium 90, each source not to exceed 0.3 millicurie,
 - (5) 1 millicurie each of cobalt 60 and cesium 137 in any form,
 - (6) six curies of americium 241 as a sealed source,
 - (7) fourteen sealed sources of 1530 curies each of antimony 124,
 - (8) twenty-five sealed sources of strontium 90, with no source to exceed 1.2 microcuries, and
 - (9) two sealed sources of 350 microcuries each of cobalt 60.
- D. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear materials as may be produced by operation of the facility.
3. This license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
- A. Maximum Power Level During Startup Testing Program

Commonwealth Edison is authorized to operate Quad-Cities Unit No. 2 at steady state power levels not in excess of 2260 megawatts (thermal) when operating singly. Steady state power levels for Unit 2 shall be limited when operating jointly with Unit 1 such

that the aggregate station steady state power level shall not exceed 2511 megawatts (thermal) during the startup test program.

B. Maximum Power Level Subsequent to Completion of the Startup Test Program

Commonwealth Edison is authorized to operate Quad-Cities Unit No. 2 singly or simultaneously with Unit No. 1 at steady state power levels up to:

- (1) 620 megawatts (thermal) at any time;
- (2) 1550 megawatts (thermal) when, in the judgment of the system load dispatcher, total demand is likely to exceed available capacity and other power sources are not available to meet system load demand;
- (3) 2260 megawatts (thermal), if after exhausting all means reasonably available, system load demand requires the facility to exceed 1550 megawatts (thermal).

C. Technical Specifications

The Technical Specifications contained in Appendix A to License No. DPR-29 issued October 1, 1971, Change No. 1 thereto dated April 19, 1972, and the Nonradiological Technical Specifications issued herewith as Appendix B are hereby incorporated in this license as the Technical Specifications. Commonwealth Edison shall operate the facility at the power levels specified in Conditions 3.A and 3.B of this license in accordance with these Technical Specifications. Commonwealth Edison may make changes in the Technical Specifications only when authorized by the Commission in accordance with the provisions of Section 50.59 of 10 CFR Part 50.

4. This amended license is issued without prejudice to subsequent licensing action which may be taken by the Commission with regard to the environmental aspects of the facility. Issuance of this amended license shall not preclude subsequent adoption of alternatives in facility design or operations of the type that could result from the environmental review called for by 10 CFR Part 50, Appendix D.

5. This license is effective as of the date of issuance, and shall expire at midnight, September 15, 1972, unless extended for good cause shown or upon the earlier issuance of a superseding licensing action.

FOR THE ATOMIC ENERGY COMMISSION

A. Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Enclosures:

1. Appendix A - Technical Specifications issued 10/1/71
2. Appendix B - Nonradiological Technical Specifications

Date of Issuance: May 12, 1972

APPENDIX B

TO

OPERATING LICENSES DPR-29 AND DPR-30:
NON-RADIOLOGICAL TECHNICAL SPECIFICATIONS

AND BASES

FOR

QUAD-CITIES STATION UNITS 1 AND 2

ROCK ISLAND COUNTY, ILLINOIS

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NUMBERS 50-254 AND 50-265

DATE OF ISSUANCE: May 12, 1972

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1.0 LIMITING CONDITIONS FOR OPERATION

1.1 CHLORINE EFFLUENT

Specification:

A. Normal Operation:

The free chlorine in the circulating water shall be maintained at ≤ 1.0 ppm in the center water box of each unit's condenser half during chlorination by the automatic control system.

B. Operation with Inoperable Components:

1. After the automatic feed rate controller is found or made to be inoperable, chlorination may continue on a manual basis, provided the free chlorine is maintained at ≤ 1.0 ppm in the center water box of each unit's condenser half as indicated by the automatic analyzer.

2.0 SURVEILLANCE REQUIREMENT

2.1 CHLORINE EFFLUENT

Specification:

A. Normal Operation:

At least once per calendar month during chlorination, a sample shall be taken from the center water box of each unit's condenser half to calibrate the automatic analyzer. In addition, at least once per week it shall be verified by visual observation of the analyzer that the residual in the center water box is being maintained at ≤ 1.0 ppm free chlorine.

B. Operation with Inoperable Components:

1. During chlorination with an inoperable automatic feed rate controller, the free chlorine in the center water box shall be verified as being ≤ 1.0 ppm by visual observation of the automatic analyzer immediately and daily thereafter.

LIMITING CONDITIONS FOR OPERATION

2. After the automatic analyzer is found or made to be inoperable, chlorination may continue on a manual basis, provided the free chlorine is maintained at < 0.5 ppm in the discharge canal downstream of the weir.

C. Corrective Action:

If free chlorine concentration in the discharge canal downstream of the weir exceeds an average of 0.5 ppm, as determined by an analysis of 3 samples, chlorination shall cease until the system is corrected.

SURVEILLANCE REQUIREMENT

2. During chlorination with an inoperable automatic analyzer the free chlorine in the discharge canal shall be verified as being ≤ 0.5 ppm by taking grab samples downstream of the weir in the discharge canal during the chlorination period and performing an overflow analysis for free chlorine immediately, and weekly thereafter.

C. Monitoring

A series of samples will be taken on a weekly basis during chlorination at the end of the discharge canal and at a sampling station just downstream of the side jet discharge to characterize the chlorine discharges to the Mississippi River. These samples will be analyzed for free and combined residual chlorine. Samples will also be taken at the same frequency when not chlorinating to ascertain background conditions.

Bases:

Each Quad Cities unit has its own main condenser. The design of these condensers is such that each main condenser is divided and has two parallel water flow paths. This physical division results in each condenser consisting of two condenser halves, with each condenser half containing an inlet, outlet, and center water box. The water flow in both condenser halves may also be reversed. As such the end water boxes may be either inlet or outlet water boxes depending on the direction of flow.

Chlorination for condenser cleaning purposes is accomplished by the injection of a sodium hypochlorite solution into the inlet water box. An automatic system controls the injection rate to maintain a preset free chlorine level as sampled in the center water box. The use of the center water box as a sampling point provides a common sample point when water flow is in either direction.

The free chlorine level is measured by an automatic analyzer, and the output of this analyzer is used to control the hypochlorite feed valves. A timer is used to control length of injection. Present practice is to inject 10 gpm, 3 times per day for ten minutes in each condenser half,

to maintain a .2 to .7 ppm free chlorine level as sampled in the center water box.

The .2 to .7 ppm free chlorine level, as analyzed from the sample in the center water box, is approximately representative of the free chlorine level leaving the exit water box of the condenser half being chlorinated due to the transit times involved both to the analyzer and through the remainder of the condenser itself. This level is also as low as can be detected on commercially available equipment. Upon mixing with the water from the condenser half not being chlorinated the free chlorine level is reduced to .1 thru .35 ppm by dilution.

The Limiting Conditions for Operation of 1.0 ppm as measured on the analyzer is a reasonable limit which will allow chlorine discharges to be maintained as low as practicable, and includes some small margin. The Limiting Conditions for Operation of 0.5 ppm as measured in the discharge canal after the weir, provides a comparable limit when the automatic system is out of service.

The 0.5 ppm controlled level at the weir is based on discussions in the draft environmental statement as to the levels expected with the procedures (p 58 ff) and the effects on the aquatic life (p85 ff). It has been found that some fish can detect and avoid levels of chlorine as low as 0.01 ppm,

and probably should not be exposed to levels of 0.1 ppm. Control of the chlorine to a maximum of 0.5 ppm at the condenser outfall (at the weir) should assure that less than 0.1 ppm will be discharged to the river. Therefore, the control level of 0.5 ppm is chosen to assure protection of aquatic life in the weir around the discharge point. To assure that the chlorine limits are not exceeded, monitoring points at the discharge into the river and at the sampling station downstream of the side jet discharge are specified. The chlorine levels at the latter monitoring points could be too low to measure precisely; therefore, a measurable value of 0.5 ppm was specified at the location immediately after discharge from the station condenser and prior to dilution by the river of the discharge.

The free chlorine level will further decay in transit to the river such that at operational levels such as these, chlorine discharges to the river will be even further reduced. The monitoring program described will define this reduction and demonstrate that chlorine discharges have been kept to minimal levels.

LIMITING CONDITIONS FOR OPERATION

1.2 TEMPERATURE LIMITATIONS

Not applicable during side jet discharge operation.

SURVEILLANCE REQUIREMENT

2.2 TEMPERATURE LIMITATIONS

A temperature monitoring program will be conducted as specified in Table 2.3.1 (A).

Bases:

No limiting conditions of operation are applicable to temperature variations during an interim period when Quad Cities Station will operate to meet critical power needs. Reference Commonwealth Edison (Byron Lee, Jr.) letter to Division of Feactor Licensing (Dr. Peter A. Morris) dated April 12, 1972.

LIMITING CONDITIONS FOR OPERATION

1.3 NON-RADIOLOGICAL ENVIRONMENTAL
MONITORING

A non-radiological environmental program will be conducted to monitor the effects of plant operation on the environment.

SURVEILLANCE REQUIREMENT

2.3 NON-RADIOLOGICAL ENVIRONMENTAL
MONITORING

The non-radiological environmental monitoring program will be conducted as specified in Table 2.3.1.

TABLE 2.3.1

NON-RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

A. TEMPERATURE AND DISSOLVED OXYGEN

Temperature and dissolved oxygen (DO) monitoring at Quad-Cities Station will be conducted to document ambient and discharge plume temperatures and DO in the River at Quad-Cities Station. Three existing temperature sensors and three DO sensors, used to obtain pre-operational data, will be augmented with four additional temperature sensors and one additional DO sensor to define more adequately the thermal regime above and below the plant. Information from the sensors will be telemetered into the station control room and duly recorded.

Specifically, five temperature sensors and two DO sensors will be located in the side jet discharge area; three temperature sensors and one DO sensor will be considered as the minimum necessary to adequately monitor the discharge area. Two temperature sensors and two DO sensors will be located in the intake area to record ambient data; one temperature sensor and one DO sensor will be considered as the minimum necessary to adequately monitor the intake area.

In addition, four continuous recording thermometers will be placed in down-

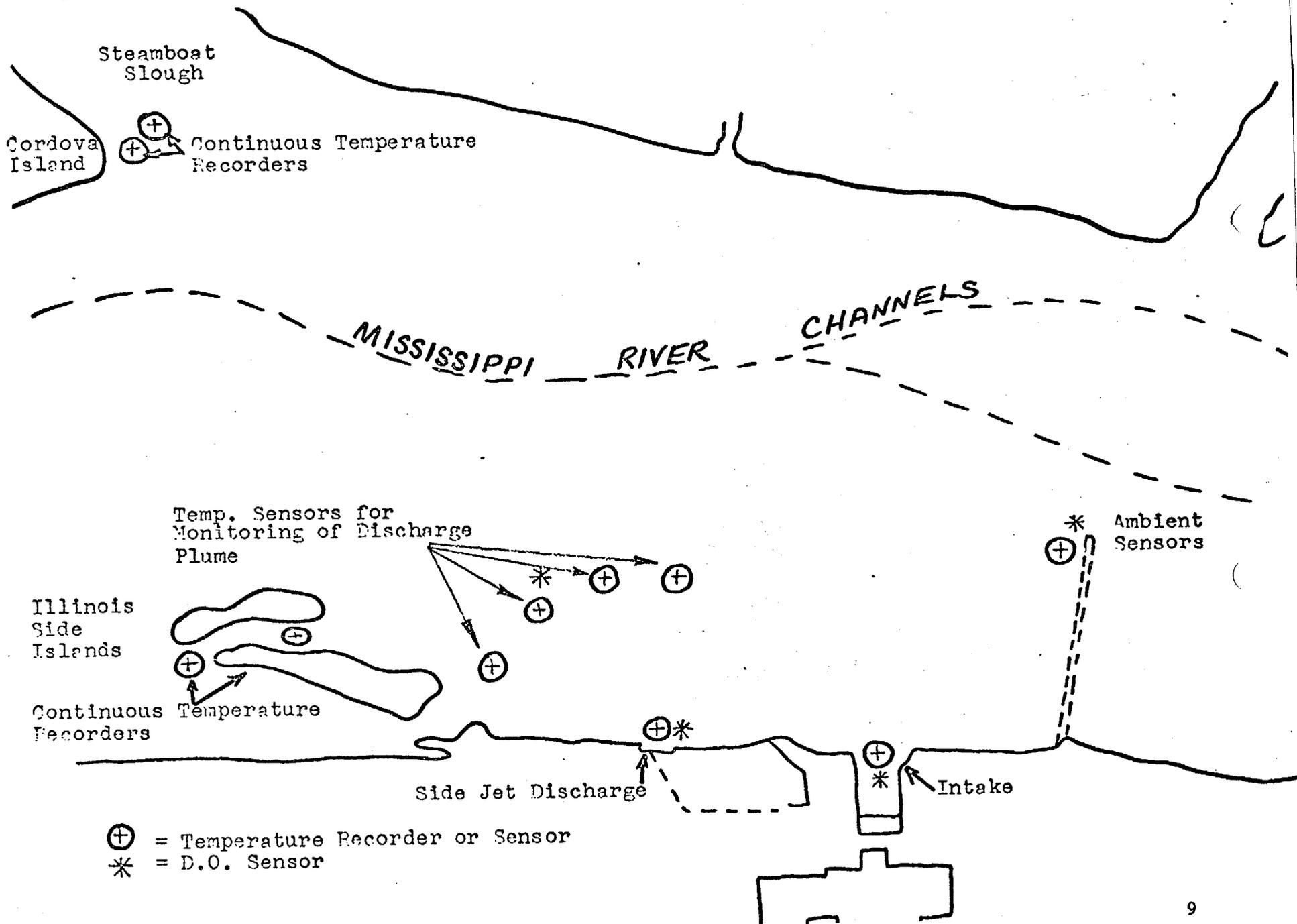
stream island areas. Two will be placed in the island area below the side jet discharge and two others in the Steamboat Slough area; one recording thermometer in each area will be considered as the minimum necessary to adequately monitor the downstream island areas. These continuous recorders will monitor the rate of change of River temperature due to Quad-Cities Station cooling water effluent.

Monthly thermal mapping surveys will be performed in the Illinois island area during side jet operation. Each of these surveys shall be conducted at the highest practicable power level. Power level and river flow shall be recorded during the thermal mapping surveys. The thermal survey maps will be included as part of the monitoring program report.

See attached map, Figure 2.3.1, for the location plans of sensors and recorded thermometers.

TEMPERATURE AND DO MONITORING STATIONS

Fig. 2.3.1



B. WATER QUALITY

Monitoring at the Quad-Cities Station will be conducted to determine if differences in water chemistry exist between preoperational and operational periods and between sampling stations above the plant, in the discharge plume, and downstream at the Quad-Cities Station. Three sampling stations for this monitoring are shown in Figure 2.3.2. Stations 1 (above the plant) and 2 (in the discharge plume area) were preoperational monitoring sites. Station 3, in the downstream area just below the Illinois islands, will be added to determine if any changes in water chemistry due to thermal effects persist downstream.

The chemical parameters that will be determined, and sample collection frequencies, are shown in Table B-1. Parameters which, based on previous sampling results, have shown the greatest variations, or any with in-month variation, will be sampled on a weekly basis. The remaining parameters will be sampled on a monthly basis.

Samples will be collected at a depth greater than one foot but at least one foot off the bottom.

Laboratory techniques and analytical procedures will follow Standard Methods for the Analysis of Water and Wastewater (1971).

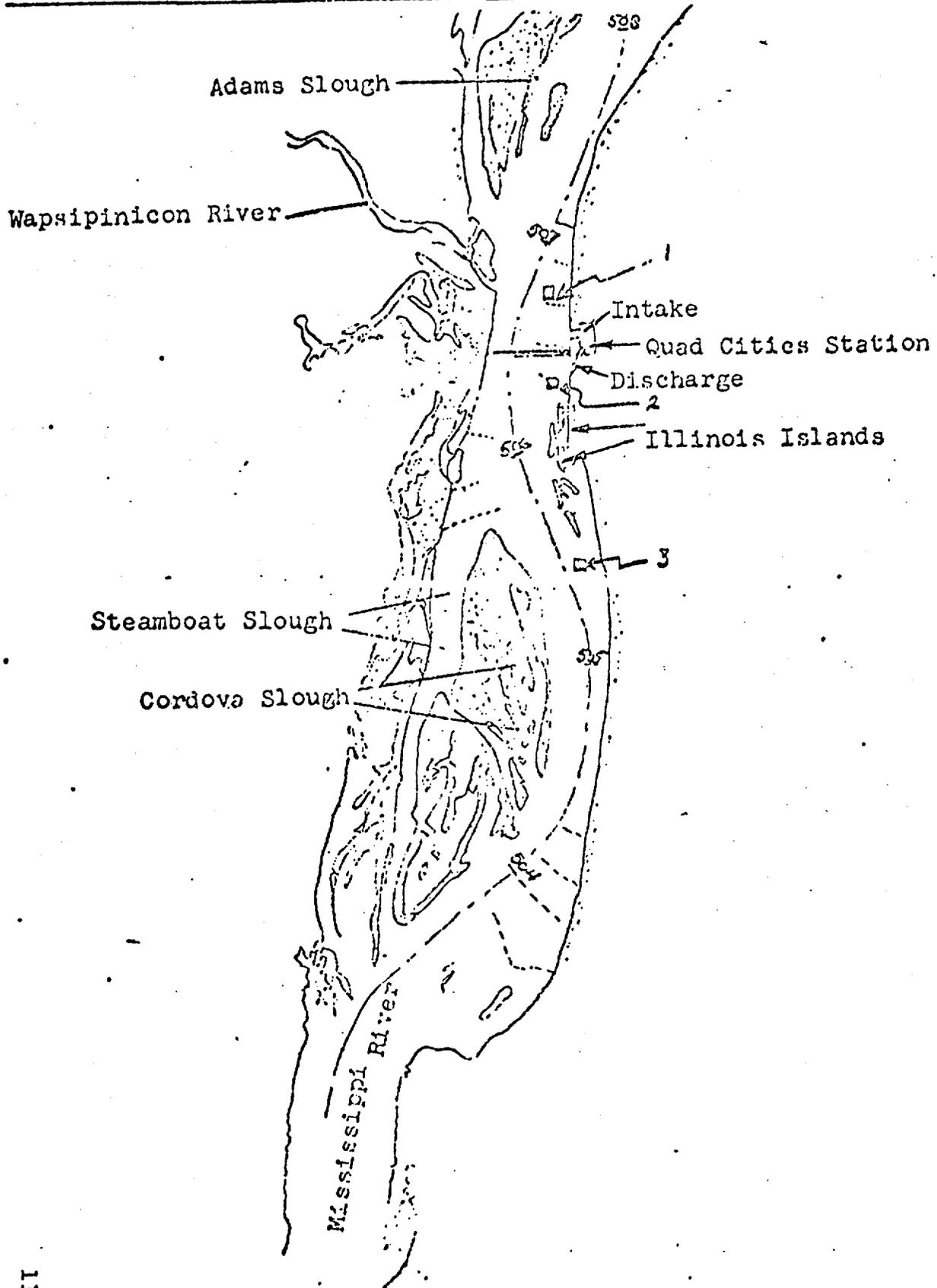


TABLE B-1

WATER QUALITY PARAMETERS TO BE MONITORED & SAMPLING FREQUENCY

WEEKLY (WK) and MONTHLY (MO)

<u>Parameter</u>	<u>Frequency</u>	<u>Parameter</u>	<u>Frequency</u>	<u>Parameter</u>	<u>Frequency</u>
1. Total Bacteria, 20°C	MO	12. pH	WK	25. Ferrous Iron	MO
2. Coliform Bacteria	MO	13. Calcium Hardness	WK	26. Total Iron	MO
3. Fecal Coliform Bacteria	MO	14. Alkalinity	WK	27. Copper	MO
4. Fecal Strepto- cocci Bacteria	MO	15. Total Phosphate	WK	28. Zinc	MO
5. Threshold Odor	MO	16. Orthophosphate (soluble)	WK	29. Lead	MO
6. Color	MO	17. Nitrate Nitrogen	WK	30. Mercury	MO
7. Turbidity	WK	18. Ammonia Nitrogen	WK	31. Total Organic Carbon (TOC)	MO
8. Dissolved Oxygen (D.O.)	WK	19. Cyanides	MO	32. Residual Chlorine	MO*
9. Biochemical Oxygen Demand (BOD)	WK	20. Phenols	MO	33. Silica	MO
10. Chemical Oxygen Demand (COD)	MO	21. Total Dissolved Solids	MO		
11. Temperature	WK	22. Total Suspended Solids	MO		
		23. Specific Conductance	MO		
		24. Manganese	MO		

* Weekly at sampling station #2, which is in the discharge plume, and at the additional station at the end of the discharge canal.

TABLE 2.3.1

NON-RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

1. MACROINVERTEBRATE COMMUNITIES

Operational monitoring of the growth and species composition of periphyton and associated macroinvertebrate communities on artificial substrates will be conducted. Comparison of growth and species composition will be made at all sites between preoperational and operational periods, and between all sites (areas).

The location of substrate samples will be one upstream of the intake, one in the intake canal, one in the Illinois island area, and one in the downstream area, below the mixing zone. These sampling locations are shown in Figure 2.3.3. Samples will be taken monthly.

In addition, an artificial substrate sampler will be placed in the discharge canal to evaluate any effects on periphyton and associated macroinvertebrates in the canal. Samples will be taken monthly.

2. MICROINVERTEBRATE COMMUNITIES

Operational monitoring for plankton (phytoplankton and zooplankton), benthic populations, and sediments will be conducted.

Comparisons of plankton and benthic population characteristics (size, composition and diversity) and sediment composition will be made between preoperational and operational periods and between stations above and below the discharge.

Plankton samples, benthic samples, and sediment samples will be collected at two week intervals. Sample locations are shown in Figure 2.3.4. The sampling locations are: 1) upstream of the intake, 2) in the Illinois island area, 3) just downstream of these islands, 4) in Cordova Slough, 5) in an Illinois shore line area a little over a mile and a half below the plant.

Additional bottom sediment and benthic sampling stations will be established to assess the impact on sedimentation and benthic population on the installation of the diffuser pipe. Three sampling stations will be located immediately above and three immediately below the diffuser system. These are also shown in Figure 2.3.4. Sediment and benthos samples will be collected prior to construction, and every other week during construction and for two months after operation begins.

Figure 2.3.3

Macroinvertebrate Communities

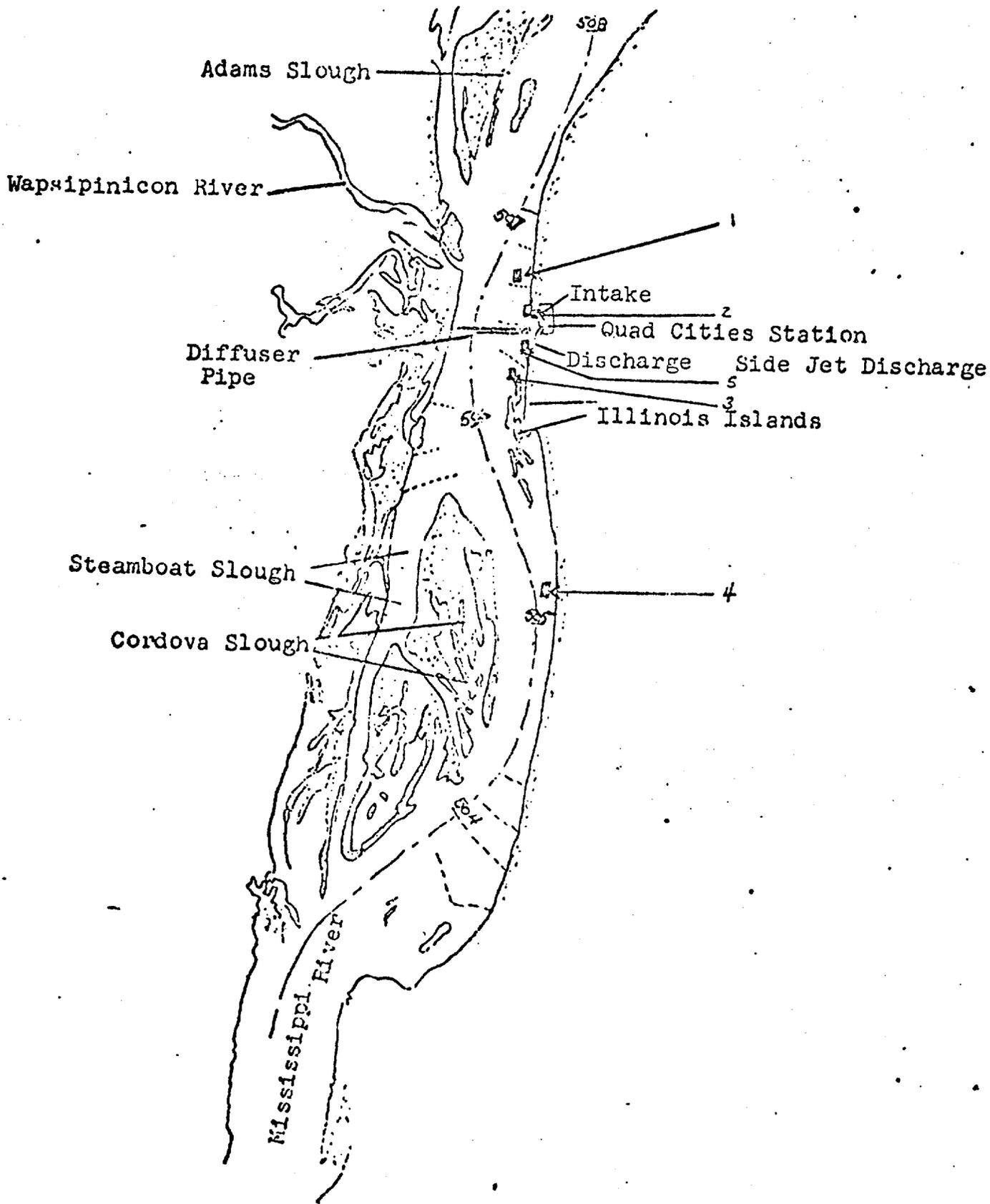


Figure 2.3.4

Microinvertebrate Communities

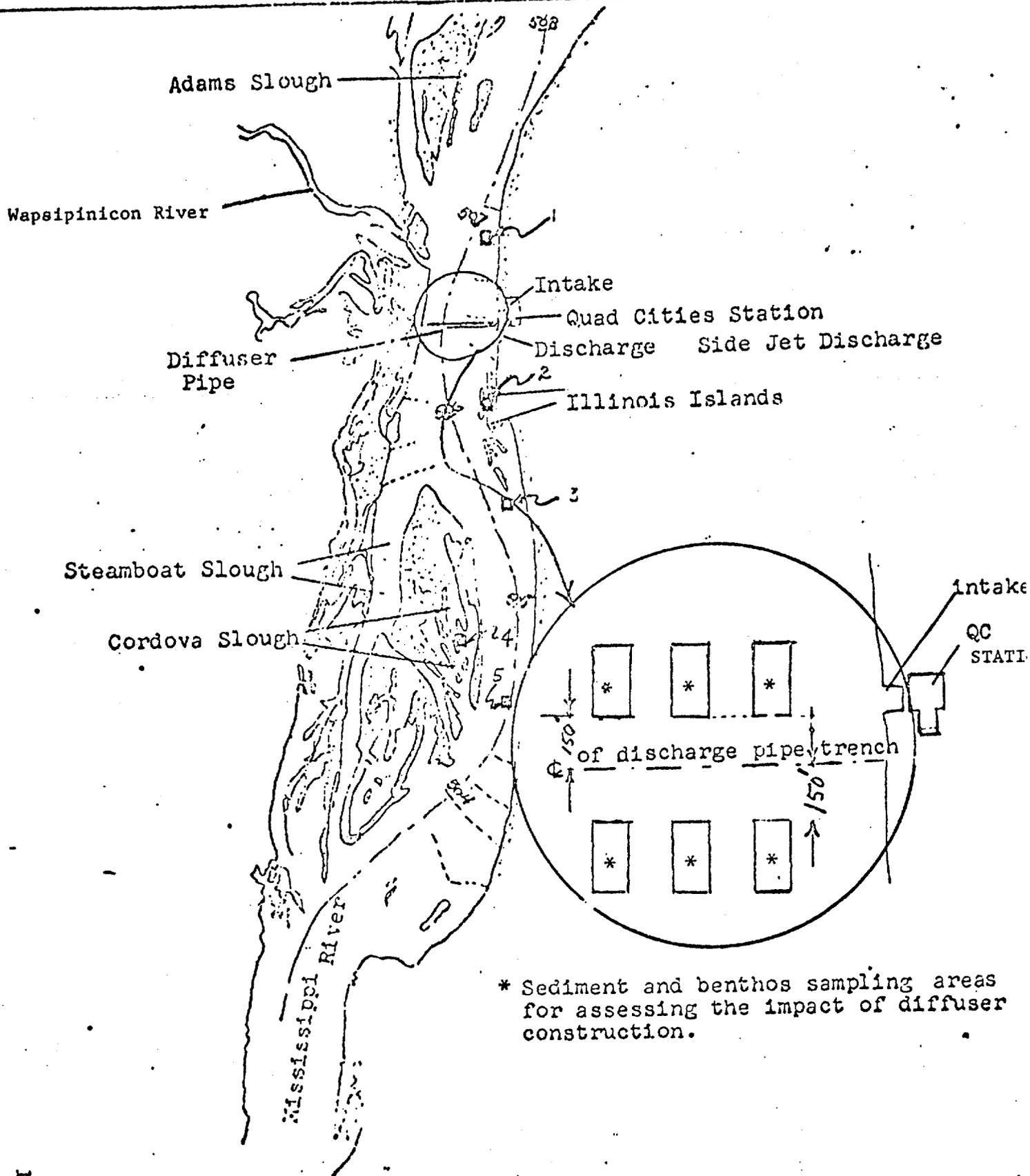


TABLE 2.3.1

NON-RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

E. FISH POPULATION

Monitoring of fish populations and larval fish will be conducted. Sampling will be conducted at 8 sampling stations located as follows: Station 1 located in the Adams Slough area upstream from the plant; Station 2, a channel edge station, located near the Illinois shore upstream from the plant intake; Station 3 located in the Illinois island area below Quad Cities Station; Station 4 located directly below the Illinois islands; Station 5, located in the closed slough area east of Steamboat Slough; Station 6, a channel edge habitat, located near the Illinois shore about one-half mile below the plant; Station 7 located in the midstream of Steamboat Slough; and Station 8 located in the plant intake canal. These stations are shown in Figure 2.3.5.

The same sampling collection procedures used in the preoperational monitoring programs will continue in the operational program to insure comparability of results. Seining, net sets, and drift nets

will be used to collect minnows and immature forms. Fyke nets, shoreline seining, gill nets, trawl nets, cove nets, and electro shocking will be used to collect large fish. Based on preoperational experience about 15,000 fish may be studied annually.

The preoperational results have provided baseline, "without heat additions" information on fish. Operational data will be compared with the preoperational data for any indication of change with respect to fish due to thermal additions. Also, comparison will be made between stations affected and not affected by thermal discharge during the operational period for any indications of change.

Observation and analysis will be conducted to determine if thermal additions affect feeding, migration, reproductive patterns, or ectoparasitism. Habitat effects will be evaluated by determining the species composition and abundance at each station. Effects on feeding habits will be determined by stomach analysis

Figure 2.3.5

Fish Population Studies

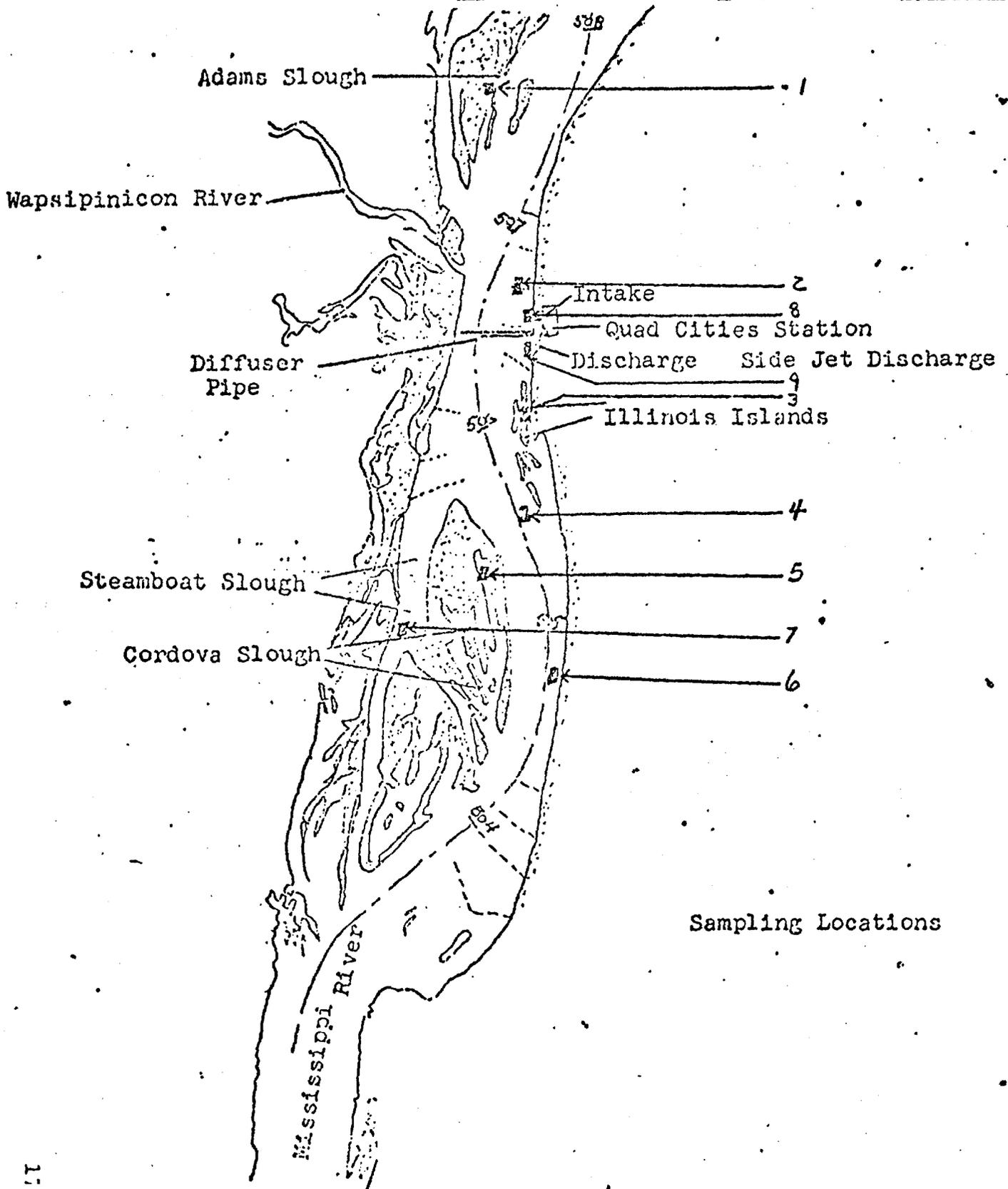


TABLE 2.3.1

NON-RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

3. FISH POPULATION (CONT'D)

of an unbiased sample of fish from each station. Any effect on migration will be determined through a continuing mark-and-recapture program. Of the 15,000 fish captured annually, about 5,000 are expected to be of sufficient size for tagging. Recapture is achieved both by continued sampling and by others who report capture of tagged fish. In this program, particular emphasis will be placed on comparison of pre-operational and operational results.

Effects on reproduction habits will be analyzed through examination of mature fish specimens for sexual ripeness, and by observation of nesting and nursery areas and larval fish. Evaluation will be made of any thermal effects by determining any gross changes in the timing of maturation or other reproductive phenomena (such as appearance of larval forms) and of any changes in the habitat preferences of gravid (ripe) fish or location of nursery areas.

All fish will be examined for external parasites and disease incidence.

To determine general comparability of fish populations being studied for thermal effects, descriptive statistics on relative year class distribution and body condition (length and weight relationships) of the fish at each station will continue to be prepared.

In addition, one more monitoring station will be added to the program. It will be located in the discharge canal to determine if fish are attracted into the canal by the thermal discharge, and to determine any thermal effects on these fish, and to compare earlier mentioned possible effects on these fish with those of other stations.

Sampling frequencies will be weekly at all stations. This frequency is designed to clearly define the effects on fish, especially in their reproductive and larval stages.

A special study will be undertaken to determine the numbers of fish, by species and size, removed from plant intake waters and collected in trash baskets at the plant.

There are three protective devices to prevent larger floating materials and fish from entering the plant intake pumps and condensers. These

TABLE 2.3.1

NON-RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

E. FISH POPULATION (CONT'D)

devices consist of a floating boom at the mouth of the intake canal, designed to help reduce entrance of floating materials into the canal, and a series of bar grills and 3/8 inch mesh traveling screens to prevent all other sizable materials from going through the pumps and condensers. Materials that are trapped on the bar grills are removed by a mechanical lift and dumped into a trash cart. Smaller materials, trapped on the traveling screens, are washed into trash baskets. The materials collected will be examined, all fish and fish remains will be removed for analysis, and afterwards the material will be hauled off site for appropriate disposal.

The fish will be counted, classified as to size, and identified to species. This analysis will be performed twice a week for one year.

F. ORGANISMS IN THE PLANT COOLING WATER SYSTEM

Studies to determine the lethal chemical, mechanical and thermal effects on entrained phytoplankton, zooplankton and larval fish organisms will be conducted for a twelve month operational period of the Quad Cities Station. Studies to determine the effects of mechanical abrasion and chemical additions were conducted during the pre-operational stage.

Samples will be collected by drift nets and by special sampling pumps. Samples will be collected at six stations, as shown on Figure 2.3.6. One station will be in the intake canal, one will be in the condenser discharge area, two will be in the River just above the plant, and two will be in the river about 150 feet below the plant.

Comparison between the intake and condenser discharge sampling stations will indicate effects of passage through the condenser alone. The off-shore distances of the sampling stations in the river above and below the plant will be set so that stations 4 and 6 monitor the effects

Figure 2.3.6

Organisms In The Plant Cooling Water System

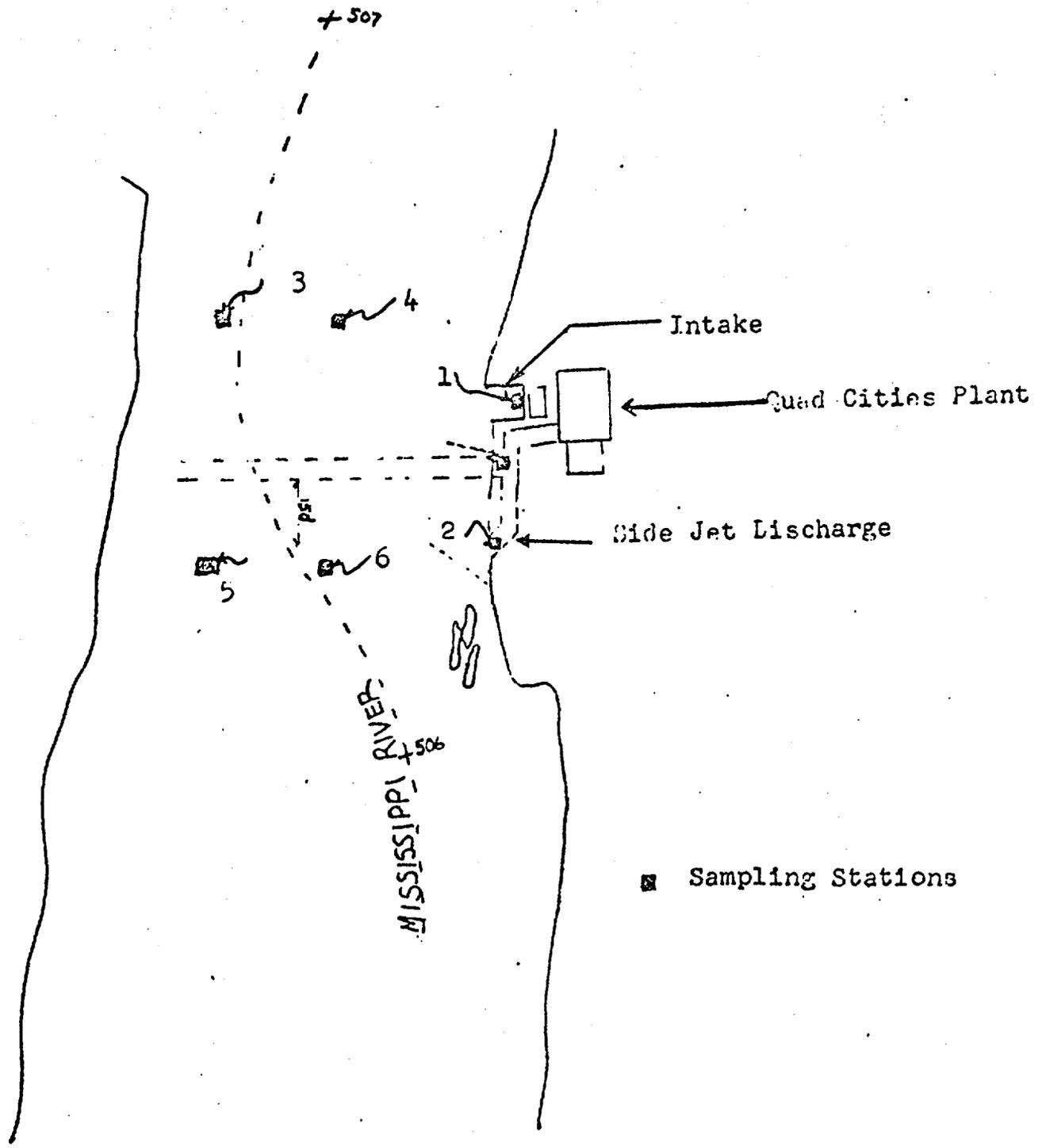


TABLE 2.3.1

NON-RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

F. ORGANISMS IN THE PLANT COOLING
WATER SYSTEM (CONT'D)

of shorter distances of travel, 3
and 5 longer distances of travel.

Sampling will be every two weeks.
Some sampling will be conducted
during chlorination of the conden-
sers, some while not chlorinating,
to determine the separate effect of
chlorination. Sampling will be
conducted at various station loads
to determine the effect of various
heat rises across the condensers.

The percent of immediate and resi-
dual mortality (survival) will be
measured at all sampling locations
to determine differential mortality
(survival) rates before and after
passage through the cooling water
system.

NON-RADIOLOGICAL ENVIRONMENTAL MONITORING (CONT'D)

Bases:

Possible short-term but reversible environmental effects may occur from interim operation of Quad Cities Station. Internal staff experts and outside biological consultants have designed the non-radiological environmental monitoring program to determine the impact of interim plant operation, provide comprehensive records of ambient variations, and develop knowledge for possible corrective action. Reference: STATEMENT ON THE ENVIRONMENTAL EFFECTS OF TESTING AND OPERATION OF QUAD CITIES STATION USING THE SIDE-JET DISCHARGE DURING THE PERIOD APRIL-AUGUST 1972, prepared by Industrial BIO-TEST Laboratories, Inc. and Dr. Donald B. McDonald as Exhibit #3 to the Commonwealth Edison (Byron Lee, Jr.) - Division of Reactor Licensing (Dr. Peter A. Morris) letter dated April 12, 1972.

3.0 REPORTING REQUIREMENTS

3.1 Chlorine Effluent Reports

A. A letter will be sent to the Directorate of Licensing (within 30 days after a Limiting Condition of Operation is exceeded) describing the occurrence and justifying corrective action.

B. A report will be sent to the Directorate of Licensing (within 60 days after operation of the side-jet discharge has ceased) describing the results of the chlorine monitoring program through the period of operation with the side jet.

3.2 Non-Radiological Environmental Report

A report will be sent to the Directorate of Licensing (within 60 days after operation of the side-jet discharge has ceased) describing the results of the environmental monitoring program through the period of operation of the side jet.

This report will include conclusions derived from data collected on temperature, dissolved oxygen, water

quality, macroinvertebrate communities, microinvertebrate communities, fish population, and organisms in the plant cooling water system.

Since the possibility of short term but reversible environmental effects are recognized, this report will include a definitive compendium of any such occurrences. Likewise, this report will include a discussion of those means to be taken to assist natural recovery from any such temporary effects.

UNITED STATES ATOMIC ENERGY COMMISSION

DOCKET NOS. 50-254 AND 50-265

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

(QUAD-CITIES UNITS 1 AND 2)

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

Notice is hereby given that the Atomic Energy Commission (the Commission) has issued Amendments Nos. 3 and 1 to Facility Operating Licenses Nos. DPR-29 and DPR-30, respectively. These licenses previously authorized the Commonwealth Edison Company and the Iowa-Illinois Gas and Electric Company to possess, use and operate the Quad-Cities Nuclear Power Station Units 1 and 2 (both single-cycle, boiling water reactors and located in Rock Island County, Illinois) at steady state power levels up to 502 megawatts (thermal) per unit (20% of each Unit's rated power).

The amendments that are the subject of this notice authorize Commonwealth Edison Company (acting for itself and Iowa-Illinois Gas and Electric Company) to operate the Quad-Cities Nuclear Power Station, during the startup testing program, at power levels up to 2260 megawatts (thermal) when operating a single unit or at power levels up to 2511 megawatts (thermal) when operating both Units 1 and 2 simultaneously. After completion of the startup testing program, the amendments authorize

operation of each Unit singly or simultaneously with the other Unit at steady state power levels up to (1) 620 megawatts (thermal) at any time, (2) 1550 megawatts (thermal) when, in the judgment of the system load dispatcher, total demand is likely to exceed available capacity and other power sources are not available to meet system load demand; and (3) 2260 megawatts (thermal), if after exhausting all means reasonably available, system load demand requires the facility to exceed 1550 megawatts (thermal). Incorporated in the license amendments and issued therewith are Nonradiological Technical Specifications which govern activities at the Station related to protection of the environment. The license amendments for Unit 1 and Unit 2 revise the licenses in their entirety and are effective upon their date of issuance. The amended licenses will expire on September 15, 1972, unless extended for good cause shown or upon the earlier issuance of superseding licensing actions.

The Commission has found that the applications, as amended, comply with the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Chapter I, and has made the remainder of the findings as set forth in the amendments and has concluded that the issuance of these license amendments will not be inimical to the common defense and security or to the health and safety of the public. The Commission also has found that (1) considering and balancing the factors as described in the Commission's regulations in 10 CFR Part 50, Appendix D, Section D.3, the balance of such factors warrants the issuance of these amendments, and (2) the emergency demands for

power in the area served by the Station warrant the issuance of these amendments.

Notice of AEC Consideration of Issuance of Facility Operating License for operation of each of the Quad-Cities Units 1 and 2 at 2511 megawatts (thermal), full-power, was published in the Federal Register on March 16, 1971 (36 F.R. 5008). However, licenses for full-power have not been issued pending review of the additional environmental considerations, including the balancing of factors, required by the September 9, 1971 revision of Appendix D to 10 CFR Part 50. On March 9, 1972, the Commission's Draft Detailed Statement on Environmental Considerations was published in the Federal Register (37 F.R. 5073), and thereafter on March 24, 1972, a Supplementary Notice of AEC Consideration of Issuance of Facility Operating Licenses was published in the Federal Register (37 F.R. 6142). The supplementary notice provided 30 days for intervention on the environmental aspects of the operation of Quad-Cities Units 1 and 2. No request for a hearing by the applicants or petition for leave to intervene by any interested person have been filed following publication of the Notice of Consideration of Issuance of Facility Operating Licenses on March 16, 1971, and the publication of the Supplementary Notice on March 24, 1972, thereby permitting the licensing actions that are herein being noticed.

For further information concerning these actions, see copies of the following items which are available for public inspection at the

Commission's Public Document Room at 1717 H Street, N. W., Washington, D. C., and at the Moline Public Library at 504-17th Street, Moline, Illinois 61265: (1) Amendment No. 3 to Facility Operating License No. DPR-29 and Amendment No. 1 to Facility Operating License No. DPR-30, (2) the Technical Specifications dated October 1, 1971, and Nonradiological Technical Specifications, issued as part of Amendments 3 and 1, (3) Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company's applications, as amended, including the letter from Commonwealth Edison Company dated April 12, 1972, and supplement thereto dated April 28, 1972, (4) the Division of Reactor Licensing's Safety Evaluation for the Quad-Cities Units 1 and 2 dated August 25, 1971, (5) the report of the Advisory Committee on Reactor Safeguards dated March 9, 1971, (6) the Discussion and Conclusions of Environmental Impact by the USAEC Directorate of Licensing concerning the Proposed Issuance of Licenses to the Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company for Emergency Operation of Quad-Cities Nuclear Power Station Units 1 and 2 dated May 4, 1972, (7) the Discussion and Conclusions pursuant to Appendix D to 10 CFR Part 50 dated January 24, 1972, and supplement 1 thereto dated March 31, 1972, and (8) the Commission's Draft Detailed Statement of Environmental Considerations dated March 6, 1972. A copy of each of the above items, except for item (3), may be obtained, as supply last, upon request addressed to the Atomic Energy

Commission, Washington, D. C. 20545, Attention: Deputy Director
for Reactor Projects, Directorate of Licensing.

Dated at Bethesda, Maryland, this 12th day of May 1972.

FOR THE ATOMIC ENERGY COMMISSION

A. Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

DISCUSSION AND CONCLUSIONS
OF ENVIRONMENTAL IMPACT
BY THE
U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF LICENSING
CONCERNING THE PROPOSED ISSUANCE OF LICENSES
TO THE
COMMONWEALTH EDISON COMPANY AND THE
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY
FOR EMERGENCY OPERATION OF
QUAD-CITIES NUCLEAR POWER STATION UNITS 1 AND 2
DOCKET NOS. 50-254, 50-265

Issued May 4, 1972

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INTRODUCTION

On April 12, 1972 the Commonwealth Edison Company and the Iowa-Illinois Gas and Electric Company (Applicants), in a letter from Mr. Bryon Lee, Jr. to Dr. Peter A. Morris, requested, pursuant to Paragraph D(3) of Appendix D of 10 Code of Federal Regulations Part 50, authority to complete all necessary testing of each unit up to its full power rating, but to do so without at any time operating the two units at an aggregate power level in excess of one-half of their combined capacity. The Applicants also requested authorization to operate the station after testing is completed until September 15, 1972 (the anticipated end of the summer peak electrical load period) in the following manner:

- a. Upon completion of the power test program, to operate at power levels up to 200 MWe for each unit. This minimum level is required to avoid damage to the turbine from operation for extended periods at levels below 200 MWe;
- b. To operate above 200 MWe, but not more than 500 MWe for each unit, only on those days in which, in the judgment of the system load dispatchers, total demand is likely to exceed available capacity unless the Quad-Cities Station capacity is greater than 400 MWe even if all available emergency power were purchased. Such operation can be expected on days when the air temperature exceeds 90°F or unusual outages are experienced; and
- c. To operate at power levels above 500 MWe only when in the judgment of the system load dispatchers, capacity in excess of that amount will be required to meet demands. Operation above 500 MWe is not expected to occur for more than eight hours in any 24-hour period.

The application of The Commonwealth Edison Company and The Iowa-Illinois Gas and Electric Company (Applicants) for licenses to operate the Quad-Cities Nuclear Power Station Units 1 and 2 (Station) is presently under consideration by the Atomic Energy Commission (Commission) regulatory staff (AEC staff). Appendix D of 10 CFR Part 50 to the Commission's Regulations, which implements the National Environmental Policy Act of 1969 (NEPA), establishes procedures for an environmental review of such facilities. On March 6, 1972, the Draft Detailed Statement on the Environmental Considerations required by Appendix D was issued and circulated for comment.

Appendix D provides a procedure in Section D.3 for issuance of an interim operating license authorizing the loading of fuel in the reactor core and limited operation of the facility. This procedure may be applied to applications for an operating license for a nuclear facility for which the Commission published a notice of opportunity for hearing prior to October 31, 1971, and no hearing was requested. The limited license may be issued by the Commission, pending the completion of an ongoing NEPA environmental review of a full-power license application, upon a showing that such licensing action will not have a significant adverse impact on the quality of the environment, or after considering and balancing the factors described in Section D.2 of Appendix D, and upon the Commission's making appropriate findings on the matters specified in 10 CFR Part 50.57(a); provided, however, that operation beyond 20 percent (20%) of full power will not be authorized except in emergency situations or other situations where the public interest so requires. Any license so issued will be without prejudice to subsequent licensing action which may be taken by the Commission with regard to the environmental aspects of the facility, and any license issued will be conditioned to that effect.

This Discussion and Conclusions is based primarily on the Draft Detailed Statement on the Environmental Considerations issued on March 6, 1972. It is noted that on March 27, 1972 the Applicants have entered into an agreement with the plaintiffs to the litigation in the U. S. District Court for the District of Columbia, The Isaac Walton League of America et al. vs. James Schlesinger et al.; People of the State of Illinois et al vs. U. S. Atomic Energy Commission et al.; Civil Action Nos. 2207-71 and 2208-71. On April 4, 1972 the Iowa Conservation Commission granted a permit to construct the diffuser-pipe.

On April 25, 1972 the Illinois Pollution Control Board issued an opinion and supplemental order that permitted a variation from the state water quality standards on an emergency basis until the diffuser is installed and operating but no later than August 15, 1972. It is further noted that on March 31, 1972, Facility Operating License No. DPR-29 was amended and No. DPR-30 was issued to Units 1 and 2 respectively to permit operation of each unit at power levels up to 502 Mwt, 20 percent of rated power. These licenses are in effect until June 1, 1972.

CONCLUSIONS*

The Regulatory Staff is required to review the proposed operation of Units 1 and 2 as indicated above in the framework of the following factors specified in 10 CFR Part 50, Appendix D Section D.2:

* These conclusions are pursuant to 10 CFR Part 50, Appendix D. Findings required by the provisions of 10 CFR Part 50.57(a) have been set forth in the Safety Evaluation dated August 25, 1971.

"(a) Whether it is likely that limited operation during the prospective review period will give rise to a significant, adverse impact on the environment; the nature and extent of such impact, if any; and whether redress of any such adverse environmental impact can reasonably be effected should modification or termination of the limited license result from the ongoing NEPA review.

"(b) Whether limited operation during the prospective review period would foreclose subsequent adoption of alternatives in facility design or operation of the type that could result from the ongoing NEPA environmental review.

"(c) The effect of delay in facility operation upon the public interest. Of primary importance under this criterion are the power needs to be served by the facility; the availability of alternative sources, if any, to meet those needs on a timely basis; and delay costs to the licensee and to consumers."

The Regulatory Staff has reviewed the Applicants' request and, based on evaluations set forth in the March 6, 1972, Draft Detailed Statement of the Environmental Considerations and herein, has reached the following conclusions:

a. Operation of both units at power levels up to 25 percent of rated power each, during the period ending April 1, 1973, will likely give rise to only a minimal impact on the environment. As discussed below, this potential impact is due to chemicals, particularly chlorine and chlorine derivatives, and heat added to the condenser cooling water. This impact would be localized and is not likely to have a measurable effect on the overall aquatic population of Pool 14.* Furthermore, should this proposed operation be terminated, recovery of the aquatic biota in Pool 14 would be good and probably complete.

Operation of both units at power levels from 25 to 100 percent of full power on an intermittent basis will result in an adverse impact on the aquatic environment. This impact will be localized to the island area below the station, the slough area downstream and across the channel

*The section of the Mississippi River between Lock and Dam 13 and Lock and Dam 14 on which the Station is located.

from the Station, and the east bank of the river, possibly as far as Cordova. This impact is due to the heated water and possibly the chlorine and chlorine derivatives. This impact is not likely to affect the upper half of Pool 14. Should this operation be terminated by changing from the side-jet discharge to the diffuser-pipe discharge, the recovery of the aquatic environment in the affected areas would be good but take longer than the recovery from steady state 25 percent operation.

b. Operation of the station under the limited license would not foreclose subsequent adoption of alternatives in the facility design or in the operation of the Station of the type that could be required as a result of the ongoing supplemental NEPA environmental review.

c. There will be an adverse effect upon the public interest as a result of delay in facility operation. The Federal Power Commission (FPC), in its December 20, 1971 letter, has stated that it is essential that these units be available for power generation by this summer. This has been reaffirmed in the March 22, 1972 FPC comments on the Draft Detailed Statement on the Environmental Considerations. The FPC letter and supporting data confirm the Applicants' statements to the effect that an emergency situation exists with regard to the public need for power.

After considering and balancing of the foregoing factors and making appropriate findings on the matters specified in 10 CFR Part 50.57(a), we therefore conclude that granting of the application for the interim operation of the Station would be consistent with the emergency requirements of Section D.3 of Appendix D of 10 CFR Part 50.

The foregoing operation is contingent upon the Applicants' establishing and maintaining a monitoring program as delineated in the Technical Specifications. Furthermore, the Technical Specifications require a report on the operations to be submitted after the limited operation is concluded identifying observed environmental effects and means to assist recovery of the environmental damage.

Any license for limited operation of the Station will be without prejudice to subsequent licensing action which may be taken by the Commission.

STATEMENT OF ENVIRONMENTAL CONSIDERATIONS

A. Biological Effects

1. Heat Removal System Effects

a. Condenser Cooling Water Intake:

Regardless of the power level of operation or mode of once-through cooling discharge (side-jet or diffuser-pipe), the ecological considerations of the water intake system discussed in the Draft Environmental Statement (V.C.2.a-1, p. 75) are applicable to this proposed license, assuming that all six intake pumps operate at full capacity (2270 cfs). Any reduced level of pumping would tend to reduce the impact of the water intake system. The staff concludes that the mechanical screening devices (floating barrier, trash racks, and traveling screens) will not prevent motile aquatic organisms from entering the intake canal and establishing "residence" in the canal, or protect some of the less-motile species from potential destruction due to impingement on travelling screens or condenser entrainment. These problems will occur to some extent which is not readily quantifiable, and determination of the degree of occurrence and the need for remedial action will be required by the Commission as part of the Applicant's environmental surveillance program.

b. Condenser Passage:

In passing through the condensers and the discharge system (side-jet or diffuser), entrained organisms will be subjected to mechanical, thermal (up to 23°F temperature increase) and chlorine damage (intermittent). These effects are not readily separable from each other under routine operation.

When intake temperatures are relatively high (June, July, Aug., Sept.), maximum thermal damage to entrained organisms is expected and the potential exists for \geq 20 percent mortality of river plankton (based on low river flows and maximum intake flow). However, studies conducted by Bio-Test Labs at the Riverside Generating Station (Pool 15)¹ showed that during May, June and July 1971, a ΔT of up to 8°C (15°F) resulted in less than 10 percent

¹Beer, L.P., and Pipes, W.O., A Practical Approach to the Preservation of the Aquatic Environment: the Effects of Discharge of Condenser Water into the Mississippi River, Commonwealth Edison Company, Chicago, Illinois 1968, 210 pp.

mortality of entrained zooplankton. Other studies discussed in the Draft Environmental Statement indicate that although significant plankton mortality may occur at higher ΔT 's (100 percent for fish larvae and >20 percent for zooplankton), no quantifiable adverse effects were observed on the aquatic system.

Based on the above considerations and the discussion in the Draft Environmental Statement (V.C.2.a-2, p. 76), the staff concludes that even if 100 percent of the condenser entrained plankton are lost (maximum of 20 percent of river plankton during low flow periods), a reduction in the number of species or individuals immediately downstream may occur, but the overall community structure of Pool 14 will not be adversely affected. However, the Applicant will be required to determine the effects (immediate and long-term) of condenser entrainment on river biota and the community structure of Pool 14.

c. Condenser Cooling Water Discharge

(1) Side-Jet:

The side-jet discharge will most likely attract a variety of fish species during various seasons, creating the potential for both thermal and chlorine effects on fish. Although many studies have shown that acclimation temperature determines upper and lower lethal temperatures, field studies have not absolutely determined temperature changes to be the cause of fish kills. A study² shows that many warm water species of fish (largemouth bass and sunfishes) can tolerate rapid temperature increases and decreases of up to 20°F; mortalities which resulted from temperature changes of this magnitude varied with species and generally were restricted to diseased or otherwise stressed individuals.

In summary, the degree of fish congregation in the discharge canal and in the immediate plume area cannot be predicted at this time. It is expected that at any level of Station operation there will be some attraction of fish to these areas, and that the species composition and size of this "resident" population will change on a seasonal basis. When fish are in

²Nickum, J. G., "Some Effects of Sudden Temperature Changes Upon Selected Species of Freshwater Fishes," 1966 Pd.D. Thesis, Southern Ill. Univ. (Zool.).

the canal and immediate discharge area, they are subject to the potential damage caused by temperature changes and chlorination. According to the above discussion, such fish are not likely to be adversely affected except possibly in the case of a rapid shutdown during periods of 100 percent Station power output (ΔT 23°F). This leads to the need to avoid unplanned shutdown whenever practical. If shutdowns are planned, rapid shutdown should be avoided.

The heated discharge from the side-jet may affect the benthic communities near the outfall to the river, as discussed in the Draft Environmental Statement (V.C.2.a-3, p. 78). However, based on the available field data, it is not likely that any major changes will occur in the benthic communities of Pool 14.

The staff concludes that in the immediate discharge area (i.e., the mixing zone), there may be a seasonal change in organism diversity, abundance and productivity different than that prior to Plant operation. The magnitude of these changes will be greatest at full Station power and proportionately less at 50 and 25 percent operation. Less temperature tolerant motile species will evacuate the area and may be replaced by species that prefer the warmer discharge water. The less temperature tolerant benthic species will not survive in this area and may be replaced by more temperature tolerant species. The Applicant will be required to monitor the nature and magnitude of effects on benthic communities in and near the discharges.

Downstream areas that will experience temperature rises consist primarily of the channel, channel border, littoral regions along the banks and a small area of island (Illinois shore), as discussed in the Draft Environmental Statement (V.C.2.a-2, p. 81). Although the island area has been shown to be frequented by many of the sport and commercial species of interest in Pool 14,³ it appears that upstream island areas are utilized to a greater extent by these species. It is certain that the small downstream island area is utilized for spawning during the spring by some of these species (such as sunfishes, bass, and catfish). However, it is doubtful that significant spawning occurs during other seasons (June-Feb.). Modeling studies predicting the thermal plume behavior indicate that these islands will be contacted by warm discharge water during periods of river flow above 20,000 cfs (85-90 percent of the year). At full Station power, temperature increases ranging from 10 to 16°F (surface) and 4 to 12°F

³

Bio Test Labs, Fish Population Study, May-Dec. 1971, Pool 14, Mississippi River (Project XIII).

(near-bottom) will be superimposed on the natural temperature cycle in the island area. It is highly likely that the effects mentioned previously in the discussion of the immediate discharge area will also occur here. Again, the magnitude of this impact cannot be quantified. Less temperature tolerant fish and motile invertebrates will retreat from the region and probably seek comparable habitats lower in the pool or above the Station resulting in a change in species diversity and abundance of organisms in the island area. At lower power levels (25 and 50 percent), the downstream thermal plume effects will be proportionally less, but some changes in diversity and abundance of organisms may still occur in the island area. However, it is unlikely that a discharge of warm water that is 11.5°F or less above ambient (i.e., for power levels 50 percent or less) will adversely affect the overall ecological balance of Pool 14.

Downstream of the island area, the thermal plume will be primarily a surface phenomenon (less than 6 ft depth) during the warmer months. At 50 percent Station power and river flow equal to 30,000 cfs (a condition illustrated by the Applicants' monitoring studies), it is estimated that the three degree Fahrenheit isotherm will extend less than 10 miles downstream; at 100 percent power, less than 17 miles downstream. No adverse biological effects are expected in the far downstream areas of Pool 14 as a result of the thermal plume.

In summary, the biotic community of the downstream island area will be altered as a result of Station operation. Changes in the number and kinds of species, and the productivity of the area are expected to occur. The magnitude of these changes is expected to be a function of the Station power level. The Applicants will be required, as indicated in the Technical Specifications, to determine the nature and extent of changes induced by the thermal plume, especially in the island area below the Station. Effort should be concentrated on changes in species diversity, of fish, benthos, and periphyton.

(2) Diffuser-Pipe:

The discharge of condenser cooling water from the diffuser-pipe will result in nearly complete mixing within 600 feet downstream. The resulting temperature increase after complete mixing will never exceed 5°F and will be only 1 to 2°F above ambient most of the time. This is based on the modeling studies as discussed in the Draft Environmental Statement (III.D.1.c-2, p. 44).

Organisms drifting downstream past the diffuser will be subjected to rather sudden increases in temperature (up to 23°F at full Station power) and turbulence. Fish attracted to the warmed diffuser discharge area

will potentially be subjected to cold shock should the Station undergo a rapid shut down although this potential cold shock is not as likely to be as severe during the summer months as it would be during the winter months. In addition, such fish may be exposed to water supersaturated with gases, resulting in the development of gas-bubble disease. The possibilities of such damage will be taken into account by the Applicants' monitoring program as indicated in the Technical Specifications.

The staff concludes that the diffuser-pipe condenser cooling water discharge has a smaller environmental impact on the aquatic biota because it disperses the heat more rapidly throughout the river and has a smaller high-temperature-zone than the side-jet. Since the high temperature zone is likely to be the zone of maximum biological effect, the diffuser minimizes the above effects more than any other once-through cooling system. However, the diffuser-pipe, or any once-through cooling system after complete mixing, raises the temperature of the river. This temperature increase may tend to change the temperature character of the lower half of Pool 14 to the downstream pools of corresponding temperatures.

The Applicants will be required, as indicated in the Technical Specifications, to determine the dimensions of the thermal plumes resulting from operation of the diffuser. In addition, the effects of discharged diffuser water on plankton and fish will be evaluated by the Applicants.

2. Chlorination Effects

Sodium hypochlorite solution is added intermittently (40-minute periods, three times/day) to the condenser cooling water to reduce the growth of microorganisms in the system. Chlorine is known to be toxic to aquatic life. We have reviewed the literature as indicated in the Draft Detailed Statement and observed measurements of chlorine residual at the Station. The foregoing indicate to us that well-controlled chlorination, involving the mixing of chlorinated streams with larger volumes of unchlorinated water in the discharge system, can lead to little or no chlorine discharge to the rivers and lakes. However, there are no known published data which definitely establish this position. Because of the uncertainty involved and to assure that the environment is adequately protected, the Applicant will be required to monitor for residual chlorine and its effects on the aquatic biota so that remedial action may be taken if necessary. The Applicants will establish a test program to relate the total residual chlorine at the point of discharge to the sodium hypochlorite input and the monitored condenser concentration. The sodium hypochlorite input will be controlled such that the monitored condenser cooling water discharge level of free residual chlorine does not exceed 0.5 ppm for a cumulative period of time, not to exceed two hours per day.

No adverse effects are expected to result from the chlorination procedures to be utilized. However, the staff concludes that chlorine levels must be regulated as indicated in the Technical Specifications.

B. RADIOLOGICAL EFFECTS

1. Normal Operation

As discussed in the Draft Detailed Statement (section V.D., p. 87) the staff has concluded that the releases of radioactive materials during full power operation of the Station will contribute only an extremely small increment to the dose that area residents receive from natural background radiation. Since fluctuations in this background exceed this small increment, the dose will be immeasurable itself and constitute no meaningful risk. The staff has further concluded that there will be no adverse effects on species other than man due to radiation exposure caused by operation of the Station. Operation under the proposed interim license would result in lower average power, the fuel would be newer and less subject to failure, the fission product inventory would be lower, and consequently there would be a lesser environmental impact than at steady state full power operation.

2. Accidents

As discussed in the Draft Detailed Statement (section VI.A. p. 98), the staff has concluded that the environmental risks due to postulated radiological accidents are exceedingly small at full power operation. Operation under the proposed license will be with new fuel at a lower average power and consequently a lesser potential environmental impact.

C. ADDITIONAL CONSTRUCTION EFFECTS

All construction needed for the requested testing and emergency operation has been completed as confirmed by onsite review by AEC inspectors. Therefore, there will be no further impact on the environment from construction associated with this operation.

D. OTHER EFFECTS

No new or spent fuel will be shipped for the requested operation, so there will be no environmental impact related to transportation. Similarly, no additional transmission lines are needed for this operation, so this will not lead to further environmental impact. The only other potential effect identified is that related to transportation of solid wastes. The Draft Detailed Statement (Section V.E., p. 91 and VI.B., p. 104) discusses this possibility for normal fuel power operation and finds that the risks to the general public would not result in a significant exposure to radiation.

E. REDRESS OF IMPACTS

As indicated in the Draft Environmental Statement (section V.C.2., p. 73) the environmental impacts from the proposed operation are expected to involve mainly aquatic life and to be recoverable. The nature of these impacts, though not readily quantifiable, are such that full redress can be expected. That is, fish may relocate or benthic organisms be replaced by other types, but resumption of normal temperatures will permit the reversal of these impacts. The staff has concluded that redress from the above effects can be expected.

F. FORECLOSURE OF ALTERNATIVES

The Station is completed and already in the process of being tested up to 20 percent of full power under licenses DPR-29 and 30. No additional changes are proposed in connection with the requested amendment of the license which would lead to foreclosure of subsequent adoption of alternatives in facility design or operation of the types that could result from the ongoing NEPA review. The principal alternatives still practicable for the Station appear to be those associated with the condenser cooling water system, and the ongoing development of the alternate cooling systems is not contingent upon the activities in the requested amendment. These alternatives are still being evaluated by the staff in the ongoing NEPA review.

G. VERIFICATION OF ENVIRONMENTAL IMPACTS

Any amended license issued to the Applicants will include requirements for monitoring and evaluation programs to insure the necessary operating limitations to protect the environment are met. The Applicants will be required to report the results of this program at the end of the period of operation under this amended license.

FACILITY OPERATING CONSIDERATIONS

The application is being considered for limited emergency operation of Units 1 and 2 at a steady state level up to 25 percent of rated power (200 MWe, 620 MWt), up to 62 percent of rated power (500 MWe, 1550 MWt) to meet load demands when other power sources are not available, and up to 90 percent of rated power (728 MWe, 2260 MWt) during emergency load demands provided that all other reasonable means to meet the emergency have been exhausted.

Operating below 25 percent of rated power has been demonstrated to result in unstable power generation system operation. Under this condition, the feedwater system is supplied insufficient steam flow from the turbine, to assure stable operation of the feedwater heaters.

Thus, 25 percent of rated power is considered the lowest practicable steady state power level for each facility. At 62 percent of rated power, the power level can be increased by primary coolant flow control without moving the control rods from an established pattern. This mode of operation provides a rapid means for increasing power to meet emergency load demands and minimizes the detrimental effects on the fuel that may result from the power redistribution induced by control rod motion.

The assessment of environmental impacts on aquatic communities cannot be determined as precisely as would be desired due to uncertainties in the knowledge of the behavior of these aquatic communities. As a consequence, variations of 5 or 10 percent in temperature change cannot be quantitatively evaluated other than to indicate the direction of the effect. Thus, the evaluation of operation of the Station at 25 percent of rated power, compared with the 20 percent of rated power assessed in the Draft Detailed Statement on Environmental Considerations, is characterized as a slightly greater impact. Similarly, the impact on the aquatic community due to operation of the Station at 62 percent of rated power, as compared with the 50 percent in the Draft Detailed Statement on Environmental Considerations, is somewhat greater.

EFFECT OF DELAY

The Staff discussion in the Draft Detailed Statement (I.A., p.1) points out the need for power. On the basis of the review of the data submitted by the Applicants and the support of this data by the FPC, the staff has concluded that the effect of the delay of placing the Quad-Cities Station in service would lead to a serious power shortage in the area served by the Station in the summer of 1972. FPC comments on the Draft Environmental Statement (March 22, 1972) reaffirm the urgency of getting the Station on line and indicate that the Commonwealth Edison Company has a reserve margin of only 5.4 percent without Quad-Cities units or the Zion unit.

The Commonwealth Edison Company's reserve margin had been projected to be 23.5 percent. The Iowa Gas and Electric Company would have a deficit without the Quad-Cities power. However, these effects are spread over a much larger area through the Applicants' participation in the MAIN power planning group and the Iowa Power pool, thus the effects of delay are also spread over a larger area than that served by the Applicants.

The Applicants have further pointed out the schedule of operation (letter, Mr. Byron Lee, Jr. to Dr. Peter Morris dated April 12, 1972, Exhibit 1) which would permit the testing of the reactors. This schedule indicates that in order to be ready for the summer peak requirements the amended licenses are needed as soon as possible, in order to be available during the summer peak demand for power.

SUPPLEMENT NO. 1

TO

DISCUSSION AND CONCLUSIONS

U.S. ATOMIC ENERGY COMMISSION

DIVISIONS OF RADIOLOGICAL AND ENVIRONMENTAL PROTECTION

AND

REACTOR LICENSING

PURSUANT TO APPENDIX D OF 10 CFR PART 50

SUPPORTING THE ISSUANCE OF LICENSES

TO COMMONWEALTH EDISON COMPANY

AUTHORIZING 20 PERCENT OPERATION OF

THE QUAD-CITIES STATION UNITS 1 AND 2

DOCKET NOS. 50-254 AND 50-265

Issued: March 31, 1972

SUPPLEMENT NO. 1

Subsequent to the issuance of the "Discussion and Conclusions by the U.S. Atomic Energy Commission, Divisions of Radiological and Environmental Protection and Reactor Licensing Pursuant to Appendix D of 10 CFR Part 50 Supporting the Issuance of Licenses to Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company Authorizing 20 Percent Operation of the Quad-Cities Station Units 1 and 2 Docket Nos. 50-254 and 50-265" issued January 24, 1972 (Discussion and Conclusions), the Commonwealth Edison Company has provided the Commission copies of an agreement (attachment #1) reached between the Commonwealth Edison Company and the plaintiffs in the litigation pending in the U.S. District Court for the District of Columbia relating to the operation of the Quad Cities Station Units 1 and 2 (The Isaac Walton League of America et al. vs. James Schlesinger et al.; People of the State of Illinois et al. vs. U.S. Atomic Energy Commission et al.; Civil Action Nos. 2207-71 and 2208-71, the U.S. District Court for the District of Columbia). The agreement sets forth certain modifications of the condenser cooling water system and plans for operation of Quad Cities Units 1 and 2. The AEC staff has evaluated the contents of the agreement and has concluded that the staff's Discussion and Conclusions, dated January 24, 1972, are unmodified by the contents of the agreement. The January 24, 1972 Discussion and Conclusions deal only with the operation of Quad-Cities Station Units 1 and 2 at 20 percent of station power until June 1, 1972. The staff concludes that operation of the station at 20 percent of power for this period of time will not foreclose any of the alternatives for the protection of the environment.

It is noted that the AEC issued a Draft Detailed Statement on Environmental Considerations relating to the proposed issuance of a full term operating license for the Quad-Cities Station Units 1 and 2 on March 6, 1972. The Federal Power Commission has submitted comments on the draft detailed statement which updates their views on the need for power from the Quad Cities Units 1 and 2 (attachment #2).

The findings on environmental considerations set forth in the AEC staff Discussion and Conclusions of January 24, 1972 and in this supplement are without prejudice to an independent evaluation by the AEC of environmental considerations for operation of the Quad Cities Units 1 and 2 in a manner other than 20 percent power for each unit until June 1, 1972. In connection with any such future licensing action, the AEC will, of course, carefully evaluate the environmental aspects of any proposed facility changes resulting from the above referenced agreement.



Attachment #1

Commonwealth Edison Company

ONE FIRST NATIONAL PLAZA * CHICAGO, ILLINOIS

Address Reply to:

POST OFFICE BOX 767 * CHICAGO, ILLINOIS 60690

March 29, 1972

Mr. A. Block
U. S. Atomic Energy Commission
Washington, D.C. 20545

Dear Ed:

Attached are several copies of the agreement reached between Commonwealth Edison and the parties to the Quad-Cities suit. If you have any questions, please give me a call.

Sincerely,

Byron Lee, Jr.
Assistant to the President

Att.

The People of the State of Illinois, represented by the Attorney General, William J. Scott (hereinafter, the "State of Illinois"), The Izaak Walton League of America, the Illinois Division of the Izaak Walton League of America, the Iowa Division of the Izaak Walton League of America, the Davenport, Iowa Chapter of the Izaak Walton League of America, the Clinton, Iowa Chapter of the Izaak Walton League of America, the Blackhawk Chapter of the Izaak Walton League of America (hereinafter, collectively, the "Izaak Walton League"), the Illinois State Community Action Program of the United Automobile, Aerospace and Agricultural Implement Workers of America (hereinafter, the "UAW"), (all of whom, hereinafter, collectively, the "Plaintiffs"), Commonwealth Edison Company, the Iowa Illinois Gas & Electric Company (hereinafter, the "Utilities") are parties to litigation pending in the United States District Court for the District of Columbia and each is of the view that it is in its best interest and in the best interest of the public to settle and terminate that litigation on the following terms:

1. Modification of Condenser Cooling Water System.

The Utilities will construct and place in operation within the 40-month period more fully described in Paragraph 7 hereof and in accordance with the procedures described herein, a closed-cycle cooling system for the condenser cooling water discharge from both units of the nuclear electric generating station commonly known as Quad Cities Units 1 and 2 (hereinafter, "Quad Cities Station"). The closed-cycle system shall be comprised of a spray canal, having a blowdown discharge to the Mississippi River of not more than 50 cubic feet per second annual average and 125 cubic feet per second instantaneous maximum.

2. The Utilities will reapply to the Iowa Conservation Commission for a permit to construct a diffuser discharge pipe (of the design previously submitted to that Commission) in the Mississippi River to be used for the discharge of condenser cooling water, and, if the Utilities obtain all necessary approvals from regulatory agencies, will construct and place the diffuser discharge pipe in operation as soon as feasible after the issuance of the last required permit. The parties anticipate that the construction time for the diffuser will not exceed five months.

3. Dismissal of Pending Judicial Proceedings.

The State of Illinois, the Izack Walton League and the UAW (who are, collectively, the plaintiffs in the suits described below) will cause the preliminary injunctions entered in the suits known as Izack Walton League of America, et al., v. Schlesinger, et al., No. 2207-71; the People of the State of Illinois ex rel Scott, et al., v. United States Atomic Energy Commission, et al., No. 2208-71, pending in the United States District Court for the District of Columbia (the "District Court Cases") to be vacated and will cause those actions to be dismissed with prejudice. Thereafter, Utilities will dismiss their appeals currently pending in the United States Court of Appeals for the District of Columbia Circuit in the following actions: Izack Walton League of America, et al., v. James Schlesinger, et al., Nos. 71-2028 and 72-1057; People of the State of Illinois ex rel Scott v. United States Atomic Energy Commission, et al., Nos. 71-2029 and 72-1053.

4. Further Regulatory Proceedings.

A. In view of the demonstrated and immediate need for additional electrical generating capacity within the Utilities service areas and of the particular need to fully test each of the Quad Cities units prior to the date of the summer 1972 peak load, the Plaintiffs, when and as requested by the Utilities, will support in any reasonable way the application of the Utilities for all permits and licences which are required under the following circumstances:

1. Prior to completion of the diffuser discharge pipe;
 - (a) To operate at 50 percent of station capacity; and
 - (b) To operate at capacity levels in excess of 50 percent of station capacity when, after the Utilities have used their best efforts to reduce total demand for electricity by interrupting their interruptible customers, such operation is necessary to avoid a reduction in the voltage being supplied either to the Utilities' customers, or to the customers of inter-connected systems, when alternative power sources are not available.
2. To operate after completion of the diffuser discharge system, at full station capacity.

Such applications include:

- (a) Application to the Illinois Pollution Control Board.
- (b) Application to the Iowa Conservation Commission for permission to construct the diffuser discharge pipe in the bed of the Mississippi River.

(c) Applications for interim and permanent operating licenses from the United States Atomic Energy Commission.

(d) Applications for any permits that may be needed from the United States Army Corps of Engineers.

Such support shall include, as the Utilities may request, written statements to, and oral testimony before, the appropriate regulatory body indicating approval of the authority sought by the Utilities, together with furnishing to the Utilities or the regulatory body of such data or evidence as the Utilities may request, to the extent such data or evidence is reasonably available to the Plaintiffs or any of them.

B. In the event that permits allowing construction and operation of the diffuser discharge pipes from the appropriate regulatory agencies acting for the States of Iowa and Illinois and the United States of America are not obtained and Utilities determine to install an alternative condenser cooling water discharge system, Plaintiffs will support the Utilities' applications to install such an alternative condenser cooling water discharge system which, having due regard for the energy needs of the Utilities and the conservation of the aquatic environment of the Mississippi River, will enable the Utilities to operate the Quad Cities Station at full station capacity, pending completion of the closed-cycle cooling system described in Paragraph 1 hereof. Utilities will inform the Plaintiffs of the progress of pending applications to various regulatory bodies and will consult with the Plaintiffs prior to the filing of any substantial amendment of those applications.

5. Condition to Performance of the Agreement.

Performance of this agreement by the Utilities is conditional upon vacation of the preliminary injunction and dismissal of the proceedings now pending in the United States District Court for the District of Columbia in the District Court Cases by March 29, 1972.

6. Time of Performance and Force Majeure.

A closed-cycle cooling system having a capacity equal to one-half of the condenser cooling water discharge of the Quad Cities Station shall be installed and placed in operation no later than May 4, 1974 and the closed-cycle cooling system for the entire station shall be placed in operation no later than May 4, 1975; provided, however, that in the event the completion of such system is delayed either by reason of the failure of any governmental agency asserting jurisdiction over the Quad Cities Station to grant all necessary authority for construction and operation of the closed-cycle cooling system within three months after submission of a request therefor, or by reason of any other event beyond the reasonable control of the Utilities, the time for performance shall be extended for a time equal to such period of delay. The Utilities will notify the Plaintiffs no later than ten business days after it becomes aware of any factor which the Utilities claim may be a basis for an extension of time of more than 30 days for performance of the Utilities' obligations described in this paragraph.

7. Operation After Construction of the Closed-Cycle System.

The Utilities shall operate closed-cycle at the Quad Cities Station at all times, except that:

A. The Utilities may utilize the diffuser or other alternate cooling system and shall not be required to operate closed-cycle when, in the judgment of the Utilities, closed-cycle operation will result in a threat to public health and safety. In no event, except as provided below, shall the Utilities operate without the closed-cycle cooling system after its installation, except to avoid a threat to public health and safety arising from closed-cycle operation. One calendar year after installation of the closed-cycle cooling system, Utilities and Plaintiffs agree to confer regarding the establishment of reasonable criteria, pursuant to which Utilities shall operate the Quad Cities Station thereafter without the closed-cycle cooling system to avoid a threat to public health and safety arising from closed-cycle operation. Such reasonable criteria shall be established within 60 days after the end of the first calendar year of closed-cycle operation.

B. Utilities may utilize the diffuser or other alternate cooling system whenever (i) a malfunction or other physical impairment, such as freezing, of the closed-cycle cooling system occurs which prevents operation of the Quad Cities Station at its operating capacity, as scheduled from time to time, and (ii) if the Utilities cannot reasonably supply their customers' energy needs by using other sources of energy within their generating system. Utilities agree to correct the malfunction or other physical impairment and restore the closed-cycle cooling system to operation at the earliest practicable date.

C. In each case in which the Utilities shall operate other than closed cycle pursuant to subparagraph

A or B, or pursuant to Paragraph 4A.1.(b), shall operate in excess of 50% capacity, they shall within ten business days thereafter, furnish notice to the Plaintiffs of all of the circumstances surrounding the use of the diffuser or other cooling system or operation in excess of 50% capacity, including, as applicable, the nature of the threat to the public health or safety, or the malfunction, or the extent to which operation exceeded 50% of capacity, all action taken in connection therewith, and the length of time the closed-cycle cooling system remained inoperative.

8. Disputes.

If any dispute arises between the Utilities and the Plaintiffs, or any of them, concerning the interpretation or performance of this agreement, the parties hereto will first attempt to resolve the same by good faith discussions directed to settlement of the dispute. In the event the parties are unable to resolve the disputes through good faith negotiations, this agreement will be enforceable by appropriate judicial or administrative bodies.

9. Illinois Commerce Commission.

Commonwealth Edison Company shall file this agreement with the Illinois Commerce Commission as part of the record in its Docket Numbers 56405 and 55149, and the requirement for the construction of a closed-cycle cooling system as described in this agreement shall, subject to the approval of the Commission, be incorporated in the Commission's environmental orders in those proceedings.

10. Entire Agreement.

This agreement and any other writing signed by the parties or their agents or any of them contemporaneously herewith supersede all prior representations, negotiations and

understandings of the parties hereto, whether oral or written, and constitute the entire agreement of the parties. This agreement shall not be changed or superseded, except in a writing, signed by the duly authorized representatives of the parties hereto.

11. Notices.

Any notice of information required by this agreement shall be sent registered mail, return receipt requested, postage prepaid, to a representative of each party as follows:

(a) For the Utilities:

President
Commonwealth Edison Company
Post Office Box 767
Chicago, Illinois 60690

(b) For the Plaintiffs in the District Court Cases:

Hon. William J. Scott
Attorney General of Illinois
169 North LaSalle Street
Chicago, Illinois 60601

Joseph V. Maraganis, Esq.
189 West Madison Street
Chicago, Illinois 60602

12. Miscellaneous.

No public announcement or statement regarding this agreement shall be made by any of the parties or their agents prior to the time the orders referred to in Paragraph 5 have been entered by the District Court.

The undersigned represent that they have the requisite authority of their respective organizations to execute this agreement on their behalf. This agreement shall be binding upon the representatives, successors and assigns of each signatory.

This agreement is entered into by the Utilities and the State of Illinois, the Isaak Walton League and the UAW to resolve all controversies, differences and disputes between the parties hereto with respect to the licensing and operation of Quad Cities Station Units 1 and 2, including, but not limited to, those which have heretofore arisen, or might or could have arisen to the date of this agreement. The execution of this document by the Utilities is not intended to and does not constitute any admission by the Utilities that the discharge of condenser cooling water other than from a closed-cycle cooling system is inadequate, unsafe or results in any way in an adverse effect on the aquatic environment in the Mississippi River.

Dated: March 27, 1972

COMMONWEALTH EDISON COMPANY and IOWA-ILLINOIS GAS & ELECTRIC COMPANY

By: Ischery Lincoln & Beale
ILB

STATE OF ILLINOIS

By: William J. Law
Attorney General

IZAAK WALTON LEAGUE OF AMERICA
ILLINOIS DIVISION OF THE IZAAK
WALTON LEAGUE OF AMERICA
IOWA DIVISION OF THE IZAAK WALTON
LEAGUE OF AMERICA
DAVENPORT, IOWA CHAPTER OF THE
IZAAK WALTON LEAGUE OF AMERICA
CLINTON, IOWA CHAPTER OF THE IZAAK
WALTON LEAGUE OF AMERICA
BLACKHAWK CHAPTER OF THE IZAAK
WALTON LEAGUE OF AMERICA

By: Joseph Kaszgan

ILLINOIS STATE COMMUNITY ACTION FED
OF THE UNITED AUTOMOBILE, AIRCRAFT
AND AGRICULTURAL IMPLEMENT SOCIETY
OF AMERICA

By: Kate T. Brickman
Haskell O. Katz

Attachment #2

J. Louch

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO

FWR-ER
March 22, 1972

50-254

50-265

Mr. Lester Rogers
Director, Division of Radiological
and Environmental Protection
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Rogers:

This is in response to your letter dated March 6, 1972, requesting the comments of the Federal Power Commission on the AEC's Draft Detailed Statement on Environmental Considerations Related to the Proposed Issuance of an Operating License to the Commonwealth Edison Company and the Iowa-Illinois Gas and Electric Company for the Quad Cities Nuclear Power Station Units 1 and 2.

Comments of the Federal Power Commission on the Quad Cities facilities in relation to area power needs were submitted previously in a letter dated December 20, 1971, and are referenced in the Draft Detailed Statement as References Section I, (6). Thus the following comments will update the earlier ones to reflect changes occasioned by later developments.

The Commonwealth Edison Company's evaluation of its 1972 summer peak situation without the Quad Cities units and without the Zion unit yields a reserve margin of 5.4 percent. This is comparable to the 7.1 percent margin shown for the similar situation in the FPC December 20, 1971 report noted above. The difference in reserve margin percentages results from the difference of 224 megawatts of net dependable capacity between the Company's projected 13,189 megawatts and the 13,423 megawatts used in the FPC staff analysis. The staff used the full capability of the Dresden Plant rather than the restricted output capability imposed by the Illinois Pollution Control Board. The 23.5 percent reserve shown for the Company for the 1972 summer period in Table 1 (referred to in the text on page 1 of the Draft Detailed Statement) was predicated upon the Company's early plans which included the availability of the Quad Cities and Zion units. It is worthy of note that the erosion of the reserve margin from the earlier projected level of 23.5 percent to the currently anticipated level of only 5.4 percent has been caused by the delays in bringing the new nuclear units into commercial operation.

1622

Mr. Lester Rogers

The Commonwealth Edison Company is a member of the Mid-America Interpool Network (MAIN), a major power planning group and also one of the nine regional electric reliability councils organized in response to the Federal Power Commission's April 1970 Statement of Policy on the Adequacy and Reliability of Electric Service (Order No. 383-2). The Draft Detailed Statement illustrates the effect of the delay of the Quad Cities nuclear units upon the Commonwealth Edison Company, the Iowa Power Pool and the Iowa-Illinois Gas and Electric Company, which is related to the Commonwealth Edison Company by formal contract relations, but the equally relevant impact of unit delays upon the MAIN systems as a whole is not included. The December 20, 1971 report of the FPC Bureau of Power included this analysis, and it indicated a reserve margin for the MAIN area of only 8.9 percent without the Quad Cities and Zion units. This becomes 8.1 percent if the 224-megawatt reduction of Commonwealth Edison capacity heretofore noted is subtracted. Also of great importance are the seven large fossil-fueled units in the MAIN area included in the capacity resources which have suffered some delays and are not now expected to be in commercial operation until May and June 1972. These units and their sizes are: Cayuga 2 - 500 megawatts, Edwards 3 - 350 megawatts, Coffeen 2 - 600 megawatts, Powerton 5 - 840 megawatts, Neal 2 - 321 megawatts, Labadie 3 - 555 megawatts, and New Madrid 1 - 600 megawatts. Recent experience with large new units has indicated a relatively high degree of unavailability during initial service periods, with a consequent added threat to the adequacy and reliability of electric service. Also included in the area capacity are two other nuclear units, the operating 497-megawatt Point Beach 1 and the not yet operating 497-megawatt Point Beach 2. Because of the logistics of current licensing procedures, the latter unit may not be available for the 1972 summer peak. Excluding the two Quad Cities units, the seven fossil-fueled units and the Point Beach No. 2 unit, not yet in operation, total 4,263 megawatts of new capacity which was included in the originally-planned summer 1972 total.

The staff of the Bureau of Power concludes that developments subsequent to its December 20, 1971 report, as indicated above, serve to further emphasize the need for the power output of the two Quad Cities units for the 1972 summer period and beyond.

Very truly yours,


E. A. Phillips
Chief, Bureau of Power

UNITED STATES ATOMIC ENERGY COMMISSION

DOCKET NOS. 50-254 AND 50-265

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

NOTICE OF ISSUANCE OF AN AMENDMENT TO A FACILITY OPERATING LICENSE
AND ISSUANCE OF A FACILITY OPERATING LICENSE

On March 16, 1971, a Notice of AEC Consideration of Issuance of Facility Operating Licenses for possession and operation of the Quad-Cities Nuclear Power Station Units 1 and 2 was published in the Federal Register (36 F. R. 5008). That notice proposed the issuance of facility operating licenses to Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company for possession, use and operation of the Quad-Cities Nuclear Power Station Units 1 and 2 (both being single cycle, boiling water reactors located in Rock Island County, Illinois) at steady state power levels up to 2511 megawatts (thermal) for each unit.

Construction of Unit No. 1 having been substantially completed in accordance with Construction Permit No. CPPR-23 and the provisions of Commission regulations, Facility Operating License No. DPR-29 was issued October 1, 1971, for operation of Unit No. 1 at power levels up to 25 megawatts (thermal) for fuel loading and low power testing.

Further Commission action on the licensing of both Unit 1 and

Unit 2 was delayed as a result of litigation brought by the Attorney General of Illinois and the Isaak Walton League, et.al. (U. S. District Court for the District of Columbia Civil Actions Nos. 2207-71 and 2208-71).

The Commonwealth Edison Company and the parties in the suit reached an agreement on March 27, 1972, and the litigation has been dismissed permitting the licensing action taken by the Commission described in this notice.

Accordingly, no request for a hearing by the applicants or petition for leave to intervene by any interested person having been filed following publication on March 16, 1971, of the Notice of AEC Consideration of Issuance of Facility Operating Licenses, the Commission has issued Amendment No. 2 to Facility Operating License No. DPR-29 for Unit No. 1 and has issued Facility Operating License No. DPR-30 for Unit No. 2 to Commonwealth Edison Company and Iowa-Illinois Gas and Electric Company. The license amendment and the license, effective as of the date of issuance, authorize Commonwealth Edison Company (acting for itself and Iowa-Illinois Gas and Electric Company) to possess, use and operate the Quad-Cities Nuclear Power Station Units 1 and 2 each at power levels up to 502 megawatts (thermal), 20% of each Unit's rated power, in accordance with the Technical Specifications issued for Unit 1 dated October 1, 1971 and the licenses. Both licenses will expire June 1, 1972, unless extended for good cause shown or upon earlier issuance of a superseding licensing action.

The Commission has inspected the Quad-Cities Nuclear Power Station and has determined that Unit 1 and Unit 2 have been constructed in accordance with the application, as amended, and the provisions of Provisional Construction Permit Nos. CPPR-23 and CPPR-24. The licensees have submitted proof of financial protection in satisfaction of the requirements of 10 CFR Part 140.

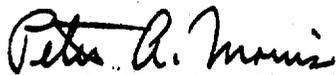
The Director of Regulation has made the findings set forth in the amendment and the license and has concluded that the application for construction permits and facility licenses, as amended, complies with the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Chapter I, and the issuance of the license amendment and license will not be inimical to the common defense and security or to the health and safety of the public.

For further information concerning these actions, see copies of the following items which are available for public inspection at the Commission's Public Document Room at 1717 H Street, N. W., Washington, D. C., and at the Moline Public Library at 504 - 17th Street, Moline, Illinois 61265: (1) Amendment No. 2 to Facility Operating License No. DPR-29, (2) Facility Operating License No. DPR-30, (3) the Technical Specifications for Quad-Cities Station Units 1 and 2, (4) Commonwealth Edison Company's letters dated October 12, 1971, October 28, 1971 and November 10, 1971, (5) the

Division of Reactor Licensing's Safety Evaluation for the Quad-Cities Station Units 1 and 2 dated August 25, 1971, (6) the report of the Advisory Committee on Reactor Safeguards on the Quad-Cities Station Units 1 and 2 dated March 9, 1971, (7) the Discussion and Conclusions pursuant to Appendix D of 10 CFR Part 50 Supporting the Issuance of Licenses for 20 percent operation of Units 1 and 2 dated January 24, 1972, and Supplement No. 1 thereto dated March 31, 1972, and (8) the Commission's Draft Detailed Statement of Environmental Considerations dated March 6, 1972 (published in F. R. March 9, 1972 - 37 F. R. 5073). A copy of each of the above items, except for item (4), may be obtained upon request addressed to the Atomic Energy Commission, Washington, D. C. 20545, Attention: Director, Division of Reactor Licensing.

Dated at Bethesda, Maryland, this 31st day of March, 1972.

FOR THE ATOMIC ENERGY COMMISSION


Peter A. Morris, Director
Division of Reactor Licensing