REPORT OF

THE ENVIRONMENTAL PROTECTION AGENCY

TO

THE LAKE MICHIGAN ENFORCEMENT CONFERENCE

ON

THERMAL QUESTION

SEPTEMBER, 1972

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

STATEMENT ON THERMAL QUESTION

LAKE MICHIGAN ENFORCEMENT CONFERENCE

SEPTEMBER, 1972

I have distributed to each of you copies of the EPA statement on the thermal question. I will not be reading the full document but instead will present certain remarks and summarize as necessary the attached documents.

I think it would be appropriate to discuss briefly the background of the thermal question to refresh your memories and to inform the audience.

Background

At the First Session of the Lake Michigan Enforcement Conference held on January 31, February 1-2, February 5-7, March 7-8, and March 12, 1968 in Chicago, Illinois, the conferees discussed the rapidly increasing construction of nuclear power generating stations designed to use Lake Michigan water for cooling. They found that, in addition to one existing nuclear power plant, five more were proposed, or under construction at Lake Michigan cities and projected for completion between 1970 and 1973. They agreed that the combined impact of siting many reactors on the shores of the Lake must be considered so that this activity would not result in pollution from wastewater heat or from the discharge of excessive amounts of radionuclides. The following recommendation was made:

"The States and the Department of the Interior will appoint members of a special committee on nuclear discharges and the thermal pollution aspects of power plants and reactors.

The committee will meet with representatives of the Atomic Energy Commission and other interested parties to develop guidelines for pollution control from nuclear power plants. The committee is to pay special attention to thermal discharges which affect the aquatic life environment of the lake. Representatives of the committee will be available to appear before any Federal or State agency considering approval of a permit for such power plants and reactors."

The Committee on Nuclear Power Plant Waste Disposal held its first meeting on May 27, 1968, followed by numerous work sessions over the next few months. They produced an extensive report which was presented at the Second Session of the Lake Michigan Enforcement Conference, held in Chicago on February 25, 1969. While the committee did reach some tentative conclusions on certain aspects of the thermal issue, the main theme of their report was that sufficient information was not available to permit establishment of a basin-wide regulation on power plant waste disposal.

The conferees at the February 25, 1969 Session expressed disappointment that the committee was unable to recommend a strong thermal pollution policy to the conferees. The Second Session of the Lake Michigan Enforcement Conference made the following recommendation:

"6. Nuclear Discharges and Thermal Pollution

The report of the committee was accepted by the conferees for consideration. One of the recommendations of the report was for further study, and this will be taken under consideration by the States and the Federal Water Pollution Control Administration.

It will be necessary to determine whether nuclear discharges and thermal pollution are covered by the State water quality standards, particularly in regard to thermal pollution. The FWPCA recommended that the State and Federal Conferees establish a committee to make specific recommendations to the conference on this problem."

The thermal question was discussed by the conferees at the March 31, April 1, and May 7, 1970 Executive Sessions and a variety of proposals were made. At this latter session the conferees agreed that a series of technical sessions would be necessary to evaluate the thermal question. These workshop sessions were held on September 28-30 and October 1-2, 1970 and were devoted solely to the thermal question.

At the October 29, 1970 Executive Session, the conferees authorized the formation of a technical committee to specifically review the various proposals that had been made on this question. The committee's report was presented at the March 23-25, 1971 session. At this session extensive time was again devoted to the subject of waste heat discharges. On the basis of the full discussion on the question, the conferees made certain findings and recommendations.

These findings and recommendations were approved by EPA Administrator William D. Ruckelshaus on May 14, 1971. In the case of Items 18 and 25, where the conferees were unable to reach a unanimous position, Mr. Ruckelshaus supported the Federal position and requested the concurrence of the reluctant conferee.

State Actions

Subsequent to the issuance of the approved findings and recommendations by Mr. Ruckelshaus, the four Lake Michigan States took certain actions relating to implementing the conference recommendations. While the individual States will undoubtedly be reporting this information in greater detail, I would like to present a summary of their actions at this time.

MICHIGAN: On August 7, 1971, the Michigan Water Resources Commission, Department of Natural Resources, adopted temperature standards for Interstate and Intrastate Waters of the State of Michigan. These standards established two zones within Lake Michigan, north and south of a line running due west from Pentwater, Michigan.

1. Adopted maximum temperatures, after mixing, for the southern zone were identical to the Conference recommendation. Maximum temperature standards for the northern zone are $5^{o}F$ lower than Conference recommendations for all months except June and November. In those two months the maximum allowable temperatures are the same for both the north and south portions.

2. Michigan's mixing zone provision does not specify maximum distance or configurations. Michigan's mixing zones are to be established on a case-by-case basis and designed to minimize effects on the aquatic biota

and to permit fish migration at all times. The Conference had recommended that the criteria be met outside a 1,000 foot radius from a fixed point adjacent to the discharge.

3. Michigan's general provision regarding water intake and discharge design criteria are excerpts from the Conference recommendations. The Conference requirements that thermal plumes not touch the Lake bottom or affect fish spawning and nursery areas and that intakes not be influenced by warmer discharge waters are not contained in Michigan's standards.
4. Michigan's standard does not contain time schedules for waste heat discharges covered by the above criteria and general provisions. The Conference recommendations establish dates for dischargers in operation to complete facilities to meet the criteria and general provisions.
5. The State's revised temperature standards do not contain monitoring requirements for waste heat discharges greater than 1/2 billion BTU/hour.
6. With regard to the specific recommendations applicable to waste heat discharges in excess of 1/2 billion BTU/hour:
    1. Michigan's standard restricts cooling water discharges to the amount essential for blowdown of a closed cycle cooling facility as recommended by the Conference.

2. Michigan's closed cycle cooling requirement applies to heated discharges in excess of 1/2 billion BTU/hour which start construction between September 1, 1971 and March 1, 1975. The Conference recommendations require all new waste heat discharges in excess of 1/2 billion BTU/hour placed in operation after March 1, 1971, to provide closed cycle cooling systems.

ILLINOIS: On June 9, 1971, the Illinois Pollution Control Board (IPCB), amended water quality standards applicable to Lake Michigan, particularly the thermal portion. On March 7, 1972, the IPCB reprinted Water Pollution Regulations of Illinois with some revisions. Section 206(e) of these regulations applies to Lake Michigan Temperature and was unchanged from the June, 1971 version.

With regard to the general thermal recommendation of the Lake Michigan Enforcement Conference:

1. Illinois amended standard contains specific numerical temperature limitations identical to those recommended by the Enforcement Conference. The Illinois standard defines a mixing zone similar to that recommended by the Conference. The Illinois and Conference mixing zones are identical in area. However, the Illinois standard enables the shape of the mixing zone to be described in any simple form, as opposed to

the Conference requirement which defines a circle or a portion of a circle.

2. The Illinois standard contains general provisions with regard to water intakes and discharges for the protection of aquatic life which provides the same protections as the Enforcement Conference recommendations. However, Illinois general provisions apply only to waste heat discharges from sources under construction as of January 1, 1971, but not in operation. The general recommendations of the Enforcement Conference apply to all existing and future waste heat discharges except municipal treatment plants and vessels.

3. The Illinois standard does not contain a time schedule for the one facility under construction (Zion) to which the above criteria and general standards apply. Dates are established for existing facilities in the Conference recommendations. The Conference criteria and general charges would apply to Zion, since it is greater than 1/2 billion BTU/hour. The Conference recommendation for backfitting with closed cycle cooling systems applies to Zion.

4. The Illinois standards require monitoring of any source of heated effluent if specified by the State. The Conference recommendation requires monitoring of all waste heat discharges greater than 1/2 billion BTU/hour.

With regard to the specific recommendations:

1. The Illinois standard will require any source of heated effluent in excess of 1/2 billion BTU/hour which is in operation or under construction as of January 1, 1971, to backfit with alternative cooling devices, unless it is demonstrated to the State by the owner or operator of the source of heated effluent that discharges from that source have not caused and cannot be reasonably expected in the future to cause significant ecological damage to the Lake. Since the Illinois standards will not permit the discharge of waste heat in excess of a daily average of .1 billion BTU/hour from any source not in operation or under construction as of January 1, 1971, the Conference provision for waste heat discharges in excess of 1/2 billion BTU/hour will not have further application in Illinois.
2. The Illinois standard does not provide dates or a typical schedule for completion of backfitting of alternative cooling devices. Should the heated effluent dischargers fail to prove the absence of ecological damage by June 1977, backfitting of alternative cooling device is to be accomplished within a reasonable time to be determined by the State.

INDIANA: On November 17, 1971, the Indiana Stream Pollution Control Board adopted standards nearly identical to those contained in the Summary of the Conference. The differences are enumerated as follows:

1. Existing discharges were exempted from compliance with the requirement that discharge plumes shall not overlap or intersect.
2. Conference specified plan of implementation dates for construction of appropriate facilities whereas Indiana does not specify dates. The proposed time schedule will evidently be a part of the implementation plan now under development which will be submitted to the Stream Pollution Control Board for consideration and public hearing by the end of this year.
3. The effective date for control of new waste heat discharges greater than 1/2 billion BTU/hour as required by the conference was March 1, 1971. Indiana made that date "as of the effective date of this regulation" which was February 11, 1972.
4. The Conference required a detailed plant-by-plant evaluation of intake design and potential corrective measures within six months. This assessment will be completed as part of the plan of implementation under development by the State.

5. The State did not adopt a policy of nonproliferation of new power plants on Lake Michigan.

WISCONSIN: On December 8, 1971, the Wisconsin Department of Natural Resources adopted Lake Michigan Thermal Standards (NR102.04) to become effective February 1, 1972.

The numerical maximum temperature criteria are identical to those recommended by the Lake Michigan Enforcement Conference, however, the implementation plan varies from Conference recommendations in the following aspects:

1. Mixing zones are to be established by the State following two-year studies of the environmental impact of thermal discharges exceeding 1/2 billion BTU per hour. The Conference had recommended a maximum mixing zone of 1,000 foot radius for all cases. The $3^{o}F$ maximum temperature requirement in Wisconsin standards was not referenced to natural temperatures as recommended by the Conference.
2. Unless the two-year study results prove damage, Kewaunee and Point Beach nuclear power plants will be allowed to operate with once-through cooling contrary to Conference recommendations.
3. Conference requirements relative to intake and discharge design criteria are not present in the Wisconsin implementation plan.

4. The Milwaukee Harbor, Port Washington Harbor, and the mouth of the Fox River are excepted from the monthly temperature maximums.

Status of Compliance with Conference Recommendations

In order to achieve the conferees' objective of protection of the Lake, it is mandatory to maintain a detailed status of compliance on the established requirements. EPA has attempted to compile detailed status of compliance information on all dischargers covered by thermal pollution control requirements as adopted by the conferees. This information was furnished by the individual States. This information is presented by the attached Tables I-IV.

Rather than discuss these tables at this time, it may be more appropriate to wait until after the individual States' presentations.

Federal Administration Actions

Certain Federal administration procedures must be followed and permits received in order for a power plant to legally operate. These procedures may include permits from the Corps of Engineers and the Atomic Energy Commission.

Corps of Engineers. All power plants except the Bailly Nuclear Generating Facility have applied for and received Section 10 permits relating to construction of intake and outfall facilities in Lake Michigan.

The Refuse Act Permit Program, administered by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency, requires all dischargers of industrial waste water to obtain permits which specify permissible waste loadings. This program as such applies to all thermal dischargers covered by the Conference recommendations in question. All

major power plant dischargers under consideration by this Conference have applied for permits.

As a result of a court decision, discharge permits are not being issued by the Corps of Engineers at the present time. However, EPA is working with the States to complete the processing of applications so that permits, with suitable conditions, will be ready when they may once more be issued. This overall program has provided a great quantity of valuable data, which is now contributing to many Lake Michigan Enforcement Conference Reports.

Atomic Energy Commission. The Atomic Energy Commission has established detailed procedures that must be followed by applicants for nuclear power plant operating and construction licenses.

Table V summarizes these steps and depicts the status of the facilities located on the Lake Michigan shore.

National Environmental Policy Act of 1969

The provisions of the National Environmental Policy Act of 1969 require the preparation of Environmental Impact Statements. These Statements are detailed analyses of environmental effects of proposed action which all Federal Agencies are required to prepare and use in their agency review processes before they take any "major actions" (including recommendations and reports on legislation) which "significantly affect the quality of the human environment."

The Council on Environmental Quality Guidelines require that each statement be prepared in two states: first, the sponsoring agency prepares a draft statement using its own expertise and information. The draft is then reviewed and commented on by other agencies which have special expertise relating to the project. Finally, the sponsoring

agency uses these comments to modify the project plans (if necessary) and to preapre a final statement.

The agency preparing the draft statement is responsible for making it available to the public. Any individual or organization may then comment on the draft; he may express support or opposition, suggest alternatives, or point out project effects that may have escaped the attention of its sponsors. These comments may be in the form of a letter, a critique, or even, as done by some citizen's groups, a "counter environmental impact statement" setting forth their views and analysis in as great a depth as the draft itself.

The final Environmental Impact Statement represents the Federal Agency's official position and actions taken subsequent to its preparation - relative to the project in question - must be compatible with the findings and recommendations contained therein.

Environmental Impact Statements are required on all of the major power plants planned or under construction on Lake Michigan. The statements are being prepared by the Atomic Energy Commission.

Judicial Proceedings

In addition to the administrative proceedings relating to these plants, there have been a number of judicial proceedings involving the Lake Michigan power plants and the thermal question. Some lawsuits have sprung from the administrative and regulatory hearings and others have been based upon independent grounds. All lawsuits to date, that involve the thermal issue either directly or indirectly, deal with the construction or operation of a nuclear power plant. The following plants have been, or are presently, involved in litigation:

I. Zion Nuclear Plants 1 & 2 - Zion, Illinois

1. Businessmen for the Public Interest (BPI) v United States Atomic Energy Commission (USAEC)

   Suit filed: July 14, 1972

   Court: U.S. District Court, Northern District of Illinois

   Status: Pending

2. Robert Johnston & U.A.W. v Commonwealth Edison Company

   Suit filed: October 1969

   Court: Cook County Illinois Circuit Court

   Status: Pending

3. Metropolitan Sanitary District of Greater Chicago (MSD) v Commonwealth Edison Company

   Suit filed: September 27, 1969

   Court: Cook County Illinois Circuit Court

   Status: Suit withdrawn on July 24, 1972

II. Cook Nuclear Plants 1 & 2 - Bridgeman, Michigan

1. BPI v USAEC

   Suit filed: July 14, 1972

   Court: U.S. District Court, Northern District of Illinois

   Status: Pending

2. Indiana & Michigan Electric Company v William Ruckelshaus, Administrator of the Environmental Protection Agency (EPA)

   Suit filed: July 20, 1971

   Court: U.S. District Court, District of Columbia

   Status: Case dismissed

3. MacDonald v Indiana-Michigan Power Company

   Suit filed: March, 1970

   Court: Federal District Court, Kalamazoo, Michigan

   Status: Pending

III. Kewaunee Nuclear Plant - Kewaunee, Wisconsin

1. BPI v USAEC

   Suit filed: July 14, 1972

   Court: U.S. District Court, Northern District of Illinois

   Status: Pending

IV. Point Beach Nuclear Plant 2 - Two Rivers, Wisconsin

1. BPI, the Sierra Club, and Protect Our Wisconsin Environmental Resources v USAEC

   Suit filed: June 20, 1972

   Court: U.S. Court of Appeals - 7th Circuit, Chicago, Ill.

   Status: Temporary restraining order granted, later dissolved. Preliminary injunction denied.

Argonne National Laboratory Report

Earlier in my statement I mentioned the extensive testimony that has been presented to the conferees on the thermal question on Lake Michigan. Since the March 1971 conference, additional work has been completed on the Lake and elsewhere that bears on the question before you. For that reason, EPA entered into a contract with the Argonne National Laboratory for a review of any new technical information relevant to the environmental effects of thermal discharges into Lake Michigan, which is not reflected in the existing record of the Lake Michigan Enforcement Conference.

Attached is a copy of that completed report. Let me spend a minute summarizing its contents.

The primary sources of information for the report included hearing testimony from local, state and Federal pollution control agencies, reports from the Great Lakes Fisheries Laboratory of the U.S. Bureau of Sport Fisheries and Wildlife, universities performing research on Lake Michigan, U.S. Army Corps of Engineers permits, technical and environmental reports prepared by or for power companies discharging into Lake Michigan and environmental impact statements prepared by the Atomic Energy Commission. Results from studies conducted on bodies of water other than Lake Michigan and reports from the open literature were cited if they were judged to be particularly relevant and as time permitted.

The report discusses the physical and biological aspects of thermal discharges. A section on Ambient Lake Conditions describes preoperational field studies, thermal bar measurements and general lakewide phenomena that are pertinent to power plant siting considerations. A section on Studies Related to Thermal Plumes describes field measurements of the physical and biological characteristics of thermal discharges, summarizes mathematical modeling techniques, and describes some laboratory tests on the biological effects of heated water. An Intake and Discharge Effects Section summarizes operational data from most of the power plants on Lake Michigan, describes the intake and outfall designs of the five major nuclear facilities sited on the lake, and discusses biological effects observed at various power plants.

The report also discusses alternative cooling systems. A section on Cooling Towers, Ponds and Spray Canals describes several analyses of closed

cycle cooling systems as reported in some of the Environmental Impact Statements and summarizes available data on estimated costs of original installations and backfitting. Chemical discharges from both fossil fired and nuclear power plants are tabulated in the section on Chemical Inputs. This section also describes chemicals used in condensers, process water systems, cooling towers and ponds and reports on recent experiments to study the biological effects of various concentrations of these chemicals.

Environmental Protection Agency Thermal Policy

The Environmental Protection Agency (EPA), in the process of establishing nation-wide effluent guidelines for the Refuse Act Permit Program , has reviewed large quantities of data on the effects of cooling water discharges on the aquatic environment. From the beginning it has been recognized that the effects of cooling water discharges are dependent on many factors in addition to that of temperature increase. These factors include such variables as intake and outfall, location and design, quality of the cooling water supply and receiving waters, biological importance of the effected area, chemical discharges associated with plant operation, etc.

It became obvious that a single effluent requirement for the entire nation was neither feasible nor desirable. For this reason, EPA has established the policy that all discharges to the aquatic environment involving waste heat must be evaluated on a case-by-case basis, taking into account that some discharges must be evaluated collectively due to their combined impact on the receiving water.

Attached are copies of EPA's Thermal Policy as stated by Mr. John Quarles, Assistant Administrator for Enforcement and General Counsel, on May 12, 1972. Also attached is a speech by Mr. Quarles that relates to this subject.

To determine the impact of this policy on Thermal discharges to Lake Michigan, one must conduct a thorough assessment of each major heat source individually and collectively due to any combined impacts that may occur.

Mr. Chairman, that concludes my statement. I will be happy to answer any questions now or we can move into the statements by the respective States.

TABLE I

STATUS OF COMPLIANCE WITH CONFERENCE RECOMMENDATIONS

DISCHARGER	I. Criteria, Implementation and Monitoring - All Heated Discharges					II. Closed Cycle Cooling Required of New Plants Beginning Operation After March 1,1971	III. Necessary Correction of all Intakes	IV. Non-Proliferation of New Large Thermal Discharges.
	1. Temp and Mixing Zone Size.	2. Intake Criteria	3. Discharge Plume Location	4. Implementation of Necessary Changes	5. Monitoring for Discharge >0.5 Billion BTU/hr.			
WISCONSIN								State does not specifically prohibit new power plants on Lake Michigan. Requirement for closed cycle cooling on new plants does not apply to those already under construction.
Wisconsin Electric Power Co.								
Commerce St. Plant (35 MWe)	No Violation	Unknown	Unknown	Not Done	N/A	N/A	STATE DID NOT COMPLY	
Lakeside Plant (310.8 MWe)	Probable Violation	"	Probable Violation	"	Unknown	"		
Oak Creek Plant (1670 MWe)	Violation	"	Probable Violation	"	"	"		
Point Beach Nuclear Plant (1048 MWe)	Violation (See Column II)	"	Probable Violation (Both)	"	"	Unit II Not In Compliance		
Port Washington (400 MWe)	Probable Violation	"	Probable Violation	"	"	N/A		
Valley Plant (280 MWe)	Possible Violation	"	Probable Violation	"	"	"		
Wells Plant (13.7 MWe)	No Violation	Unknown	Unknown	Not Done	N/A	"		
Wisconsin Public Service Co.								
Pulliam Plant (392.5 MWe)	Probable Violation	"	Probable Violation	"	"	"		
Kewaunee Nuclear Station (540 MWe)	See Column II	"	Probable Violation	"	"	Not In Compliance		

TABLE I

STATUS OF COMPLIANCE WITH CONFERENCE RECOMMENDATIONS

DISCHARGER	I. Criteria, Implementation and Monitoring - All Heated Discharges					II. Closed Cycle Cooling Required of New Plants Beginning Operation After March 1,1971	III. Necessary Correction of all Intakes	IV. Non-Proliferation of New Large Thermal Discharges.
	1. Temp and Mixing Zone Size.	2. Intake Criteria	3. Discharge Plume Location	4. Implementation of Necessary Changes	5. Monitoring for Discharge >0.5 Billion BTU/hr.			
WISCONSIN (Con't)								
Wisconsin Power and Light Co.								
Edgewater Plant (477 MWe)	Probable Violation	Unknown	Probable Violation	Not Done	Unknown	N/A	STATE DID NOT COMPLY	State does not specifically prohibit new power plants on Lake Michigan. Requirement for closed cycle cooling on new plants does not apply to those already under construction.
City of Manitowoc Municipal Plant (69 MWe)	No Violation	"	Unknown	"	N/A	N/A		

TABLE II

STATUS OF COMPLIANCE WITH CONFERENCE RECOMMENDATIONS

DISCHARGER	I. Criteria, Implementation and Monitoring - All Heated Discharges					II. Closed Cycle Cooling Required of New Plants Beginning Operation After March 1,1971	III. Necessary Correction of all Intakes	IV. Non-Proliferation of New Large Thermal Discharges.
	1. Temp and Mixing Zone Size.	2. Intake Criteria	3. Discharge Plume Location	4. Implementation of Necessary Changes	5. Monitoring for Discharge >0.5 Billion BTU/hr.			
ILLINOIS								
Commonwealth Edison Co.								
Zion Nuclear Plant (2200 MWe)	See Column II	Problem	See Column II	Not Done	Unknown	Not In Compliance	State did not furnish implementation schedule.	State requires closed cycle cooling for all heated discharges >0.1 billion BTU/hr which were not in operation or under construction as of January 1, 1971.
Waukegan Plant (1043 MWe)	Violation	Unknown	Probable Violation	"	"	N/A		
Winnetka Power Plant (25.5 MWe)	No Violation	"	Unknown	"	N/A	"		
U.S. Steel-South Works Cooling & Process Waters-3 Outfalls (>05 billion BTU/hr)	Probable Violation	"	Probable Violation	"	Unknown	"		
U.S. Steel - Waukegan	No Violation	"	Unknown	"	N/A			

TABLE III

STATUS OF COMPLIANCE WITH CONFERENCE RECOMMENDATIONS

DISCHARGER	I. Criteria, Implementation and Monitoring - All Heated Discharges					II. Closed Cycle Cooling Required of New Plants Beginning Operation After March 1,1971	III. Necessary Correction of all Intakes	IV. Non-Proliferation of New Large Thermal Discharges.
	1. Temp and Mixing Zone Size.	2. Intake Criteria	3. Discharge Plume Location	4. Implementation of Necessary Changes	5. Monitoring for Discharge >0.5 Billion BTU/hr.			
INDIANA								
Commonwealth Edison Co								
State Line Plant (972 MWe)	Violation	Unknown	Probable Violation	Not Done	Unknown	N/A	State did not meet deadline, but has forwarded a partial list.	State does not prohibit new power plants. Requirement of closed-cycle cooling has been established for all new plants.
Northern Indiana Public Service Co.								
Dean H. Mitchell Plant (414 MWe)	Probable Violation	Unknown	Probable Violation	Not Done	Unknown	N/A		
Bailly Station (616 MWe)-Fossil (660 MWe)-Nuclear	"	"	"	"	"	N/A to Fossil Portion		
	See Column II	"	See Column II	Done	"	Agreed to Closed Cycle-Nuclear Portion		
Michigan City Plant (211 MWe)	"	"	No Problem	Done	"	Agreed to Closed Cycle		
American Oil Company, Whiting	Probable Violation	"	Interaction with Plume from Union Carbide Co.	Not Done	"	N/A		
American Maize, Hammond	Possible Violation	Unknown	Unknown	Not Done	Unknown	N/A		

TABLE III

STATUS OF COMPLIANCE WITH CONFERENCE RECOMMENDATIONS

DISCHARGER	I. Criteria, Implementation and Monitoring - All Heated Discharges					II. Closed Cycle Cooling Required of New Plants Beginning Operation After March 1,1971	III. Necessary Correction of all Intakes	IV. Non-Proliferation of New Large Thermal Discharges.
	1. Temp and Mixing Zone Size.	2. Intake Criteria	3. Discharge Plume Location	4. Implementation of Necessary Changes	5. Monitoring for Discharge >0.5 Billion BTU/hr.			
INDIANA (Con't)								
U.S.Steel - Gary	Probable Violation	Unknown	Probable Violation	Not Done	Unknown	N/A	State did not meet deadline, but has forwarded a partial list.	State does not prohibit new power plants. Requirement of closed-cycle cooling has been established for all new plants.
Union Carbide, Whiting	Possible Violation	"	Overlap to American Oil	"	"	N/A		
Bethlehem Steel Co., Chesterton	Unknown	"	Unknown	"	"	"		
Youngstown Sheet and Tube Co., East Chicago	"	"	"	"	"	"		
Inland Steel Co., East Chicago	"	"	"	"	"	"		

TABLE IV

STATUS OF COMPLIANCE WITH CONFERENCE RECOMMENDATIONS

DISCHARGER	I. Criteria, Implementation and Monitoring - All Heated Discharges					II. Closed Cycle Cooling Required of New Plants Beginning Operation After March 1,1971	III. Necessary Correction of all Intakes	IV. Non-Proliferation of New Large Thermal Discharges.
	1. Temp and Mixing Zone Size.	2. Intake Criteria	3. Discharge Plume Location	4. Implementation of Necessary Changes	5. Monitoring for Discharge >0.5 Billion BTU/hr.			
MICHIGAN								
Indiana-Michigan Electric Co.								
Donald C. Cook Nuclear Plant (2200 MWe)	See Column II	See Column II	See Column II	Not Done	Unknown	Not in Compliance	State did not comply.	State requires closed-cycle cooling systems on all new waste heat sources which start construction between September 1, 1971 and March 1, 1975. No permanent non-proliferation statement was adopted.
Consumers Power Co.								
Palisades Nuclear Plant (700 MWe)	"	OK	See Column II	Done	"	Agreed to Closed-Cycle		
J. H. Campbell Plant (650 MWe)	Probable Violation	Problem	Probable Violation	Not Done	"	N/A		
B. C. Cobb Plant (511 MWe)	"	Unknown	Unknown	"	"	"		
Big Rock Nuclear Plant (75 MWe)	Possible Violation	"	Probable Violation	"	"	"		
Holland Board of Public Works								
James de Young Plant (48.5 MWe)	No Violation	"	Unknown	"	N/A	"		
Traverse City Light and Power Co.								
Bayside Plant (35 MWe)	"	"	"	"	"	"		

TABLE IV

STATUS OF COMPLIANCE WITH CONFERENCE RECOMMENDATIONS

DISCHARGER	I. Criteria, Implementation and Monitoring - All Heated Discharges					II. Closed Cycle Cooling Required of New Plants Beginning Operation After March 1,1971	III. Necessary Correction of all Intakes	IV. Non-Proliferation of New Large Thermal Discharges.
	1. Temp and Mixing Zone Size.	2. Intake Criteria	3. Discharge Plume Location	4. Implementation of Necessary Changes	5. Monitoring for Discharge >0.5 Billion BTU/hr.			
MICHIGAN (Con't)								
City of Escanaba								
Municipal Power Plant (25 MWe)	No Violation	Unknown	Unknown	Not Done	N/A	N/A	State did not comply.	State requires closed cycle cooling systems on all new waste heat sources which start construction between September 1, 1971 and March 1, 1975. No permanent non-proliferation statement was adopted.

TABLE V

SUMMARY AND STATUS OF
ATOMIC ENERGY COMMISSION ADMINISTRATIVE HEARINGS

FACILITY	APPLIED FOR CONSTRUCTION PERMIT	HEARING ON CONSTRUCTION PERMIT	CONSTRUCTION PERMIT GRANTED	APPLIED FOR 1% OPERATING LICENSE	HEARINGS ON 1% OPERATING LICENSE	1% OPERATING LICENSE GRANTED	HEARINGS ON 20% OPERATING LICENSE	20% OPERATING LICENSE GRANTED	HEARINGS ON 60% OPERATING LICENSE	60% OPERATING LICENSE GRANTED	HEARINGS ON FULL OPERATING LICENSE	FULL OPERATING LICENSE GRANTED	COMMENTS
Donald C. Cook Nuclear Station *(Ind-Michg. Elect. Company)*	12/15/67	2/3/69	3/25/69										6-29-72 - AEC issued "Notice of Consideration of Issuance of Facility Operating Licenses and Notice of Opportunity for Hearing."
Palisades Nuclear Plant *(Consumers Power Company)*	6/2/66	2/23-24/67	3/14/67	11/5/68	6/2/70 - 3/19/71	3/24/71	6/17/71 - 10/26/71	11/23/71	1/25-26/72	3/10/72	8/2/72		
Zion Nuclear Plant *(Commonwealth Edison Company)*	7/12/67	9/10/68 - 12/17/68	12/26/68	11/25/70									6-30-72 - AEC issued "Notice of Consideration of Issuance of Facility Operating Licenses and Notice of Opportunity for Hearing."
Kewaunee Nuclear Station *(Wis. Public Serv. Company)*	8/23/67	6/27-28/68	8/6/68	1/30/71									6-22-72 - AEC issued "Notice of Consideration of Issuance of Facility Operating Licenses and Notice of Opportunity for Hearing."
Bailly Nuclear Plant *(Northern Ind. Public Serv. Co.)*	8/28/71												12-29-71 - AEC issued "Notice of Hearing on Application for Construction Permit." Pre-hearing conference scheduled for September 6, 1972 in Hammond, Indiana, hearing to scheduled
Point Beach Nuclear Plant - Unit II *(Wis. Electric Power Company)*	8/3/67	6/25/68	7/25/68	3/18/69	12/14/71 - 3/23/72	5/25/72	6/1/72 - 7/21/72	7/28/72	8/4/72 - to present				

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

May 12, 1972

Office of the
General Counsel

MEMORANDUM

TO : All Regional Administrators

FROM : Assistant Administrator for Enforcement
and General Counsel

SUBJECT: Policy on Thermal Effluent

Until further notice, the following will be the policy of the permit program with respect to processing of permits for major sources of waste heat discharge. It is understood, of course, that by reason of the district court injunction in Kalur v. Resor, no permit may be actually issued at the present time.

It is the policy of the Environmental Protection Agency that all discharges to the aquatic environment involving waste heat be evaluated on a case-by-case basis, taking into account that some discharges must be evaluated collectively because of their related impact on a receiving water. Such evaluations should include a comprehensive analysis of all relevant factors at the site, such as water quality standards, total cumulative heat loading, current biotic impact information, scouring and other velocity effects, entrainment damage, associate chemicals, and alternative cooling and pollution abatement devices and processes.

Where the evidence indicates that once-through cooling will damage the aquatic environment, plants currently operating or under construction should be permitted to operate, but with a commitment to offstream cooling (provided that the environmental impact of the offstream cooling technique adopted is acceptable). In circumstances of substantial environmental impact, the backfitting may have to be done under an implementation schedule that requires reduced heat discharge and restricted operating levels during times of peak environmental stress. Where the discharger has demonstrated that there is no substantial evidence of damage from once-through cooling, the plant should receive a permit to operate, but with a commitment to perform environmental monitoring and to go to offstream cooling if this monitoring produces evidence of substantial damage.

The test for new plants will be stricter, however, because here there is an opportunity for very substantial reduction in the cost of cooling or

other treatment. In new plant construction industry can optimize environmental protection by giving early consideration to the constraints imposed by environmental regulations at a markedly lower cost than that incurred by backfitting. All electric power companies contemplating future construction should be on notice by now of the need for thermal pollution control. (If water quality standards will be violated by the effluent, appropriate treatment is obviously necessary.) Should a company proceed with design and construction of a new plant without adequate consideration of attendant thermal problems, it must be assumed to have deliberately incurred the risks of increased costs of backfitting and of potentially not being permitted to operate during the backfitting.

It is essential that any inquiry from a utility company concerning the degree of control required for a new plant be promptly and clearly answered, in writing. We must establish a clear record of our position for each new plant. Attached is an example of a response which, although dealing with a plant under construction, addresses this general issue.

You should, of course, have your staffs available to provide such information as is needed by potential waste heat dischargers in order that they may properly design the necessary pollution control equipment at the outset. As questions arise on technical and other problems affecting the position which this Agency should take concerning thermal effluent from new plants, I urge that you notify and work with Dr. Gordon Everett and his staff in the Office of Technical Analysis.

John R. Quarles, Jr.

Enclosure

ENVIRONMENTAL PROTECTION AGENCY, WASHINGTON, D. C. 20460

Remarks by

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TO

Edison Electric Institute's Eighth
Biennial Financial Conference

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Doral Country Club and Hotel
Miami, Florida

I am happy to be with you today to discuss some problems which are of great importance to your industry, to the Environmental Protection Agency, and to the average American citizen. The electrical power industry, as one of the largest and most broadly spread industries in the United States, is being, and will continue to be, affected by any strategy to alleviate existing pollution problems and to preserve the quality of the environment for future generations. Since environmental regulation will impose additional burdens on the power industry, we need both your understanding and your affirmative cooperation.

The United States today faces a severe environmental challenge. In many areas the past has caught up with us. But we are a diverse people in a vast land and have enjoyed both spectacular and unique economic growth. Thus, if problems spring from our diversity and from the rate at which we have made economic progress, it should surprise none of us.

There is no doubt that electrical power has been the backbone of our ability to provide continually rising standards-of-living for our citizens in this century. We have, however, paid a high price for our affluence. Resource tolerances have been exceeded -- our air is dirty -- our rivers are polluted. Since the passage of the National Environmental Policy Act in 1969, we have come a long way in initiating efforts to protect the environment, but we have a long way to go. The Environmental Protection Agency has set standards and has buttressed them with vigorous enforcement. Such measures taken to protect the environment, as we all know, involve not only ecology, but also economics.

We are aware that the electrical industry is faced with grave difficulties

in the next several decades. We are attempting to be responsive. Your task of supplying adequate and clean energy in the coming decades is enormous. As a matter of fact, it is second only, for the only items consumed more widely than power in this country are air and water.

I should acknowledge that relationships between my agency and your industry are not always harmonious and cordial. They are, indeed, inherently subject to incidents of confrontation. In the absence of strong environmental regulations, many have not been responsible in their use of natural resources in the past. The cumulative damage has been great and further abuse no longer can be tolerated. In cases where damage to the environment has occurre EPA has been tough.

A foremost example is our enforcement action against the Florida Power and Light, Inc., concerning its plant at Turkey Point. We estimate that the Federal Government has spent between $1 million and $2 million and at one time had as many as 60 persons working on that case, which was in litigation for a year and a half before being settled last September. The abatement program approved by the Court requires expenditures of roughly $35 million by the company to mitigate environmental damage, though such damage even then will not be completely eliminated. We are presently engaged in litigation with the Houston Lighting and Power Company over its plans to divert huge amounts of grossly polluted water from the Houston Ship Channel and discharge it into Trinity Bay after using the water for cooling purposes. We also recently became engaged in litigation with the Delmarva Power and Light Company under the Clean Air Act as a result of that Company's refusal to comply with fuel content regulations of the Delaware Federal-State air

implementation plans. These are only a few examples of the clash between power generation and environmental protection. In cases where our best protective judgment dictates that [illegible] environmental requirements, we intend to fight with every resource at our command to prevent environmental damage. We will continue to be tough until an environmental ethic pervades every decision made by industry in this country.

The normal operation of a power plant can generate both air and water pollution. Emission of particulate matter, SO_2, NO_x, and some of the trace metals into the air must be controlled. Some of the polluting emissions can be brought to levels compatible with Federal standards through conversion to different fuel sources. Others will require installation of pollution control equipment such as electrostatic precipitators, wet scrubbers, and bag houses. The removal of SO_2 is a more difficult problem and is specifically addressed by the New Source Performance Standards promulgated by EPA this year. It has been estimated that 150 million metric tons of SO_2 are emitted to the global atmosphere each year, 70 percent of which is directly attributable to the combustion of coal.

Thermal pollution is also of major concern. The return of large amounts of cooling water to the natural environment can create a heatload highly disruptive or destructive to a fragile aquatic environment. The Environmental Protection Agency has had thermal policy actively under consideration for many months. We have recently established the policy that each discharge of waste heat to the aquatic environment shall be evaluated on a case-by-case basis. Where our analysis indicates that once-through cooling damages or will damage the environment, EPA will insist on a commitment to offstream cooling

as a prerequisite to either continued operations or to EPA concurrence with construction permits. In other cases in which we believe that damage will not occur, but in which there is a clear possibility, we shall insist on the establishment of an effective monitoring system to detect damage before it becomes serious.

Design for new plants should incorporate all features necessary for environmental protection. Inclusion of such factors at the planning and design stage will markedly lower costs from the expensive backfitting process. We are putting the power generating industry on notice of the need for control of thermal pollution. If any company chooses to ignore environmental requirements in its planning, it will be deliberately running the risk of increasing costs due to backfitting and possibly of not being permitted to operate during the backfitting. We realize that the additional costs to your industry of complying with these environmental measures will be great, but they are reasonable, and necessary to get the job done.

The costs of such environmental policy and regulations are presently being studied by both Government and industry. A recent report has estimated that total investment by the electric power industry to meet environmental requirements will be 10.7 billion dollars between 1972 and 1976. This figure could reach 17.8 billion by 1976 depending on requirements for backfitting. Furthermore, these costs will widely vary from region to region, and it is estimated that pollution control costs in 1976 will range from 2.8 percent to 10.65 percent of average 1970 revenues.

Although it is difficult to estimate what impact these additional costs will have on various classes of consumers, we can derive some "ballpark" figures. Assuming that total costs will be evenly imputed to all customers

(which in reality they probably will not be) and accepting present usage of electricity as a base, the average residential consumer would find his annual electricity bill in 1976 from $1.30 to $17.50 higher than it would be without any environmental regulation of the electrical power industry. The cost of electricity to the industrial sector will also increase. This, however, is not expected to have a major impact on consumption of manufactured goods. Only a few industries have electricity costs equalling more than a few percentage points of their value of shipments.

We have now reached a point where we have a clearer picture of the economic consequences of environmental protection. Though precise predictions are still difficult, we can draw two conclusions. One is that environmental protection will not be cheap. The second is that the costs are not prohibitive. The question, therefore, is not whether America can afford environmental protection but whether it wants to. On the basis of the laws passed by Congress, we must conclude that the environmental requirements now being imposed are desired and considered worth the cost by our American society.

On the other hand, measures taken to protect the environment do not abrogate the responsibility of fulfilling basic power needs. The Environmental Protection Agency recognizes fully that essential public services must not be disrupted in pursuit of environmental protection. Every effort must be made to minimize points of friction and administrative bottlenecks.

As one example, the Atomic Energy Commission has proposed legislation known as the "Quad Cities Bill". This bill would modify the National Environmental Policy Act on a limited, temporary basis to permit interim

[illegible] power shortages. The Environmental Protection Agency has gone on record in favor of this legislation, and I personally have testified before three different congressional committees in its support. This is one example of our efforts at EPA to assist in achieving orderly administration of environmental protective regulation and to minimize transitional problems.

I would like now to discuss this problem in a broader context. The environmental movement is, I believe, part of a more fundamental revision of values in our society. People, young and old alike, have recognized that our emphasis on material progress should be better balanced with an appreciation of aesthetic and other non-material values. While this reorientation affects social attitudes toward the pollution problems of every industry, it appears to bear upon your industry with remarkably strong effect.

Many citizens have argued with great emotion that stabilization of the growth of power, or even a decrease in the use of power, is necessary if we are to save our environment. The striking fact is that in general this attitude of opposing growth in an industry does not extend to other industries, even though many other industries have severe pollution problems. Why is it that to a large extent the environmental community has singled out the electric power industry as the target for this type of attack?

The explanation may lie in many sources. Part of the answer, no doubt, is the environmental damage created by power plants in the past, especially in a few notorious cases. Perhaps part of the answer is that electric power has to some become a symbol for the entire system of industrial development

which concerns them. Closely related to this, of course, is the prospect of enormous growth in the electric power industry and its vast demands on national resource reserves to fuel the turbines.

I wish to state my own opinion that the future vitality of our country depends continued large growth in the electric power industry. Electrical power is necessary not only to increase standards-of-living, but also to improve the quality of life in these United States. A few examples quickly make this clear. Widespread construction of rapid transit systems is imperative to our mission of alleviating urban air pollution and to achieving sound land use in metropolitan areas. Increasing amounts of electricity also will be required for the additional waste treatment plants to which we are committed; these are critical to our resolve to revitalize our rivers. In short, power is the foundation of national economic growth, and such growth is required to achieve our environmental objectives. Moreover, only with such growth can other vital social goals be realized, and in particular only with such growth can the promise of America be extended to the millions of our citizens who live close to, or below, the line of poverty.

These factors would seem to indicate indisputably the need for growth in the generation and use of electricity. To me they simply intensify the puzzle of why so many have become hostile to the power industry. It suggests the development of a severe communication problem within our society over the proper role of your industry. May I suggest that in the long run this problem cannot be solved by one side winning and the other side losing. There are fundamental truths on both sides. There must be an accommodation.

If your industry is to recoup its position of universal respect as the

public [illegible] you are, your [illegible] clear and convincing record [illegible] with full sensitivity to the environmental concerns which [illegible] disregard for environmental values have done immense damage to the position of your industry in our country. Those days must not be repeated. A far-reaching concern for environmental protection -- an insistence of fulfilling both the spirit and the letter of legal requirements -- must be present in all you do.

To present this recommendation in specific terms, I would like to focus on three pending problems, each of enormous significance.

Pursuant to Section 111 of the Clean Air Act, as amended, the Environmental Protection Agency promulgated New Source Performance Standards for fossil-fuel fired steam generators on December 23, 1971. These standards regulate emission of particulate matter, SO_2, and NO_x from new fossil-fuel power plants. All new plants with generating units over 250 million BTU input will be covered.

The New Source Performance Standards reflect our best determination of the degree of emission limitation achievable with the best available systems of emission control, and take into account the cost of achieving such reduction. In setting these standards, EPA examined power plants in Europe as well as in the United States. I realize that some in your industry have major problems with these standards and are presently challenging them in the Courts.

The setting of standards is, in any case, a difficult task. The problems encountered are mainly technical in nature, and hard answers are not easy to find. In this case, the questions focus particularly on the

technology [illegible] to [illegible] in effectiveness, their dependability and their cost. [illegible] discussions were technical issues with [illegible] combinations in setting these standards were made only after an intensive and responsible analysis of the best technical advice we could obtain. We believe in the new source standards, and we intend to enforce them.

I also wish to emphasize the essential factors which bear upon this problem. We know that we must achieve major reductions in sulfur dioxide emissions from fossil-fuel power plants. There are only two ways this can be done. One is to use low sulfur fuel. But its supply is limited. The other is to eliminate the sulfur before it goes out the stack. The only way we can meet this problem on a national basis is to make huge strides forward in the utilization of emission control technology. This must be your goal.

A second area of major interest to your industry and my Agency is the water legislation pending in Congress. Bills to overhaul the Federal Water Pollution Control Act have been passed by the Senate and by the House of Representatives. One provision of the House bill has special importance to your industry. Section 316 would exempt thermal discharges from the standard regulatory structure applicable to other pollutants, which in general requires achievement of best practicable control technology by January 1, 1976. I am aware of the special complexities in the problem of thermal pollution, some of which perhaps might justify distinct statutory treatment. At this time our Agency has taken no position on the merits of this provision, and I will not do so either. There is one facet of the problem, however, on which the merits are clear. The language of the House bill has raised some

[illegible], [illegible] in the [illegible] of [illegible] comments, that it is intended to create the [illegible] discharge [illegible] all Government control whatsoever until [illegible] approximately one year and four months after enactment of the law. You should be aware that this proposed special treatment of thermal discharges is being bitterly denounced among environmentalists. The scope of controversy and its emotional level could be reduced if it were made unequivocally clear that thermal discharges would continue to be subject to the present regulatory requirements until the new regulations are issued. I venture to suggest that it is highly in the interests of your industry to take the lead in making this clear and to make certain that the statutory language leaves no doubt on this point.

Lastly, it is often much easier to avoid major environmental problems than to find solutions for them once they exist. This is certainly the case in your industry. Power plant siting criteria are necessary and represent a rational starting place for avoiding problems in the future. The establishment of such criteria will be a major instrument in convincing the American public that power production and environmental degradation are not synonyomous. The most serious problems of environmental damage encountered by your industry in the past can be largely avoided through the adoption of sound siting criteria in the future. The Administration's Power Plant Siting Act will provide the necessary basis for environmentally sound national growth. This legislation attacks siting problems on a case-by-case basis. It incorporates a systemized approach to advanced planning and allows for public disclosure which would facilitate environmental review and reduce the delays you are now experiencing. You should be the strongest supporters of this legislation. I am certain you will not fully escape from public controversy and criticism

until power plant siting decisions are made pursuant to a regulatory system which provides to the public full confidence that environmental [illegible] the way in finding the solutions to your environmental problems, I am sure you will find public criticism will change into public support. The Power Plant Siting Act provides an efficient vehicle for both optimizing environmental protection and facilitating the expansion of power supply.

In closing, I wish to make it clear that I have no illusions that this job which you and we jointly share is easy. Some requirements imposed in the name of environmental protection may be unwise. Others may be unachievable. In such cases, representatives of the power industry have not only the right but also the obligation to speak out clearly and express their dissent. As one present example, the implementation plans being developed under the Clean Air Act of 1970 will impose enormous burdens and the time allowed by Congress for resolving the endless complexities is too short to make it possible for all mistakes to be avoided. Your industry must participate in the thrashing out of those problems, and in some instances you will find yourselves opposed to the environmentalists.

Within the Environmental Protection Agency we have an awesome responsibility to perform the duties assigned to us in a manner which does not impose improper requirements on you. Our actions have far-reaching consequences, and we continuously are required to take action in a very tight time schedule. We wish we had the wisdom of Solomon, yet clearly we do not. In addition to environmental requirements, there are also many other legal and technical complications that make it difficult -- sometimes seemingly impossible --

for you to [illegible] for [illegible] even with unlimited expenditures and unquestioned intentions.

Thus, I am not saying that the conflicts between environmental protection and power generation are easy or that the issues are one-sided. What I mean to suggest, and I hope to do this as a friend rather than as a critic, is that your industry today not only faces an immediate and continuing crisis to provide adequate electric generating capacity but also faces a critical long-term challenge to preserve its position of respect and leadership in the American society. The current public concern forces a profound revision in the operating objectives of each utility. Your goal is, and always has been, public service. What is changing and being broadened is the meaning of the term "public service." That concept must now include a major, and costly, emphasis on environmental protection.

Power supply and environmental protection do pose certain conflicts. There are severe immediate obstacles to reconciling the two objectives. These problems simply must be solved. In the long run the objectives must be reconciled, and I have confidence they will be reconciled.