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STATE OF ILLINOIS
POLLUTION CONTROL BOARD

September 30, 1992

BY HAND DELIVERY

Ms. Dorothy Gunn, Clerk
Illinois Pollution Control Board
State of Illinois Center
100 West Randolph Street
Suite 11-500
Chicago, Illinois 60601

PCB 92-143

Re: Illinois Power Company's Petition for Hearing to Determine Specific Thermal Standards Pursuant to 35 Ill. Adm. Code § 302.211(j)

Dear Ms. Gunn:

I am enclosing herewith for filing an executed original and 10 copies of: (1) a Notice of Filing, Petition for Hearing to Determine Specific Thermal Standards Pursuant to 35 Ill. Adm. Code § 302.211(j), Exhibits to the Petition, and a Certificate of Service indicating the required service on the Illinois Environmental Protection Agency; and (2) a Notice of Filing, Illinois Power's Motions Regarding Procedural Issues and Affidavit of Thomas L. Davis in support thereof, and a Certificate of Service. I would appreciate having these documents marked to indicate their receipt and returned to me.

If you have any questions on the enclosed, please let me know.

Sincerely,

Eric L. Lohrenz

Enclosures
cc: Thomas L. Davis, w/encls.
Sheldon A. Zabel, w/encls.

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SEP 30 1992
STATE OF ILLINOIS
POLLUTION CONTROL BOARD

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the matter of:	)	
	)	
Petition of Illinois Power Company	)	
(Clinton Power Station), for	)	PCB No. 92-143
Hearing Pursuant to 35 Ill. Adm.	)	
Code § 302.211(j) to Determine	)	(§ 302.211(j) Hearing)
Specific Thermal Standards	)	

PETITION FOR HEARING TO DETERMINE SPECIFIC THERMAL STANDARDS PURSUANT TO 35 ILL. ADM. CODE § 302.211(j)

In accordance with Title VII of the Environmental Protection Act, Ill. Rev. Stat. 1991, ch. 111½, §§ 1026-29; 35 Ill. Adm. Code Part 106, Subpart B; and 35 Ill. Adm. Code § 302.211,[1] Illinois Power Company ("Illinois Power") hereby submits this petition for a hearing to determine specific thermal standards pursuant to § 302.211(j).[2] Specifically, this petition requests the Illinois Pollution Control Board ("Board") to promulgate the following specific thermal standards to be applied to the recirculated condenser cooling water discharge to Clinton Lake from Illinois Power's Clinton Power Station (the "Station"):

> The temperature of the discharge to Clinton Lake from Clinton Power Station, as measured at the second drop structure of the discharge flume, shall be limited to a daily average temperature which (a) does not exceed 99°F during more than 90 days in a fixed calendar year running from January 1 through December 31, and (b) does not exceed 110.7°F for any given day.

In support of this petition, Illinois Power states:

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[1] Unless otherwise stated, references hereinafter to "§ xxx.xxx" are to the corresponding section of the Board's rules under Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code).

[2] This petition is filed in accordance with the requirements of § 106.201. That section provides little guidance regarding the general information to be included as part of the petition. For this reason, this petition generally follows the informational requirements for a petition filed in accordance with §§ 106.101 and 106.102, pertaining to heated effluent demonstrations, except to the extent that § 302.211(j) requires different or additional information.

General Plant Description

1. The Station is a nuclear-fueled electrical generating facility located six miles east of Clinton, DeWitt County, Illinois. (Figure 1.)[3] The Station operates 24 hours per day, seven days a week. Approximately 1,200 persons are employed at the Station.

2. The Station's generating system consists of a boiling-water reactor, steam turbine generator, heat dissipation system, and associated auxiliary facilities. The Station's rated thermal capacity is 2,894 MWt. Its rated gross and net electric generating capacities are 985 MWe and 933 MWe, respectively. Actual net electrical generating capacities vary depending upon auxiliary station electrical demands and intake cooling water temperatures. Net electrical generating capacities range from 930 MWe to 935 MWe during summer periods, and from 940 MWe to 944 MWe during winter periods.

3. The boiling-water reactor produces steam for direct use in the steam turbine. The reactor uses nuclear fuel consisting of assemblies of uranium dioxide and gadolinia trioxide pellets. These assemblies consist of 624 fuel bundles arranged in a cylindrical pattern in the center of the reactor. Each bundle contains 62 fuel rods, and each fuel rod is approximately 13 feet in length. The fuel rods contain the uranium dioxide and gadolinia trioxide pellets.

4. The main condenser at the Station is a single-shell, single pass, deaerating type condenser with divided water boxes. During plant operation, steam expanding through the low pressure turbines is directed downward into the main condenser and is condensed. The condenser is designed for a 22.5°F rise in cooling water temperature at 100 percent station power levels and 100 percent cooling water flow.

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[3] All Figures referenced in the petition are collected in Appendix A, attached hereto. All Tables referenced in the petition are collected in the attached Appendix B. A listing of all Exhibits submitted concurrently with this petition is provided in the attached Appendix C.

5. Initial criticality of the reactor occurred on February 27, 1987. The Nuclear Regulatory Commission ("NRC") issued the full power operating license for the Station on April 17, 1987. The Station became fully operational on October 15, 1987, and commercial operation commenced in November 1987. The current scheduled retirement date of the Station is September 29, 2026 based on the current operating license. Illinois Power in the future may request the NRC to extend this retirement date an additional 20 years to 2046.

6. Station capacity factors for 1988, 1989, 1990 and 1991 were 70.8, 35.1, 44.0, and 73.3 percent, respectively. The lower capacity factors in 1989 and 1990 were due to both scheduled and unscheduled outages. A chronology of all the Station shutdowns occurring since 1987 is presented in Table 1. The longest periods of shutdown occurred in 1989, 1990 and 1991.

7. Average yearly capacity factors projected through 2002 are presented in Table 2. Planned or scheduled refueling outages through 2002 also are shown. Future refueling outages beyond cycle 10 are expected to continue on the same 18-month cycle, with no other outages planned or scheduled. The projected capacity factors in Table 2 are based on information concerning the scheduled outages, as well as historical industry experience. Projections beyond 2002 have not been made. However, Station management personnel expect to maintain a three-year moving average capacity factor of approximately 72 percent for the life of the Station.

Description of Method for Heat Dissipation

8. Heat from the Station is dissipated by means of an artificial cooling lake known as Clinton Lake. (Figure 2.) Illinois Power constructed Clinton Lake at the same time it was constructing the Station. The lake is a U-shaped impoundment, formed by damming Salt Creek and the North Fork Salt Creek immediately below their confluence. The normal pool elevation of Clinton Lake is 690.0 feet above mean sea level. At this elevation the lake has a surface area of

approximately 4,895 acres and a volume of approximately 74,200 acre-ft. Clinton Lake is the fourth largest lake in Illinois. Waters from Clinton Lake are discharged to Salt Creek.

9. Condenser cooling water for the Station is withdrawn from the North Fork Salt Creek leg of Clinton Lake by means of three circulating water pumps each having a rated pumping capacity of 212,000 gpm (470 cfs) at the normal lake elevation. After passing through the condenser, this water travels down a 3.1-mile earthen flume and is discharged to the Salt Creek leg of the lake. Between the point of discharge and the point of withdrawal, the distance on Clinton Lake is approximately 52,300 feet, or 9.9 miles. This portion of the lake, known as the cooling loop, has a surface area and volume of approximately 3,890 acres and 60,700 acre-ft, respectively.

10. The flume also conveys heated station service water flows, and treated (unheated) sanitary effluents and intermittent discharges from the Station's radwaste treatment system. The service waters also are withdrawn from the North Fork Salt Creek leg of the lake, and are passed through nonsafety-related heat exchanger systems before being discharged back to the lake by way of the flume.

11. Flume discharge flow rates vary depending upon the number of condenser cooling water pumps in service. During summer periods, three condenser cooling water pumps are required to maintain condenser performance, and two service water pumps are required to satisfactorily operate the nonsafety-related heat exchanger systems. The total discharge flume flow during these periods varies between 1,387 cfs and 1,497 cfs (896 MGD to 968 MGD) depending upon the elevation of the lake and the cleanliness of the condenser. The design maximum quantity of heat rejected to the flume from the condenser and service water heat exchanger systems is 6.71 billion BTU/hr.

Summary of Presently Applicable Thermal Standards and Discharge Temperature Information

12. NPDES permit IL0036919 issued by the Illinois Environmental Protection Agency on July 25, 1990 requires the condenser cooling water discharges from the Station to satisfy the temperature effluent limitations prescribed by the Board in its Orders 88-97, dated June 22, 1989, and 89-213, dated June 21, 1990.[4] These limitations require that (a) daily average discharge temperatures shall not exceed 99°F more than 90 days in any year, and (b) the daily average discharge temperature shall never exceed 110.7°F on any day.[5] Compliance with the limitations is to be demonstrated by continuously measuring the temperature of the cooling water discharge to Clinton Lake at the second drop structure on the discharge flume.

13. The data demonstrate that daily average flume discharge temperatures did not exceed the presently applicable thermal effluent limits during the years 1988 through 1991. Daily average condenser cooling water flume discharge temperatures exceeded 99°F only 50 days in 1988, 10 days in 1989, 7 days in 1990, and 58 days in 1991. The maximum daily average flume discharge temperature was 108°F in 1988, 104°F in 1989, 100.1°F in 1990, and 103.5°F in 1991. Instantaneous maximum flume discharge temperatures observed during 1988, 1989, 1990, and 1991 were 109°F, 105°F, 102°F, and 105°F, respectively.

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[4] The Board ordered the present limitations as variances from the temperature effluent limitations specified in the Board's Order in PCB 81-82, dated May 28, 1981. Table 3 presents a complete chronology of the various proceedings and other key events relating to the thermal standards applicable to Clinton Lake.

[5] The Board's Order in PCB 89-213 provides that these limitations will remain applicable to Clinton Lake through September 30, 1993 if Illinois Power submits its petition for "permanent relief" (i.e., specific thermal standards) by October 1, 1992. In addition to imposing or extending the application of the present thermal standards, the Board's Orders in PCB 88-97 and PCB 89-213 also required Illinois Power to monitor the temperature of the water discharged from Clinton Lake to Salt Creek on at least a daily basis, which it has done. (See Exhibit 1.)

14. In addition to these thermal effluent limitations, the Board's temperature water quality standards at § 302.211(b)-(e) apply to the discharge from Clinton Lake to Salt Creek. Those standards state:

a. There shall be no abnormal temperature changes that may adversely affect aquatic life unless caused by natural conditions [§ 302.211(b)];

b. the normal daily and seasonal temperature fluctuations which existed before the addition of heat due to other than natural causes shall be maintained [§ 302.211(c)];

c. the maximum temperature rise above natural temperatures shall not exceed 5°F [§ 302.211(d)]; and

d. water temperatures at representative locations in the stream shall not exceed:

(i) 60°F more than one percent of the hours during December through March;

(ii) 63°F at any time during December through March;

(iii) 90°F more than one percent of the hours during April through November; and

(iv) 93°F at any time during April through November [§ 302.211(e)].

15. The Salt Creek temperature data collected by Illinois Power support the following conclusions regarding compliance with the above water quality standards applicable to Clinton Lake:

a. No abnormal temperature changes occurred in the temperature of Salt Creek immediately below Clinton Lake Dam, during the 1988 through 1991 period, that would adversely affect aquatic life. Temperatures in the discharge from Clinton Lake fluctuate slowly and within the range of naturally occurring temperatures;

b. Normal seasonal temperature fluctuations occur in Salt Creek below the Clinton Lake dam as evidenced by the range in daily and monthly average temperatures. For the periods during which Salt Creek temperatures were monitored, daily average Salt Creek temperatures ranged from 40.3°F to 84.7°F in 1988, from 32.5°F to 82.3°F in 1989, from 33.6°F to 82.4°F in 1990, and from 33.5°F to 84.8°F in 1991. During these same periods, monthly average Salt Creek temperatures ranged from 40.8°F to 81.5°F in 1988, from 36°F to 79.6°F in 1989, from 39.2°F to 79.8°F in 1990, and from 34.3°F to 81.9°F in 1991;

c. Salt Creek temperatures were more than 5°F greater than background temperatures (Station intake or site 4 temperatures) on only four days during the years from 1988 through 1991. Salt Creek temperatures are frequently equal to background temperatures. Temperature differences greater than 5°F were measured on two days in 1989 and two days in 1991, with a maximum temperature differential of 5.4°F in 1989 and 5.6°F in 1991. The difference between daily average temperatures as measured in Salt Creek and background temperatures as measured at the Station intake was never greater than 2°F in 1988, and never greater than 3.6°F in 1990;

d. Salt Creek temperatures never exceeded 60°F during the December through March periods of 1988 through 1991, nor did they exceed 90°F during the April through November period of those years. The maximum monthly average temperature observed during the April through November period was 81.9°F, and the maximum monthly average temperature observed during the December through March period was 45.1°F.

16. Exhibit 1 hereto provides more specific information regarding the temperature data on which the above conclusions are based, and also describes the monitoring program employed by Illinois Power to collect that data. Tables 1 through 8 of Exhibit 1 present summaries of the data referenced in the preceding paragraph; Appendices A through C thereto present selected temperature data in greater detail.

<u>Collection of Lake Temperature Data; Preparation of Modeling Study</u>

17. Thermal data have been collected for Clinton Lake as part of an Environmental Monitoring Program ("EMP") implemented to satisfy requirements of permits and licenses related to the construction and operation of the Station.[6] These data were used in part to verify a model used to project worst case conditions concerning thermal input to the lake, taking into account plant load factors, precipitation, ambient water temperatures, and air temperatures. This model also considers the frequency of occurrence of these worst case conditions, and their joint probabilities of occurrence. (See paragraphs 20-23 below.)

18. Clinton Lake sampling sites were selected to assess the changes in thermal gradients throughout the lake. Figures 3 and 4 indicate the temperature monitoring sites at Clinton Lake. Temperature data was collected both on a continuous basis (see Figure 3), and on an instantaneous basis for purposes of characterizing the temperature profile (see Figure 4). Other pertinent

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[6] The EMP also includes a biological monitoring program, the results of which are discussed beginning in paragraph 24.

information also was recorded at the time of temperature profile data collection, including time, weather conditions, wind speed and direction, approximate lake level, approximate plant load, and air temperature. This information is used for verification of the model and for future predictions of worst case conditions by the model.

19. The distribution of temperatures as measured by Illinois Power throughout Clinton Lake during the late spring through early fall periods of 1987 through 1991 is presented and discussed in two reports prepared by Illinois Power pursuant to the requirements of the Station's NPDES permit: (1) The Environmental Monitoring Program Water Quality Report, 1978-1991 (1992), submitted herewith as Exhibit 2; and (2) the Environmental Monitoring Program Biological Report, Comparison of Preoperational Data (1983-1986) with Operational Data (1987-1991) (1992), submitted herewith as Exhibit 3. Continuous temperature monitoring information is discussed in Chapter 6 of Exhibit 3.[7] Temperature profile monitoring information is discussed in Section 8.1 of Exhibit 2, and also in Chapter 6 of Exhibit 3.

20. The lake temperature data collected during 1989, 1990, and 1991 have been used in connection with a predictive modeling study and report performed for Illinois Power by J.E. Edinger Associates, Inc. ("Edinger"). Edinger used this data to reverify the modeling used in PCB 88-97 to establish the thermal variance limitations which presently apply to the Station.[8] Edinger also was asked to assess the adequacy of the presently applicable thermal limitations (i.e., those imposed as a variance in PCB 88-97) in terms of their potential impacts on Station operations. Edinger's modeling study and report is submitted herewith as Exhibit 4.

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[7] Exhibit 1 presents the most detailed analysis of continuous temperature data measured at the discharge flume and at the point of discharge to Salt Creek from Clinton Lake. (See paragraphs 15-16 above.)

[8] Edinger's previous (1988) modeling study is included as Appendix A to Edinger's present study.

21. The modeling study requested by Illinois Power for this proceeding was performed by Edinger using the Generalized Longitudinal Vertical and Hydrodynamics and Transport ("GLVHT") model. The GLVHT model was set up for the same lake geometry as used in previous simulations of Clinton Lake. Input data for the model included 1989-1991 hourly meteorological data obtained from the National Climatic Data Center for Springfield, Illinois. Station operating data for 1989-1991 were provided as daily average values of power factors, condenser pumping rates, and service water pumping rates by Illinois Power personnel. In addition, hydrological surface inflow data that was not available for Edinger's 1988 modeling study was available for 1989-1991, although groundwater inflow data for the lake were not available. Flows over the spillway at the dam occurred in 1989, 1990, and 1991, but did not occur in 1988 during the June through September period, and the model has been revised to account for this.

22. The accuracy of the GLVHT as applied to Clinton Lake and the Station's cooling system already has been demonstrated in Edinger's prior study, using data collected in 1988. (Exhibit 4, Appx. A.) To further assess and reverify the model, Edinger performed simulations with the model using time-varying boundary condition data for the years 1989, 1990, and 1991 for independent comparison to the observed field data from those years. The reverification portion of Edinger's report examined both the continuous temperature and instantaneous vertical profile data sets collected by Illinois Power. (See Exhibits 4 through 11 to Exhibit 4.) According to Edinger, statistical comparisons between the computed and observed temperatures for the two data sets yielded "good to excellent or "quite good" results, thus reverifying the model.

23. Edinger's report next assessed the adequacy of the presently applicable thermal discharge limits, using three criteria: (a) comparing observed discharge flume temperatures for 1989, 1990, and 1991 with the discharge limits; (b) reverifying the accuracy of the model based on observed 1989, 1990, and 1991 lake temperatures; and (c) determining if the 1989-1991

meteorological data and resulting flume discharge temperatures require re-evaluation of the limits relative to the long-term meteorological statistics from which the limits were originally derived. Edinger reaches the ultimate conclusion that the existing limitations on the flume discharge temperature are adequate, based on the following conclusions as to each criteria:

a. With respect to the first criteria, Edinger concludes that observed conditions during 1989, 1990, and 1991 demonstrated flume discharge temperatures which remained within the 110.7°F maximum daily average limit, and which did not result in an exceedance of the 90-day limit for flume temperatures in excess of 99°F.

b. With respect to the second criteria, Edinger concludes that the GLVHT model has been reverified, that predicted response temperatures (i.e., temperatures in the fully mixed lake in the absence of Station heat loads) are shown to accurately represent Station intake temperatures and therefore can be used in long-term statistical analyses, and that the excess temperatures (i.e., increases in response temperature attributable to Station heat loads)computed for actual operations during 1989-1991 were equal to or less than excess temperatures computed for full load operations.

c. With respect to the third criteria, Edinger first concludes that the additional meteorological data from 1989-1991 does not correspond to extreme conditions which would change the long-term statistics derived from the 1955-1988 data set used in conjunction with Edinger's 1988 study. Edinger then concludes that the observed conditions during 1989-1991 do not require revisions to the statistically-derived limitations on flume discharge temperature, in that the observed maximum daily average flume discharge temperatures and the observed number of daily average flume discharge temperatures in excess of 99°F during 1989-1991 generally did not exceed the statistically-expected values for either of those parameters. Edinger did identify some uncertainty with respect to the maximum temperature limit, but Illinois Power deems the potential operating impacts due to that uncertainty to be reasonable.

Summary of Observed Biological Data

24. Studies on the biological communities in Clinton Lake are among the most extensive of any cooling lake. Studies began when the lake reached spillway level in 1978 and are presently continuing. The influence of thermal discharges on the biological communities is presented in the Biological Report submitted herewith as Exhibit 3, referenced above. That report compares the last four years of preoperational data (1983-1986) to the five years of operational data (1987-1991). The last four years of preoperational data were selected for comparison with operational data due to

the dynamic fluctuations in earlier data associated with the new reservoir. The following paragraphs summarize various findings and conclusions from the Biological Report.

Periphyton.

25. Periphyton communities are composed of diatoms and filamentous green and blue-green algae which form a slippery brown or green layer on the various substrates within the upper layers of lakes and streams where sufficient light penetrates to permit their growth. A total of 83 periphyton samples were collected quarterly at three Clinton Lake sites (sites 2, 13, 16) from 1983 through 1984, and from 1989 through 1991. (Figure 5.) One additional lake site, adjacent to the Station intake (site 4), was sampled from 1989 through 1991. One site on Salt Creek down from the spillway (site 1) was sampled from 1983 through 1991.

26. The Station thermal discharge had a minimal effect on the periphyton community of Clinton Lake. The most pronounced effect was at the point where the discharge canal entered the lake (site 2). Site 2 had the only significant increase in blue-green algae and the largest decrease in periphyton densities. (Figure 6.) These changes are common in other cooling lakes where the thermal discharges enter the lake. Although several parameters experienced decreases during operational years, these decreases occurred at all sites (including site 1), and did not appear to be related to thermal discharges as they did not appear to vary with the temperature gradient between sampling sites. No Station-related thermal impacts to the periphyton community of Salt Creek were identified.

Phytoplankton.

27. A total of 1044 monthly samples of phytoplankton, or planktonic plant life, were collected at six sites on Clinton Lake between 1983 and 1991. A total of 36 samples were collected at the Salt Creek site quarterly during the same period.

28. The samples indicate that thermal discharges had a positive overall impact on the phytoplankton community of Clinton Lake. Throughout the lake a net increase occurred in three parameters: (a) density; (b) primary productivity; and (c) chlorophyll a during the operational period. (Figure 7.) No Station-influenced thermal impacts to the phytoplankton community of Salt Creek were identified.

29. Negative impacts were limited to the area where the discharge canal enters the lake (site 2), and included decreased total phytoplankton densities, lower chlorophyll a levels, and increased abundance of blue-green algae.[9] Population shifts toward blue-green algae and decreased densities are typical of areas adjacent to thermal discharges in other cooling lakes. In contrast to site 2, the adjacent site (site 13) had the highest primary productivity levels, high densities, and lower blue-green algae levels. (Figure 8.) The difference in these parameters between sites 2 and 13 confirms the limited areal extent of the negative impacts on the phytoplankton community.

<u>Zooplankton</u>.

30. Zooplankton are the animal portion of the plankton community which prey on phytoplankton and provide food for macroinvertebrates and fish. The use of zooplankton as biomonitoring tools in thermal impact studies has been scarce. Their short life cycles, transient nature, and patchy distribution make difficult the differentiation between natural variation and water-quality-induced changes. A total of 554 zooplankton samples were collected at six sites in Clinton Lake from 1983 through 1991, while 36 samples were collected from a downstream site in Salt Creek during that period.

31. Generally, the zooplankton community in Clinton Lake was unaffected by Station operations. (Figure 9.) Most of the changes seen in the zooplankton community were limited to

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[9] High abundance of blue-green algae can contribute to foul-tasting water and oxygen depletion in lakes.

lake-wide, seasonal variations in the abundance of dominant taxonomic groups. That is, densities of certain taxonomic groups decreased in operational years, while others increased, at all lake sites. These decreases and increases in density did not correlate with the thermal gradients in the lake, but occurred lake-wide. This suggests they were not directly related to thermal discharges.

32. Lake-wide changes were noted in seasonal densities of dominant zooplankton. Densities were lower in summer and higher in winter. Annual densities of dominant zooplankton were higher in operational years even at the warmest sites (site 2), however, indicating that thermal discharges did not have a negative impact on zooplankton in Clinton Lake.

33. The zooplankton community in Salt Creek was not impacted by the Station's thermal discharge. The source of zooplankton in streams typically is from lake or pond discharges or from backwater areas in the stream. The source of zooplankton at Salt Creek obviously was Clinton Lake, and changes noted at Salt Creek were similar to those in the lake.

Benthic Macroinvertebrates.

34. Benthic invertebrates are those animals which live on, in, or near the bottom substrate of a water body. The macroinvertebrate portion of this benthic community consists of those organisms which are visible to the unaided eye and are retained on a 0.595 mm mesh sieve. A total of 864 quarterly benthic macroinvertebrate samples were collected from seven sites on Clinton Lake and 144 samples were collected at Salt Creek (site 1) between 1983 and 1991. Two sites were added in 1986 for benthic macroinvertebrate sampling as intermediate sites for better assessment of thermal impacts on these sessile organisms. Specifically, site 15 is located in the discharge canal just downstream of the second drop structure and prior to mixing within the lake. Site 14 is in the lake between sites 2 and 13.

35. Overall, the benthic macroinvertebrate community in Clinton Lake was unaffected by Station operations. Macroinvertebrate densities had annual variations but were similar between

the preoperational and operational periods. (Figure 10.) Densities of several dominant taxonomic groups increased in operational years, especially in winter and spring. Such increased densities may have resulted from the extended growing season related to the Station's thermal discharge.

36. The Station's thermal discharge also had a few negative impacts on the benthic community at Clinton Lake, although these were limited to the end of the discharge canal (site 15) in the summer and fall of operational years. The decreased densities of benthic macroinvertebrates within this small area and limited period of time did not significantly impact the Clinton Lake benthic community as a whole.

37. No thermal impact was seen on the benthic community at Salt Creek site 1, in that no consistent differences in data were noted between preoperational and operational years. As expected, because streams have more diverse substrates than lakes, site 1 on Salt Creek was more productive than Clinton Lake sites.

Fisheries.

38. Fisheries monitoring was conducted from 1983 through 1991. A total of 912 fisheries samples were collected in Clinton Lake and Salt Creek downstream of the lake. Thermal discharges from the Station were determined to have had a positive impact on the Clinton Lake fishery.

39. Abundance of largemouth bass, gizzard shad, and bluegill increased during operational years. (Figure 11.) Biomass also increased considerably for largemouth bass and bluegill. (Figure 12.) Abundance and biomass declined for common carp, a common nuisance species (Figures 11-12); these decreases were viewed as a positive trend. White crappie abundance declined slightly, however, biomass increased 29 percent. (Figures 11-12.) Increased growth was observed for largemouth bass, a phenomenon which commonly occurs in cooling lakes due to thermal discharges which extend the growing season two to three months. External parasites and abnormalities were not frequently encountered during the monitoring program.

40. Seasonal movements of fishes occurred as expected; i.e., fish were attracted to warm discharge waters during cooler months and avoided the warmest waters during summer months. (Figures 13-14.) These seasonal movements have no apparent lethal or sublethal effects on the fishery, and commonly occur in cooling lakes.

41. One "fish kill" occurred in August 1988, during one of the warmest, driest years encountered. Approximately 374 hybrid striped bass died. On-site field observation indicates that the likely cause was oxygen depletion in deep gravel pits near the middle of the cooling loop. This occurrence is somewhat common in other lakes for these introduced experimental fish, and had no impact on the overall population of hybrid striped bass.

42. The stream community was dominated by common minnows, and by species that escaped from the lake. No thermal effects occurred, since there were no Station-induced thermal discharges to the stream.

Waterfowl.

43. Specific waterfowl studies have not been undertaken at Clinton Lake except for general flyover counts conducted by the Illinois Natural History Survey ("INHS"). Waterfowl common in the fall and spring migration include mallard, black duck, green-winged teal, widgeon, scaup species, common merganser, goldeneye, coot, Canada goose, and cormorant. Aerial waterfowl counts by the INHS at several other cooling lakes in Illinois also show similar use patterns, especially during the fall migratory season.

44. Extensive waterfowl studies do not appear to have been conducted at other cooling lakes. One study was conducted at Sangchris Lake by the INHS, however, which indicated that waterfowl extensively use cooling lakes without being impacted. Illinois Power has undertaken several projects to enhance waterfowl use at Clinton Lake, such as purchasing and installing 100

wood duck nesting boxes, and providing Canada goose nesting areas in a 140 acre dredge spoil pond adjacent to Clinton Lake.

Aquatic Mammals.

45. Muskrat, raccoon, and beaver are commonly observed at Clinton Lake. Populations flourish sufficiently for the Illinois Department of Conservation ("IDOC") to allow a limited entry trapping season for these species. No evidence is available or suspected that thermal discharges harm populations of any of these species. In fact, a rather large beaver lodge has been active in the discharge canal bay for several years. The lodge, in addition to providing a dwelling for the beaver, also provides excellent habitat for several fish species (white crappie, black crappie, bluegill, largemouth bass, and flathead catfish).

Amphibians and Reptiles.

46. No specific studies of amphibians or reptiles have been conducted at Clinton Lake. No evidence is available or suspected that thermal discharges harm populations of any of these species. The IDOC allows harvesting of frogs (primarily bullfrogs) and turtles (primarily common snapping turtles) on Clinton Lake. Other amphibians observed at the site include American toad, cricket frog, Northern spring peeper, Eastern gray tree frog, and leopard frog species. Other reptiles observed include painted turtle species, soft-shell turtle species, and water snakes.

Impacts on Recreation

47. Clinton Lake is managed by the IDOC as a State Recreation Area. Water-based activities include fishing, boating, water skiing, and swimming. Recreational use of the lake's warmest areas during midsummer did not appear to be reduced as a result of thermal discharges. State Recreational Area annual attendance have increased during operational years, as has the issuance of camping permits. Thermal discharges may have contributed to the increased usage by

creating a winter fishery and extending the recreation season. Observations suggest thermal effluents have extended the recreational season for primary contact water sports such as swimming and water skiing. However, the greatest amount of recreation still takes place between Memorial Day and Labor Day.

48. Concerns were raised prior to Station start-up, that elevated temperatures in Clinton Lake might result in high levels of a pathogenic amoeba, Naegleria fowleri, and constitute a significant public health risk to swimmers and water skiers. Monitoring data, during operational years, indicated that Naegleria fowleri increased in areas near the thermal discharge. However, the Illinois Department of Public Health did not regard those levels to represent a significant public health risk and has continued to permit primary contact water sports.

Winter Fishing.

49. Thermal discharges have created a winter fishery in Clinton Lake, by displacing ice cover in portions of the lake. (Figure 15.) This allows boat and shore anglers access to areas where they can catch white crappie, largemouth bass, walleye, and hybrid striped bass. These fish congregate in thermal discharges during the winter. Growth of several fish species has been enhanced by thermal discharges, contributing to an enhanced fishery. Other areas of the lake are frozen in normal winters and some ice fishing occurs.

50. In order to prevent overharvest, the IDOC restricts fishing within a two mile radius of the thermal discharge to the lake from October to April 1.

Summer Fishing.

51. Thermal discharges during the warm summer months cause many fish to move away from the areas adjacent to the discharge canal. Fishing pressure is reduced in this area as a result,

but returns during the cooler seasons. These changes in fish movements are common in midwestern cooling lakes and have had no lasting negative impacts on the fishery.

Management Practices to Limit Thermal Effects

52. Illinois Power's corporate environmental policy requires all Illinois Power facilities and operations to comply with all environmental requirements imposed directly by permit or indirectly by applicable federal and state regulations. Compliance is assured through the implementation of both structural and nonstructural measures at all Illinois Power facilities. Structural measures include the installation and operation of effluent treatment and monitoring systems. Nonstructural measures include the preparation and implementation of appropriate operating plans and procedures.

53. The temperature effluent limitations which presently apply to the Station's recirculated condenser cooling and service water discharges to Clinton Lake (see paragraph 12 above) were incorporated in the Station's NPDES permit IL0036919, reissued July 25, 1990. These limitations became binding on the Station's operations and subject to Illinois Power's corporate environmental policy. In response to the new temperature limitations, both monitoring and administrative measures were adopted by Station management personnel to assure that the limitations would not be exceeded.

54. Cooling water discharge temperatures are monitored continuously at two locations, the condenser outlet and the end of the discharge flume, prior to discharge to Clinton Lake. Monitored discharge flume temperatures are continuously recorded on a strip chart. Instantaneous condenser outlet temperatures are transmitted continuously to the main control room of the Station. The continuous temperature monitor at the end of the flume is checked daily.

55. Station personnel are regularly and routinely trained to assure they are aware of and understand all environmental requirements applicable to Station operation. A procedure

(approximately 60 pages long) has been written on the NPDES program (CPS Procedure 1816.00 Rev. 10), which identifies the 99°F and 110.7°F temperature limits. The Station procedure for the circulating water system (CPS Procedure 3113.01) requires Station management personnel to stay within the temperature limits specified in CPS Procedure 1816.00. This would require reducing reactor power levels and coincident heat rejection rates to the condenser cooling water flow.

Request for Specific Thermal Standards Pursuant to § 302.211(j)

56. The Board's Water Pollution regulations, at § 302.211(j), provide artificial cooling lakes, such as Clinton Lake, with an exemption from the Board's general use water quality standards under certain conditions. Specifically, the exemption applies when the following requirements are met:

a. All discharges from the artificial cooling lake must comply with applicable provisions of § 302.211(b)-(e) (summarized at paragraph 14, above) [§ 302.211(j)(1)];

b. The heated effluent discharged to the artificial cooling lake complies with all other applicable provisions of the Board's rules except § 302.211(b)-(e) [§ 302.211(j)(2)]; and

c. At an adjudicative hearing, the discharger shall satisfactorily demonstrate to the Board that the artificial cooling lake receiving the heated effluent will be environmentally acceptable and within the intent of the Environmental Protection Act, including, but not limited to:

(1) provisions of conditions capable of supporting shellfish, fish and wildlife, and recreational uses consistent with good management practices, and

(2) control of the thermal component of the discharger's effluent by a technologically feasible and economically reasonable method [§ 302.211(j)(3)].

If the Board finds that the discharger has made an adequate showing pursuant to § 302.211(j)(3), then "the Board shall promulgate specific thermal standards to be applied to the discharge to that artificial cooling lake." § 302.211(j)(5).

57. By this petition, Illinois Power is requesting the Board to determine specific thermal standards pursuant to §§ 302.211(j)(3) and (j)(5); and, in particular, to promulgate the following

specific thermal standards to be applied to the recirculated condenser cooling water discharge to Clinton Lake from the Station:

> The temperature of the discharge to Clinton Lake from Clinton Power Station, as measured at the second drop structure of the discharge flume, shall be limited to a daily average temperature which (a) does not exceed 99°F during more than 90 days in a fixed calendar year running from January 1 through December 31, and (b) does not exceed 110.7°F for any given day.[10]

58. Illinois Power is entitled to the requested relief. Illinois Power satisfies the requirements of §§ 302.211(j)(1) and (2) for the reasons set forth below, respectively, in paragraphs 59-61 and in paragraphs 62-63. Illinois Power also is able to make the showing required under § 302.211(j)(3) for the reasons set forth below in paragraphs 81-86. Thus, the Board should promulgate the thermal standards requested by Illinois Power, for application to the thermal discharge from the Station to Clinton Lake.

<u>§ 302.211(j)(1)</u>.

59. Illinois Power satisfies the requirements of § 302.211(j)(1), in that all discharges from Clinton Lake to other waters of the State comply with the applicable provisions of § 302.211(b)-(e). Those provisions, and data relating to Illinois Power's compliance therewith, are summarized at paragraphs 14-16 above. Based on the data, no question exists that the discharge from Clinton Lake to Salt Creek complies with §§ 302.211(b), (c), and (e).

60. The discharge also complies or substantially complies with § 302.211(d), which provides that the maximum temperature rise above background temperatures shall not exceed

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[10] Hereinafter, the limitation stated in clause (a) will be referred to as the "99°F/90 day limit", and the limitation stated in clause (b) will be referred to as the "110.7°F maximum temperature limit".

5°F.[11] Illinois Power did observe exceedances of this standard on four days over the course of four years, but the data suggest that these exceedances may not be attributable to Station operations. For example, two exceedances occurred during June 1989, when the average power level for the Station was only 14 percent. (Exhibit 1, Tables 2 and 6.) The first of these exceedances occurred on June 20, 1989, when the Station was operating at 0.48 percent power, only one day after coming off of a shutdown lasting 17 days. (Exhibit 1, Appx. A, p. 11.) The second exceedance occurred a few days later, after power levels had climbed to only 57 percent. (Id.) Interestingly, data from May 17, 1989, during a period when the Station had been shut down for over four months, indicate that positive temperature differentials of up to 3.8°F can occur, even in the absence of any thermal influence from the Station. (Id., p. 10.)

61. Two additional exceedances occurred in 1991, on May 19 and June 4. (Exhibit 1, Appx. A, p. 25.) These two exceedances occurred within a relatively short period of time, during which Station power levels were maintained between 96 to 100 percent; yet the temperature differential between the Salt Creek (site 1.5) temperatures and background (site 4) temperatures fluctuated between 5.6°F and -2.7°F during this period. (Id.) Salt Creek temperatures were greater than background temperatures on six of the days between the two exceedances, and were less than background temperatures on nine of those days. (Id.) If Station power levels were directly correlated to temperature differentials between the discharge to Salt Creek and background, one would expect that relatively high positive temperature differentials would have been maintained during the period between the two exceedances, as Station power levels were maintained. Instead, the temperature differential fluctuated during this period, suggesting that Station operations, at least

[11] For purposes of determining compliance with this subsection, Station cooling water intake temperatures, at site 4, are considered representative of background temperatures; i.e., the temperature of the lake discharge in the absence of the Station. The temperature at site 1.5 is considered representative of the temperature of the discharge to Salt Creek. (See Exhibit 1 at p. 6-8; id., Figure 1.)

as indicated by Station power levels, do not appear to correlate directly with positive temperature differentials between Salt Creek temperatures and background temperatures, and do not correlate with exceedances of § 302.211(d).

§ 302.211(j)(2).

62. Illinois Power also satisfies the requirements of § 302.211(j)(2), in that the heated effluent discharged to Clinton Lake via the discharge flume complies with all other applicable provisions of the Board's rules. Such compliance is demonstrated by the results of the monitoring program required under NPDES permit IL0036919. NPDES permit IL0036919 imposes effluent limitations on the discharge from the flume for two parameters, pH and total residual chlorine ("TRC"), in addition to the temperature limitations imposed by the Board. The pH and TRC effluent limitations are based upon either the United States Environmental Protection Agency's technology-based effluent limitation guidelines for the steam electric industrial subcategory or the Board's effluent standards. Since January 1988, only one exceedance of either the pH or TRC numerical effluent limitation has occurred at this outfall (i.e., TRC on September 2, 1991). On this basis, Illinois Power asserts that it complies with the requirement of § 302.211(j)(2).

63. The Station's NPDES permit also requires separate monitoring for two of the contributory waste streams which are also discharged to the discharge flume.[12] Specifically, the sewage treatment plant effluent is monitored for flow, pH, biochemical oxygen demand, and total suspended solids. The radwaste treatment system effluent is monitored for flow, total suspended solids, and oil and grease. Effluent limitations for these pollutants are based upon the Board's

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[12] As noted in paragraph 10, the discharge into Clinton Lake from the flume consists of heated condenser cooling water and station service water flows, as well as treated (unheated) sanitary effluents and intermittent discharges from the Station's radwaste treatment system.

effluent standards. The quality of these discharges routinely complies with these effluent limitations, as demonstrated by historical Station Discharge Monitoring Reports.

Satisfaction of Applicable Legal Standards Under § 302.211(j)(3)

64. Since Illinois Power thus satisfies the requirements of § 302.211(j)(1) and (2), it needs only to make the evidentiary showing required by § 302.211(j)(3) as the final prerequisite to receiving the requested relief from the Board, in the form of specific thermal standards for the discharge from the Station to Clinton Lake. The showing required by that section has two parts: First, Illinois Power must show that the requested thermal standards will continue to allow for provision of conditions at Clinton Lake capable of supporting shellfish, fish and wildlife, and recreational uses consistent with good management practices. § 302.211(j)(3)(A). Second, Illinois Power must show that it provides for control of the thermal component of the effluent from the Station by a technologically feasible and economically reasonable method. § 302.211(j)(3)(B). The second part of this showing ensures that the requested specific thermal standard is the most technologically feasible and economically reasonable method for the discharge to achieve compliance, over and above the control methods which already are being employed. The remaining paragraphs in this section demonstrate that Illinois Power satisfies the requirements of the two-part showing under § 302.211(j)(3).

Section 302.211(j)(3)(A).

65. The requested thermal standards will continue to allow for provision of conditions at Clinton Lake capable of supporting shellfish, fish and wildlife, and recreational uses consistent with good management practices. To support this assertion, Illinois Power has evaluated the projected impacts of once-in-thirty year summer lake temperature conditions for several trophic levels of aquatic animals (i.e., zooplankton, benthic macroinvertebrates and fish), and found those

impacts to be of limited duration and, for the most part, reversible.[13] These evaluations are summarized in paragraphs 67-80, below. More difficult is the evaluation of projected impacts of the requested thermal limits on the use of Clinton Lake by other wildlife and for recreational purposes, since those uses are less direct than using the lake as a habitat. However, the empirical data summarized in paragraphs 43-51 suggests that those less direct uses are not particularly sensitive to warmer lake temperatures, so that they are not likely to be significantly impacted by the requested thermal limits.

66. The remainder of this subsection summarizes the results of Illinois Power's evaluation of the projected impacts of once-in-thirty year summer lake temperature conditions for three different trophic levels of aquatic animals, as follows:

Thermal Impacts of the Requested Thermal Limits on Zooplankton.

67. The thermal tolerance of zooplankton varies with the taxonomic group and is dependent on acclimation temperatures (Carlson 1974).[14] Generally, few taxonomic groups can survive temperatures greater than 95°F (35°C) (Unknown, 1966, Carlson 1974, Storr 1974, Janssen & Geisy 1984). The highest reproductions and growth rates occur between 54°F and 77°F (12°C and 25°C) (Pennak 1991, Neill 1981, O'Doherty 1985, Unknown 1966). When temperatures exceed about 77°F (25°C) the zooplankton community composition shifts to taxonomic groups tolerant of high temperatures or, if the temperature change is gradual enough, some of the less tolerant taxonomic groups can acclimate to the higher temperatures.

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[13] The maximum daily average flume discharge temperature limitation of 110.7°F is representative of once-in-thirty-year summer conditions, according to Edinger's statistical analysis of meteorological data. (See Exhibit 4.) The durational limitation, that the daily average flume discharge temperature not exceed 99°F more than 90 days per year, is representative of conditions less severe than the once-in-thirty-year summer. (Id.)

[14] The references cited in paragraphs 67-74 are listed in Exhibit 5 submitted herewith.

68. One may be able to establish that some acclimation to higher temperatures has occurred in the zooplankton community at Clinton Lake from the absence of impacts observed in the past at temperatures higher than those stated in the literature. For example, during most of August 1988 mean weekly temperatures in Clinton Lake exceeded the 95°F upper limit temperatures without impact in lake segment 16 (see Exhibit 1 to Exhibit 4). Mean weekly temperatures in this segment in August were 101.8°F, 100.9°F, 99.3°F, and 94.5°F (38.8°C, 38.3°C, 37.4°C and 34.7°C, respectively). These temperatures correlated with mean weekly discharge temperatures of 106.7°F, 105.8°F, 104.2°F, and 98.1°F (41.5°C, 41.0°C, 40.1°C and 36.7°C, respectively). Since the zooplankton community was generally unaffected by the Station's thermal discharge (Burke 1992), then the zooplankton community in this segment probably was acclimated to the higher temperatures or was able to find cooler water at a deeper depth. The zooplankton community in this segment of Clinton Lake most likely was just maintaining itself at these mean weekly temperatures, and no reproduction or growth occurred.

69. To project the potential impact of the 110.7°F maximum temperature limitation (corresponding to a maximum weekly average temperature of 109.2°F or 38.8°C) from existing data which indicates some acclimation, one can assume no impact to zooplankton at a weekly average temperature of 101.8°F (38.3°C), as was observed at Clinton Lake in segment 16. With this assumption, the impact of a discharge temperature of 110.7°F (43.7°C), corresponding to a weekly average temperature of 109.2°F (38.8°C), would be limited to the top two or three layers of segment 16, as shown in Exhibit 4, Appx. A, Table 5.4(c). If one assumes a more conservative area of impact, i.e., 95°F (35°C) as stated in published data, then the area of impact would extend from the upper three layers of segment 13 and the upper five layers of segment 14, through all of segments 15-17, again as shown in Exhibit 4, Appx. A, Table 5.4(c). Recovery from these high temperatures should be rapid as temperatures cool off. This rapid recovery is related to the high

growth rates for zooplankton, and to the return of unaffected zooplankton from the Salt Creek arm of the lake and from cooler, deeper water (McNaught 1976).

70. The predicted impact to Clinton Lake zooplankton from extended periods of high lake temperatures (i.e., at the 99°F/90 day limit) should be similar to the impacts just discussed. The only additional impact of the prolonged high temperatures may be to the growth and reproduction of zooplankton, but the zooplankton should recover quickly when more favorable temperatures return.

Thermal Impacts of the Requested Thermal Limits on Benthic Macroinvertebrates.

71. The thermal tolerance of benthic macroinvertebrates varies with taxonomic group, lifestage, and the type of environment in which the taxonomic group normally live (i.e., lakes vs. streams) (Sweeney 1984, Wiederholm 1984). Generally, macroinvertebrates are enhanced by bottom temperatures up to 77°F (25°C), but are impacted when bottom temperatures exceed 86-89.6°F (30-32°C) (Parkin & Stahl 1981, Wiederholm 1984, Rempel & Carter 1987). Bottom temperatures between 77°F and 95°F (25°C and 35°C) tend to change the benthic community by eliminating more sensitive taxonomic groups and increasing densities of other taxonomic groups. Often, overall densities of benthic macroinvertebrates will be greater at temperatures between 77°F and 95°F than at temperatures below 77°F. Few taxonomic groups can survive bottom temperatures greater than 95-105.8°F (35-41°C) (Coutant 1962, Miller et al. 1976, Parkhurst & McLain 1978, Parkin & Stahl 1981, Wiederholm 1984).

72. Clinton Lake bottom temperatures were measured from 1989 through 1991 (Burke 1992). These data showed that, during summer of each year, the bottom temperatures were at or exceeded the 95°F upper limit temperatures only in the discharge canal (site 15). Actual bottom temperatures were 98.6°F, 94.8°F, and 94.8°F, respectively, for 1989 through 1991. These increased bottom temperatures explain why the only impacts seen on the benthic macroinvertebrates occurred

in the discharge canal, and only in the summer months (Burke 1992). It should be noted, however, that a diverse benthic community existed in the discharge canal, upstream from the drop structures, at bottom temperatures of 95-99°F (Burke, unpublished data). The area above the drop structures is typically devoid of fish as predators.

73. The threshold temperature at which an impact occurred at Clinton Lake exists somewhere between 82.7°F and 95°F. This follows from the fact that an impact was seen in the discharge canal at 95°F (35°C), while no impact was seen in the lake, a short distance away, where the maximum measured bottom temperature was 82.7°F (28.2°C). If one assumes the very conservative no-impact temperature of 82.7°F (28.2°C), then all of Clinton Lake would be impacted under the once-in-thirty-year predictions, shown at Exhibit 4, Appx. A, Table 5-4(c). Ambient temperatures under these predicted conditions would be 89.2°F (31.8°C), however, which also would exceed the conservative observed no-impact temperature. Thus, in the once-in-thirty-year summer, the benthic macroinvertebrate community would be impacted even in the absence of the Station. On the other hand, if one assumes the opposite extreme (i.e., a no-impact temperature of 95°F or 35°C) then only lake segments 15, 16 and 17 would be impacted in the once-in-thirty-year summer. (Exhibit 4, Appx. A, Table 5-4(c).)

74. Several studies have noted that the densities of the benthic community are enhanced at temperatures between 82°F and 90°F even though some of the more sensitive taxonomic groups are eliminated (Coutant 1962, Benda & Proffitt 1974, Parkin & Stahl 1979, Nichols 1981, Webb 1981, Rempel & Carter 1987). One would thus expect that in the predicted once-in-thirty-year summer at Clinton Lake, the benthic macroinvertebrate community would change in favor of more thermally tolerant taxonomic groups. Quite possibly, overall density may be greater than during cooler seasons. Additionally, it is doubtful that all thermally sensitive taxonomic groups would be eliminated from the lake. Rather, they probably would burrow into the mud, where temperatures

will be cooler, whenever temperatures at the lake bottom exceed their tolerances (Cherry, et al. 1979). These sensitive taxa would then return to the surface of the lake bottom when conditions are more favorable.

75. The predicted impact to Clinton Lake benthic macroinvertebrates from extended periods of high lake temperatures (i.e., at the 99°F/90 day limit) should be similar to the impacts just discussed. The only additional impact of the prolonged high temperatures may be to emerging insects. However, many of the benthic insects are able to adjust their development to avoid emerging under poor environmental conditions.

<u>Thermal Impacts of the Requested Thermal Limits on the Clinton Lake Fishery</u>.

76. Illinois Power submitted a detailed biological evaluation of the projected impacts of predicted Clinton Lake temperatures during a once-in-thirty-year summer, in support of its petition for thermal variance in PCB 88-97. That evaluation was prepared for Illinois Power by Environmental Science and Engineering, Inc. ("ES&E"). The evaluation consisted of two parts: an analysis based on an earlier (LARM) modeling of Clinton Lake temperatures, including a detailed discussion of the methodology for applying the United States Environmental Protection Agency ("U.S. EPA") Protocol for assessment of thermal effects; and a subsequently update, in the form of the prepared testimony of ES&E biologist Richard Hall, to address changes in the predicted lake temperature regime arising from the use of Edinger's GLVHT model in place of the LARM model. ES&E's original evaluation and subsequent update are being submitted herewith, as Exhibits 6 and 7, respectively.

77. The evaluations developed by ES&E were then further updated by Illinois Power personnel to incorporate information which became available after the conclusion of PCB 88-97, including results of the EMP presented in the two reports submitted herewith as Exhibits 2 and 3. Potential impacts of the 110.7°F maximum temperature limit, and of the 99°F/90 day limit were

evaluated for six representative species for Clinton Lake. These species include gizzard shad, common carp, channel catfish, bluegill, largemouth bass, and white crappie. The U.S. EPA Protocol was used to assess impacts on reproduction, growth, and survival for each species using temperature data from an extensive literature database and the preferred habitats of each species. Application of the U.S. EPA Protocol results in a conservative assessment of thermal impacts, since only preferred habitats are used, rather than the entire lake area, and no consideration is allowed for adaptation to a cooling lake environment, such as through early spawning or through the identification of thermal refuges in the lake.

78. Illinois Power's evaluations indicate that minimal impacts will be incurred for gizzard shad, common carp, and bluegill for reproduction, growth, and survival. For channel catfish and largemouth bass minimal impacts would occur for growth and survival. Reproduction would be somewhat limited for a part of the spawning season. In spite of these predicted impacts, however, largemouth bass and channel catfish thrive in numerous other midwestern cooling lakes. Even if these impacts did occur, at worst the result would be a weak year class, a relatively common occurrence in fish populations.

79. Under lake temperature conditions which approach the 110.7°F maximum temperature limit and the 99°F/90 day limit, Illinois Power's evaluations suggest that white crappie may not survive in Clinton Lake. The evaluations also suggest that crappie may not survive even under severe ambient summer conditions at Clinton Lake, even without discharges from the Station. If crappie did survive, impacts on reproduction would be substantial (generally 40 percent of preferred habitat available) and impacts on growth much less severe (generally 90 percent of preferred habitats available).

Summary of Evaluations of Thermal Impacts.

80. Thus, the requested thermal standards will continue to allow for provision of conditions at Clinton Lake capable of supporting shellfish and fish consistent with good management practices. The requested thermal limits are projected to result in impacts, under predicted once-in-thirty-year conditions, which are limited and generally reversible. Zooplankton are expected to recover quickly from any thermal impacts, while the overall densities of benthic macroinvertebrates are expected to increase with warmer temperatures. For most fish species, the worst impact expected to occur in a once-in-thirty-year summer is a weak year class, which is relatively common. Certain sensitive taxonomic groups of benthic macroinvertebrates, as well as white crappie, might be eliminated during a once-in-thirty-year summer, although those results appear to be independent of whether the Station is operating. Finally, all of the projections are conservative, and do not account for acclimation and other survival mechanisms utilized by the aquatic community.

Section 302.211(j)(3)(B).

81. Illinois Power provides for control of the thermal component of the effluent from the Station to Clinton Lake by a technologically feasible and economically reasonable method. The discharge of heated effluent from the Station is transported to Clinton Lake by means of a 3.1-mile discharge flume, with a hydraulic retention time for water in the flume of approximately four hours at full circulating water flow. A study performed for Illinois Power by Sargent & Lundy Engineers ("S&L") estimates that a drop of approximately 2.63°F in the temperature of the recirculated condenser cooling water discharge from the Station is achieved solely from natural cooling at the surface of the discharge flume and from heat loss due to natural water spray at the drop structures of the flume. (Exhibit 8.) This natural temperature drop amounts to more than 24 percent of the total drop in heated effluent temperature which S&L estimates would be required to assure that

the daily average temperature of the recirculated condenser cooling water discharge would never exceed 99°F at the second drop structure of the discharge flume.[15] (Id., p. 14.) Illinois Power also employs the management practices described at paragraphs 52-55 above, to ensure compliance with applicable thermal limitations on the Station's recirculated condenser cooling water discharge. Finally, thermal impacts from the Station's discharge are mitigated by the design of Clinton Lake, which originally was built to act as a cooling lake for two generating units rather than one.

82. Illinois Power also considered several alternative means for controlling the recirculated condenser cooling water discharge from the Station to Clinton Lake. These alternative means included derating the Station and adding some form of supplemental cooling. To provide some basis for comparison among these several alternatives, Illinois Power prepared, or commissioned the preparation of, studies delineating the costs associated with each. The present alternative, seeking permanent relief from the Board in the form of specific thermal standards, is viewed as being essentially costless.

83. At Illinois Power's request, S&L completed a study investigating four passive cooling techniques to provide supplemental cooling of the circulating water and service water flows discharged from the Station while those flows were in the discharge flume.[16] (Exhibit 8.) The techniques considered by S&L were: (a) shading the flume surface from solar radiation; (b) spray

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[15] The 99°F value is significant because it serves as the basis for the durational component of the temperature limitations applicable to the Station's heated effluent discharge to Clinton Lake (i.e., the daily average discharge temperature at the second drop structure presently may not exceed 99°F more than 90 days per year). Thus, if the temperature of the discharge at the second drop structure was never greater than 99°F, the durational component of the limitations could never be exceeded; and, a fortiori, the maximum daily average temperature limitation could never be exceeded.

[16] Illinois Power commissioned the study prepared by S&L in part to respond to the Board's suggestion in its Order in PCB 88-97, that Illinois Power "may also wish to consider adding some type of heat conducting device to the flume to passively conduct heat from the water and radiate it to the air." (Order, at p. 9.)

devices driven by fluid velocity; (c) fins (dry, wetted and rotating); and (d) natural draft gravity-flow cooling towers. For design and costing purposes, S&L used as the target heat loss of these techniques the amount of heat loss required to cool circulating water from a condenser discharge temperature of 109.8°F to 99°F, or about 8.419×10^{10} BTU per day.

84. Based on these parameters, S&L estimated approximate costs of $52,300,000 for the gravity-flow natural draft cooling towers, and $10,000,000 (order of magnitude) for passive cooling with fins. Due to spatial limitations, however, cooling with fins only would achieve 50 percent of the target heat loss. The other two techniques, shading the flume and natural spray devices, each were estimated to cost considerably less than a cooling tower, but achieved only limited heat loss (10.4 and 2.4 percent of the target, respectively). (Exhibit 8, p.14.) S&L concluded that "[t]he only technique which would perform adequately is to use a cooling tower." (Id.)

85. Illinois Power also prepared an internal study to determine the operating cost impact associated with projected capacity deratings that could be required at the Station to comply with the prior thermal limits during summer meteorological conditions representative of a once-in-ten-year occurrence.[17] (Exhibit 9.) The cost impact is based upon incremental production costs with Clinton derated compared to Clinton operating at full power. The incremental costs include the additional fuel, variable operation and maintenance and interchange purchase costs incurred by the Illinois Power - Soyland Power ("IPSP") Pool. Given these conditions, and assuming forecasted 1993 system conditions, the IPSP Pool Production costs would be expected to increase by $365,000 (in 1993 dollars) if Clinton were derated. (Id.)

86. The foregoing analyses demonstrate the significant costs and lack of feasibility associated with alternative means of controlling the recirculated condenser cooling water discharge

[17] In the absence of relief from the Board in this proceeding, on October 1, 1993 the thermal limits applicable to the recirculated condenser cooling water discharge from the Station to Clinton Lake will revert back to those ordered by the Board in PCB 81-82.

from the Station to Clinton Lake. In contrast, the biological data and analyses project that the requested thermal limits are likely to result in impacts, under predicted once-in-thirty-year conditions, which are limited and generally reversible. The biological "costs" of the proposed thermal limits therefore is limited and, in the long term, most likely negligible. For these reasons, alternative means for controlling this heated effluent discharge, beyond what is already in place, are not technically feasible and economically reasonable. Illinois Power therefore satisfies the requirements of § 302.211(j)(3)(B), and its request for specific thermal standards should be granted.

Consistency with Federal Law

87. The relevant federal statute is the Clean Water Act ("CWA"), 33 U.S.C. § 1251 et seq. Under § 402 of the CWA, 33 U.S.C. § 1342, all discharges, including the thermal discharge from the Station, must be permitted under the NPDES permit requirements which include, pursuant to § 301 of the CWA, 33 U.S.C. § 1311, any applicable state standard. Here, the concern is with the specific thermal standard adopted by the Board and applicable to the Station's thermal discharge. Under § 316(a) of the CWA, 33 U.S.C. § 1326(a), alternative thermal effluent standards, alternate to any applicable federal standard (of which there is none for the Station) or any state thermal effluent standard, may be imposed if it is demonstrated that the alternative standard will "assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge" is made. Although the Board's standard under § 302.211(j)(3)(A) is not exactly the same as the standard under § 316(a) of the CWA, Illinois Power believes the two standards are consistent, and is not aware of any authority to the contrary. Indeed, the Board's rules recognize the consistency between the evidentiary showings required under these two standards, at § 302.211(j)(4).

88. The Board also is authorized to grant the relief requested by Illinois Power. The NPDES permitting authority has, in accordance with the CWA, been delegated to the State of

Illinois, which includes the authority to make determinations pursuant to § 316(a) of the CWA. The Board has previously determined, by rule and in prior decisions, that it is the Board itself which will exercise this authority.

<u>Request for Hearing; Summary of Evidence</u>

89. The Board's rules governing specific thermal standards for cooling lakes, §§ 106.201 et seq. and § 302.211(j), require an adjudicative hearing before the Board will grant such standards to the petitioner. Illinois Power therefore requests that the Board schedule a hearing on the present petition in accordance with § 106.202.

90. In support of the factual assertions herein, Illinois Power is attaching hereto Figures 1 through 15 and Tables 1 through 3, as Appendices A and B, respectively, and is submitting herewith the above-described Exhibits 1 through 9, listed on the attached Appendix C. Illinois Power also is submitting herewith, as Exhibits 10 through 14, respectively, the affidavits of Thomas L. Davis, John E. Edinger, Ph.D, Gary D. Matthews, James A. Smithson, and Edward F. Stoneburg, in further support of the factual assertions herein and in support of the various Figures, Tables, and other Exhibits. Certain of these affidavits initially are being filed in facsimile form, and the affidavit of James A. Smithson is being filed in unsigned form, due to time constraints and/or unavailability of the affiant.[18] To the extent it is unable to do so initially, Illinois Power will file signed, original affidavits for the above individuals as soon as reasonably possible.

<u>Intention With Respect to Heated Effluent Demonstration Pursuant to § 302.211(f)</u>

91. The timing of the present proceeding coincides with the period of time during which Illinois Power must file with the Board its petition regarding the heated effluent demonstration for

[18] With respect to Mr. Smithson's affidavit, see Illinois Power's Motions Regarding Certain Procedural Issues, filed concurrently herewith.

Clinton Lake, as required by § 302.211(f). Illinois Power is assembling the final exhibits and other documentation for the thermal demonstration, and presently intends to file its petition pursuant to § 302.211(f) in the very near future. Many of the exhibits which are relevant to the thermal demonstration are relevant to the present proceeding and have been filed as exhibits herein as well. In addition, the Board's rules, at § 106.102(d)(4), contemplate that the petitioner in a thermal demonstration proceeding under § 302.211(f) may make its demonstration in the form of a showing pursuant to § 302.211(j). Thus, because the two proceedings will be addressing essentially the same subject matter, and will involve much of the same evidence, Illinois Power may, at the time of filing its petition under § 302.211(f), request that the Board consolidate the proceedings on that petition with the proceedings on the present petition.

92. Illinois Power's principal objective in filing this petition before filing its § 302.211(f) petition is to secure the final year of the three-year extension of its original variance, granted in PCB 88-97, from limits applicable to thermal discharges from the Station. Illinois Power has complied with the request in the Board's Order in PCB 89-213, that it file the present petition by October 1, 1992 in order to obtain an extension through October 1, 1993 of the existing variance. Having obtained this extension, Illinois Power's operations at the Station are not likely to be unduly restricted in the event of severe meteorological conditions until the summer of 1994 at the earliest. Illinois Power thus will seek to consolidate the present proceeding with the proceeding on its petition for thermal demonstration if such consolidation is not likely to delay the Board's resolution of this petition for specific thermal standards beyond the spring of 1994.

WHEREFORE, Illinois Power respectfully requests the Board to schedule a hearing herein and thereafter enter an order granting to Illinois Power the following specific thermal standard for application to the recirculated condenser cooling water discharge from the Station to Clinton Lake:

> The temperature of the discharge to Clinton Lake from Clinton Power Station, as measured at the second drop structure of the discharge flume, shall be limited to a daily average temperature which (a) does not exceed 99°F during more than 90 days in a fixed calendar year running from January 1 through December 31, and (b) does not exceed 110.7°F for any given day.

Respectfully submitted,

ILLINOIS POWER COMPANY

By: ______________________
One of its Attorneys

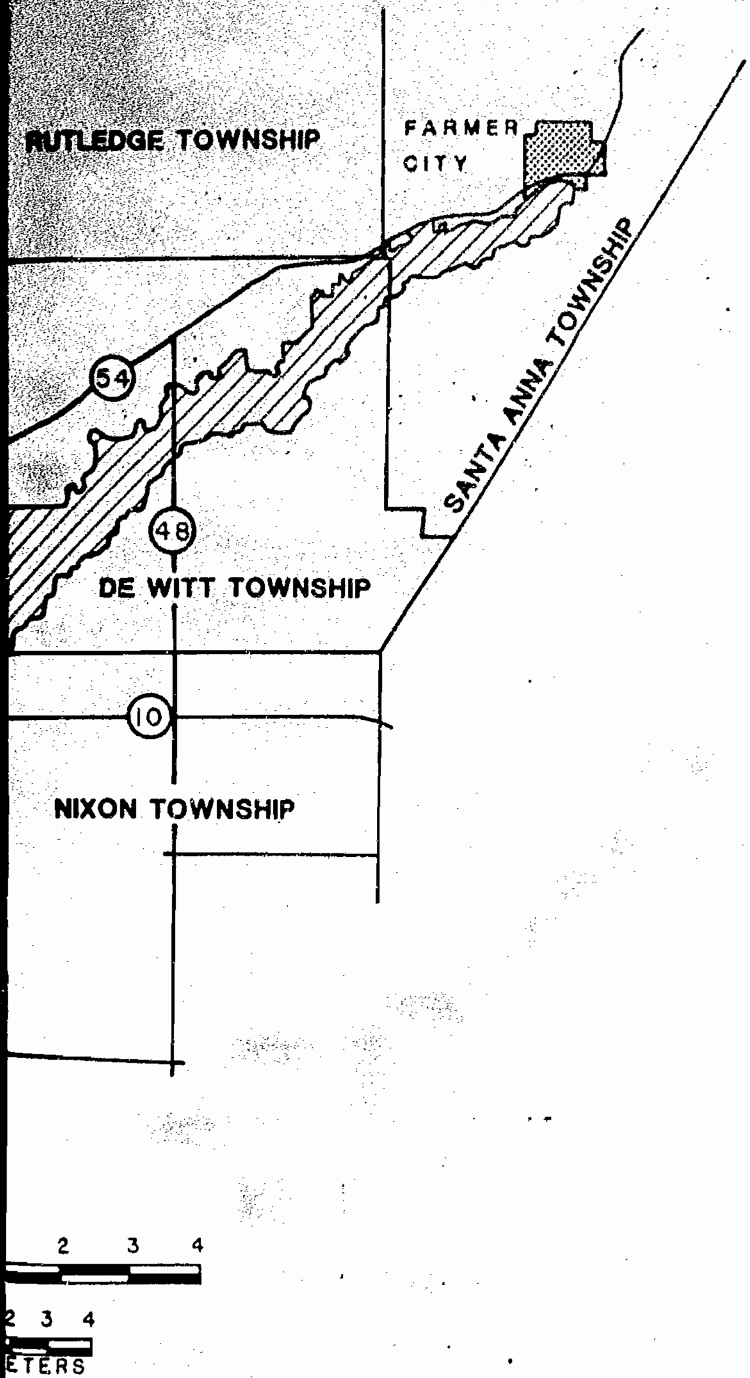
Sheldon A. Zabel
Eric L. Lohrenz

SCHIFF HARDIN & WAITE
7200 Sears Tower
Chicago, Illinois 60606
(312) 876-1000

APPENDIX A TO

PETITION FOR HEARING TO DETERMINE SPECIFIC THERMAL STANDARDS PURSUANT TO 35 ILL. ADM. CODE § 302.211(j)

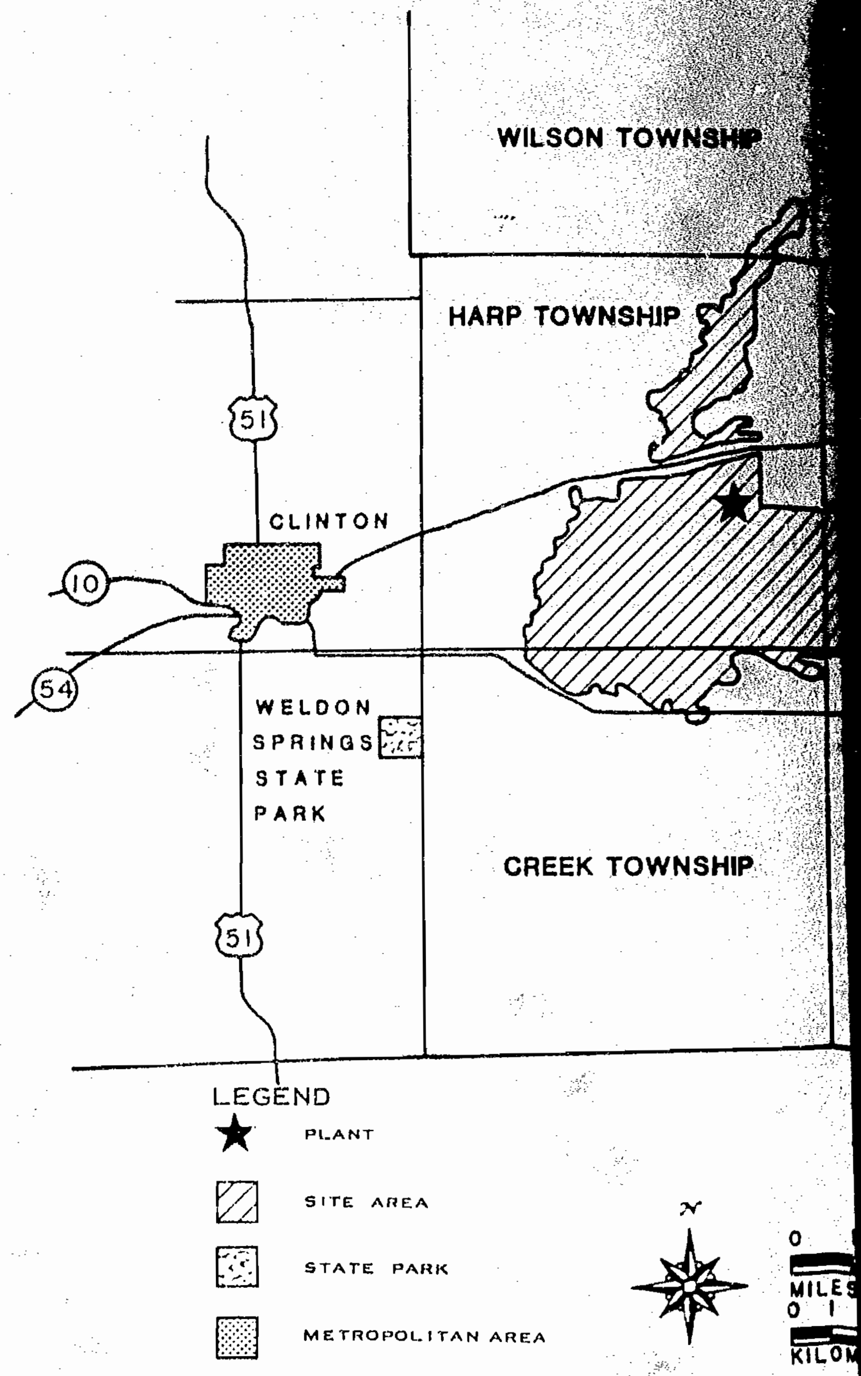
LIST OF FIGURES
(Attached hereto)

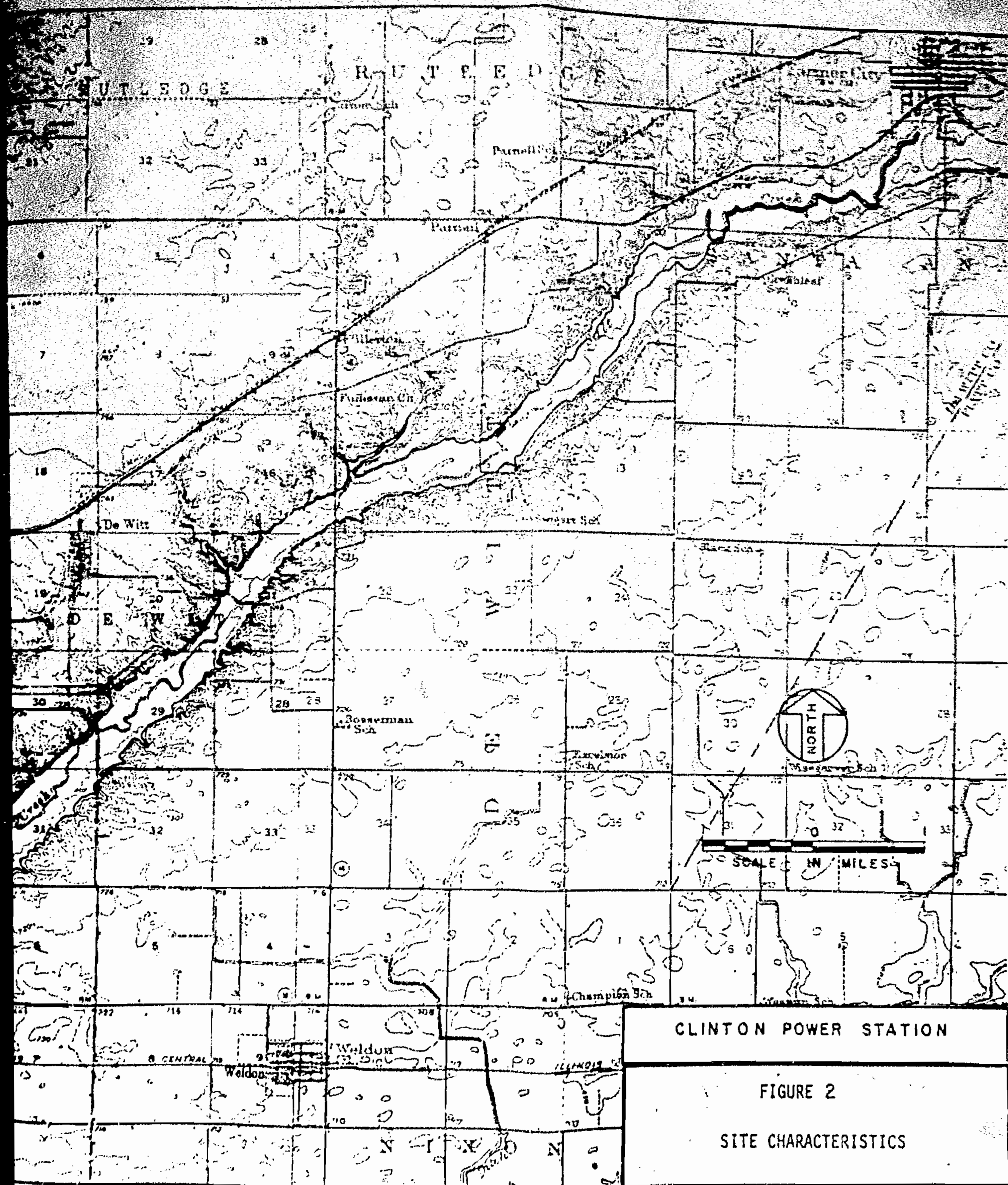


CLINTON POWER STATION

FIGURE 1

LOCATION OF CLINTON POWER STATION SITE WITHIN POLITICAL TOWNSHIPS

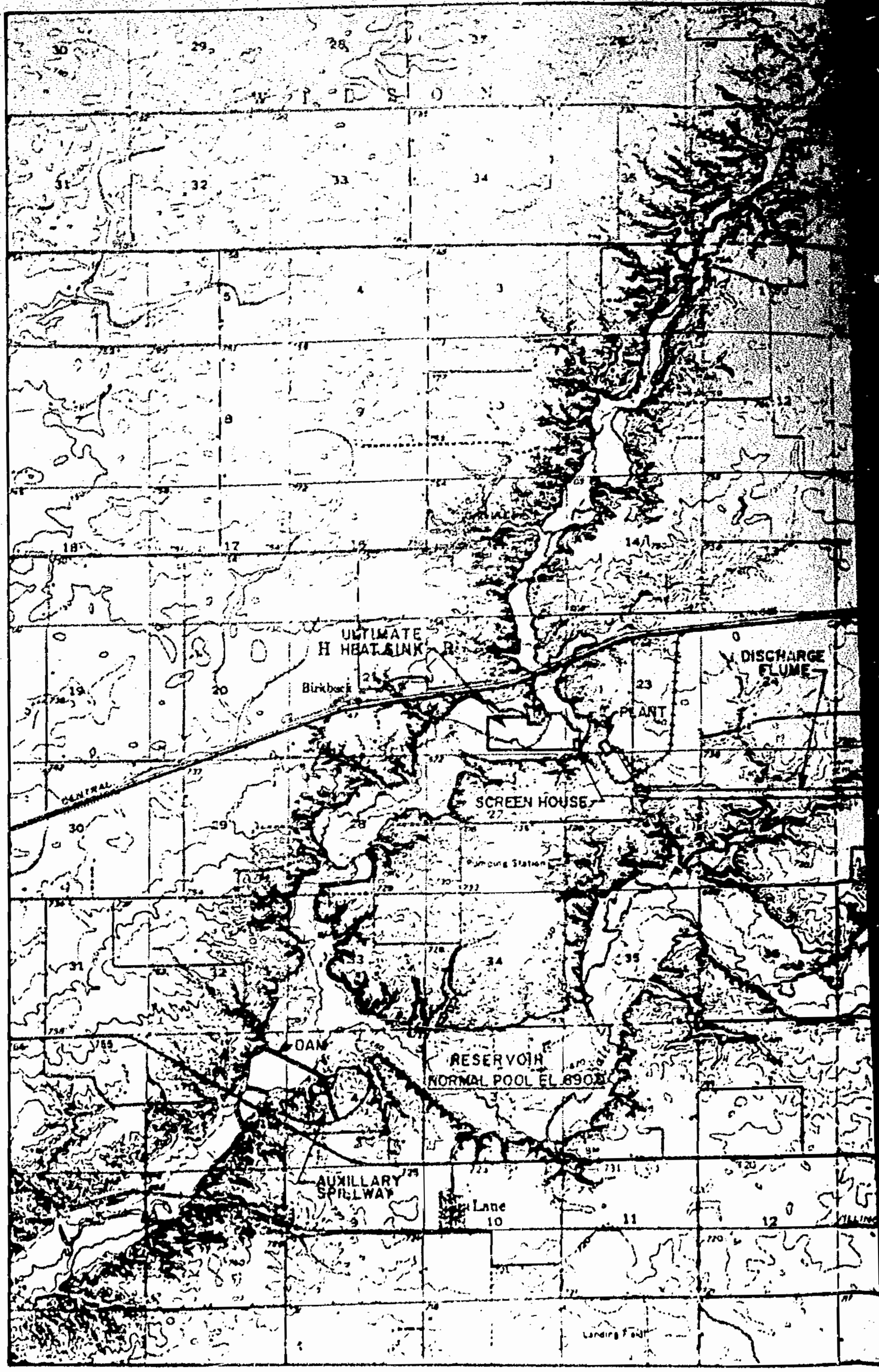

WILSON TOWNSHIP
HARP TOWNSHIP
51
CLINTON
10
54
WELDON
SPRINGS
STATE
PARK
CREEK TOWNSHIP
51
LEGEND
PLANT
SITE AREA
STATE PARK
METROPOLITAN AREA
N
0
MILES
0 1
KILOM



CLINTON POWER STATION

FIGURE 2

SITE CHARACTERISTICS



ULTIMATE HEAT SINK
Birkbeck
DISCHARGE FLUME
PLANT
SCREEN HOUSE
Pumping Station
DAM
RESERVOIR
NORMAL POOL EL 690
AUXILLARY SPILLWAY
Lane
Landing Field
CENTRAL

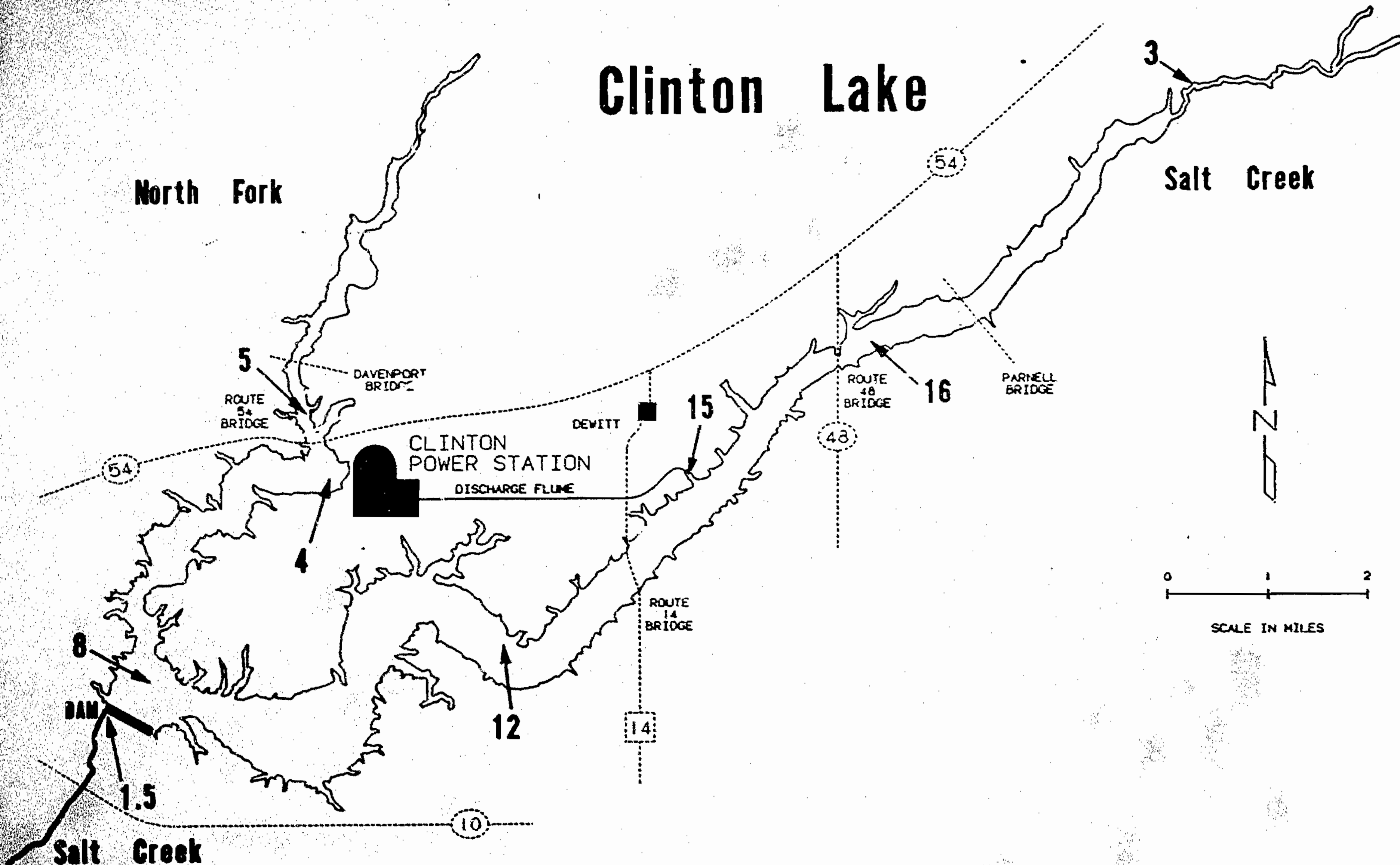


Figure 3 Continuous Temperature Monitoring Sites
Clinton Lake, Clinton, Illinois

M.0289382
09-16-92

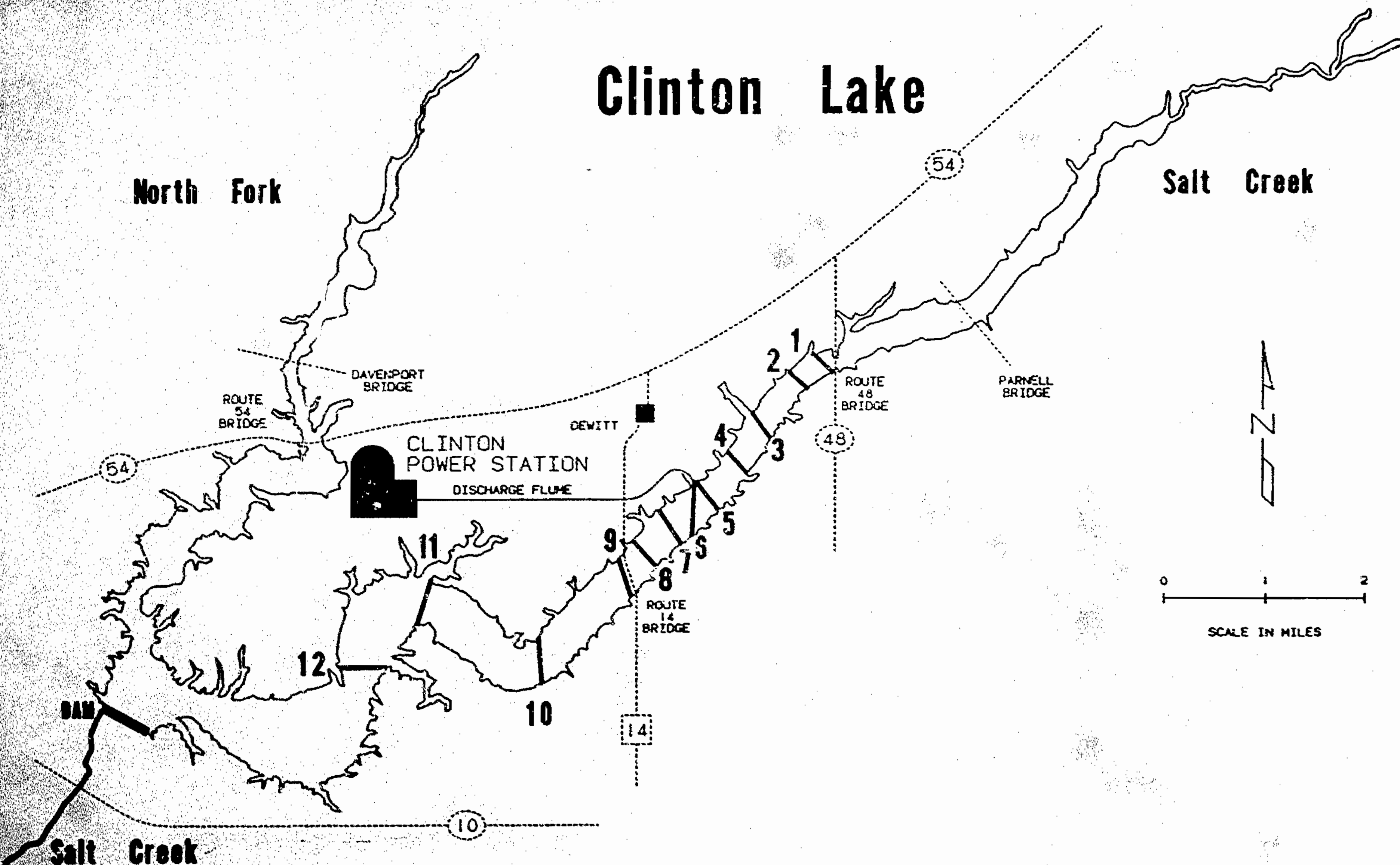


Figure 4 Thermal Plume Transect Locations
Clinton Lake, Clinton, Illinois

M.028938I
09-16-92

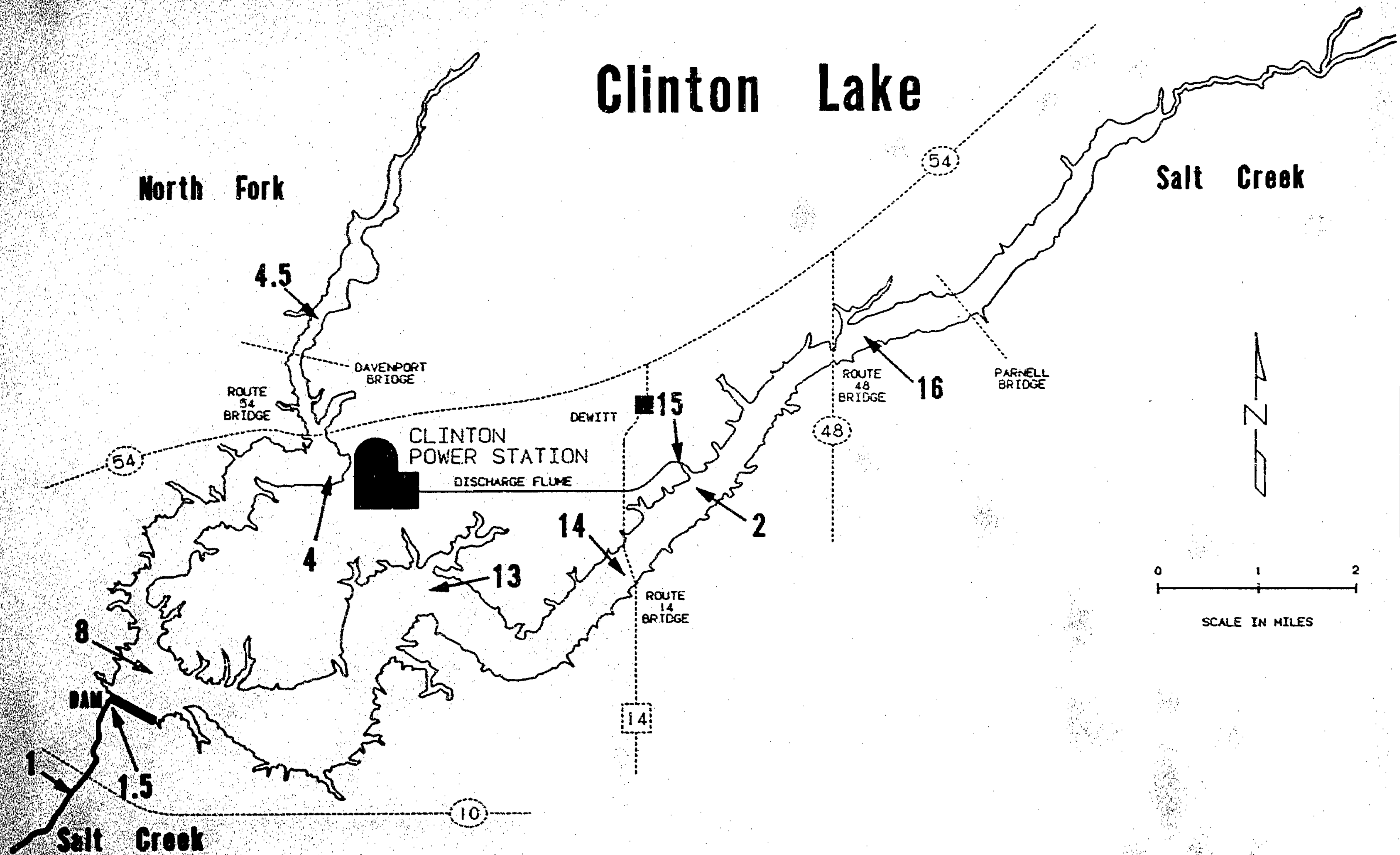


Figure 5 Environmental Monitoring Program Sampling Sites Clinton Lake, Clinton, Illinois

M.0289383
09-16-92

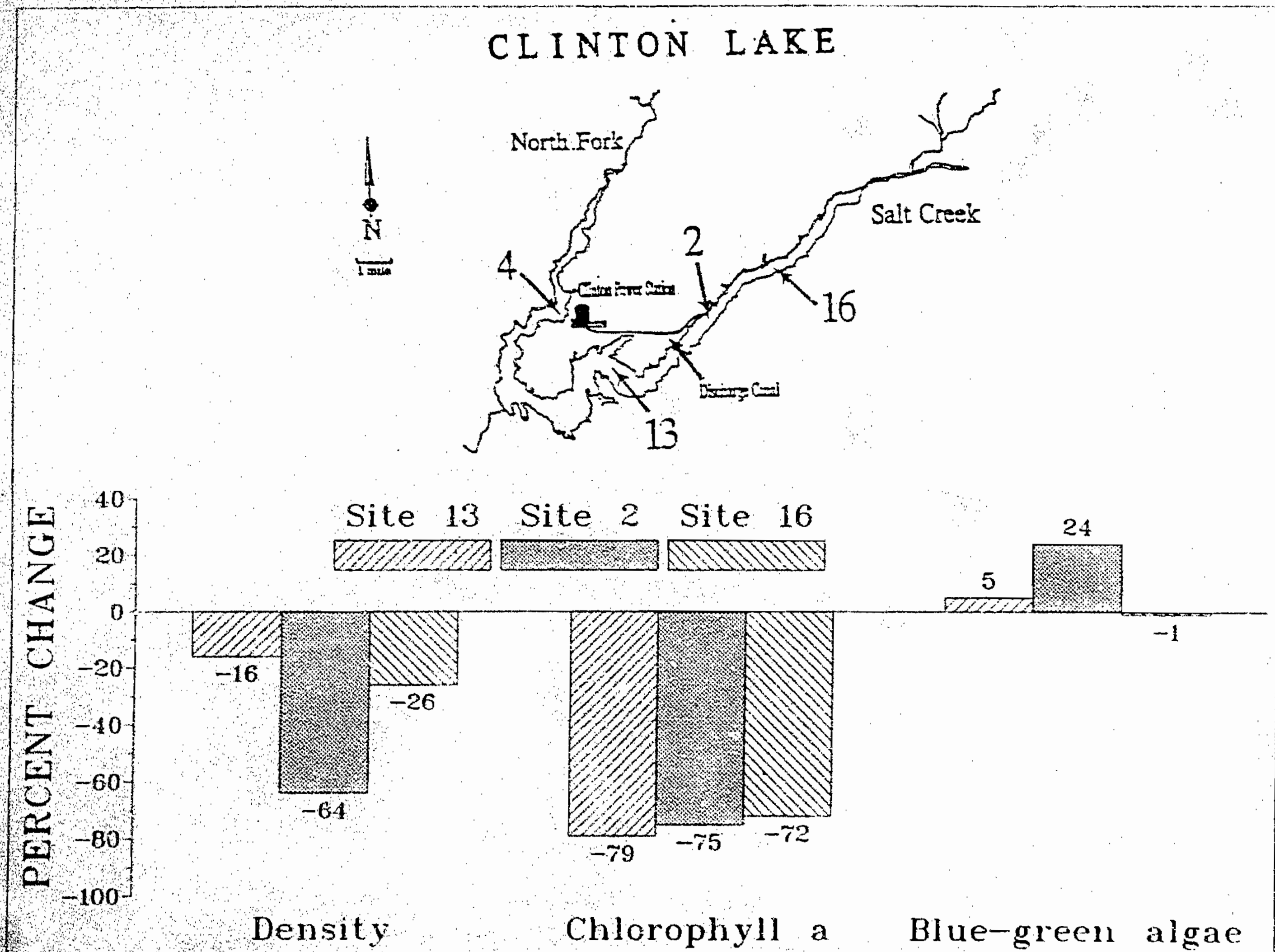


Figure 6: Percent change in three parameters related to the periphyton community between preoperational and operational years, Clinton Lake, Clinton, Illinois.

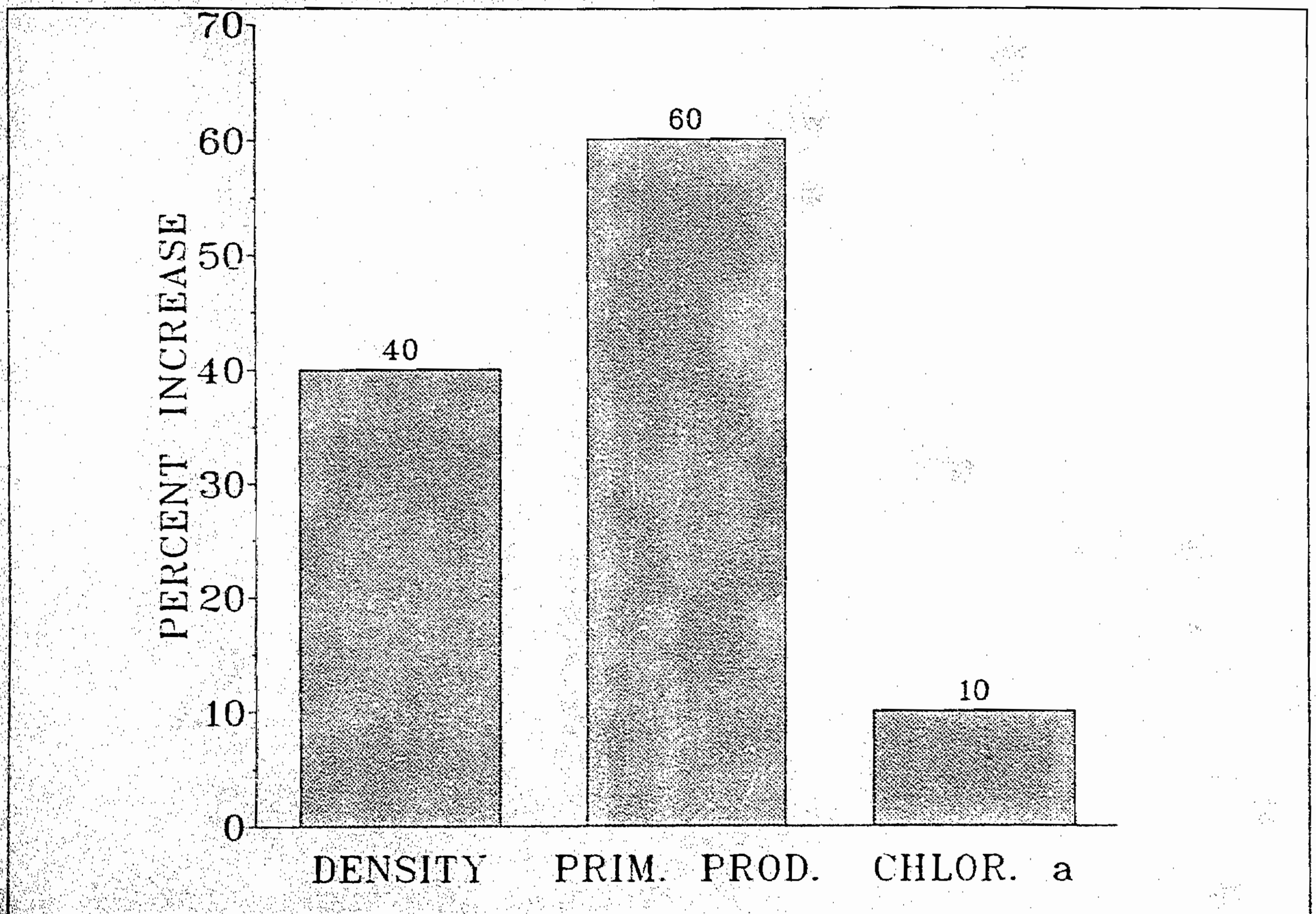


Figure 7: Percent increase in three parameters related to the phytoplankton community between preoperational and operational years in Clinton Lake, Clinton, Illinois.

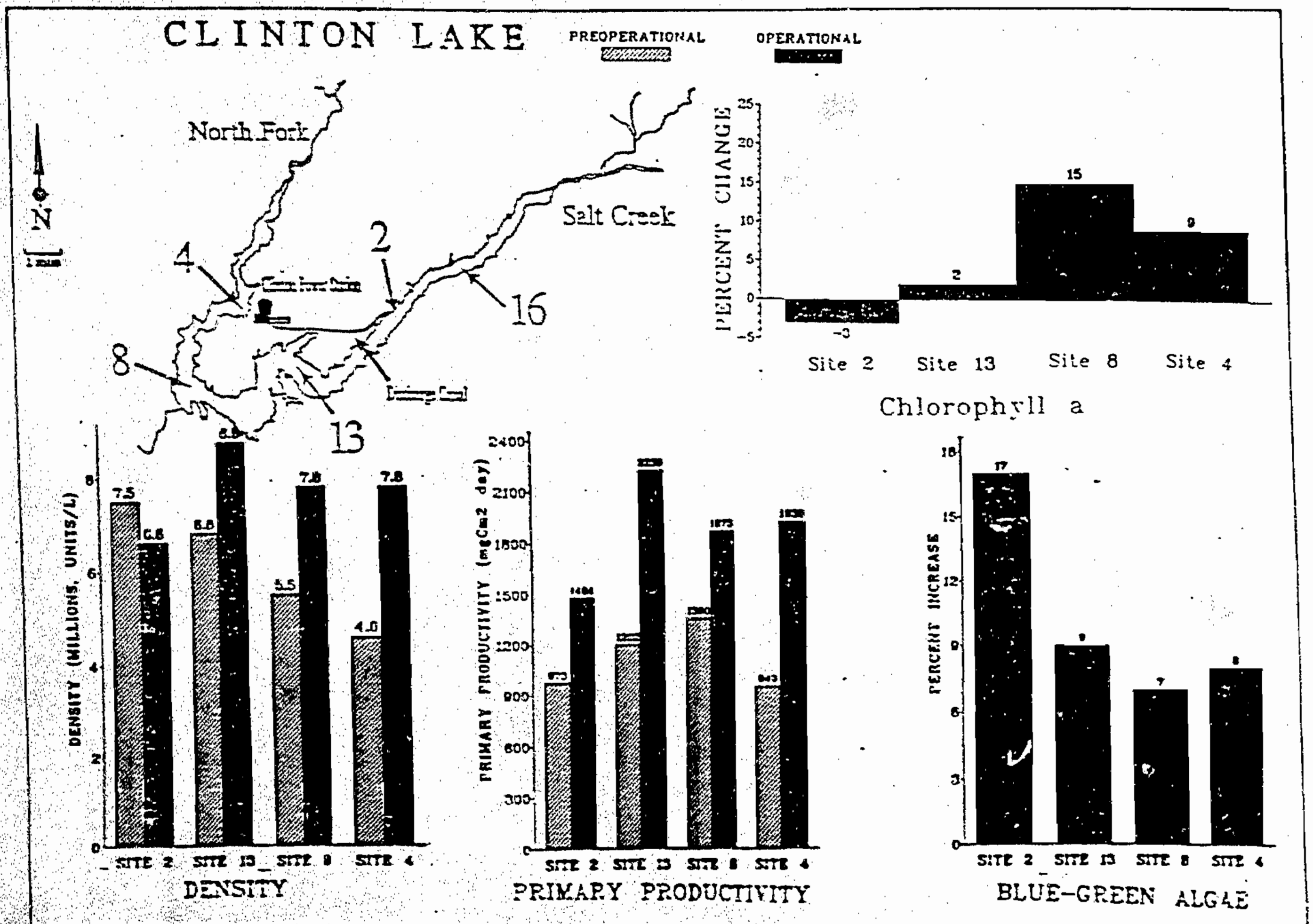


Figure 8: Comparison of four parameters related to the phytoplankton community between preoperational and operational years in Clinton Lake, Clinton, Illinois.

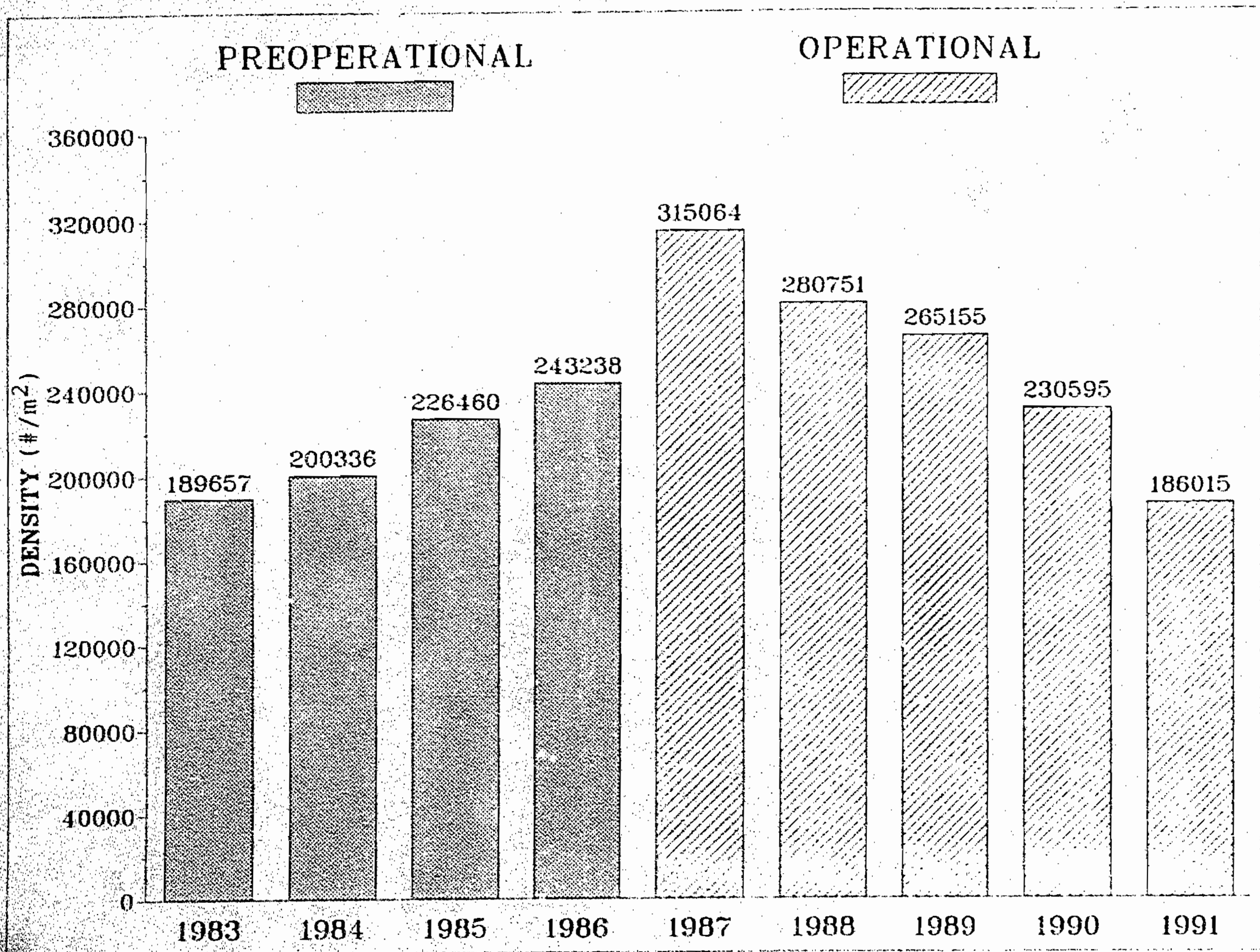


Figure 9: Density of zooplankton, by year, collected from 1983 through 1991 in Clinton Lake, Clinton, Illinois.

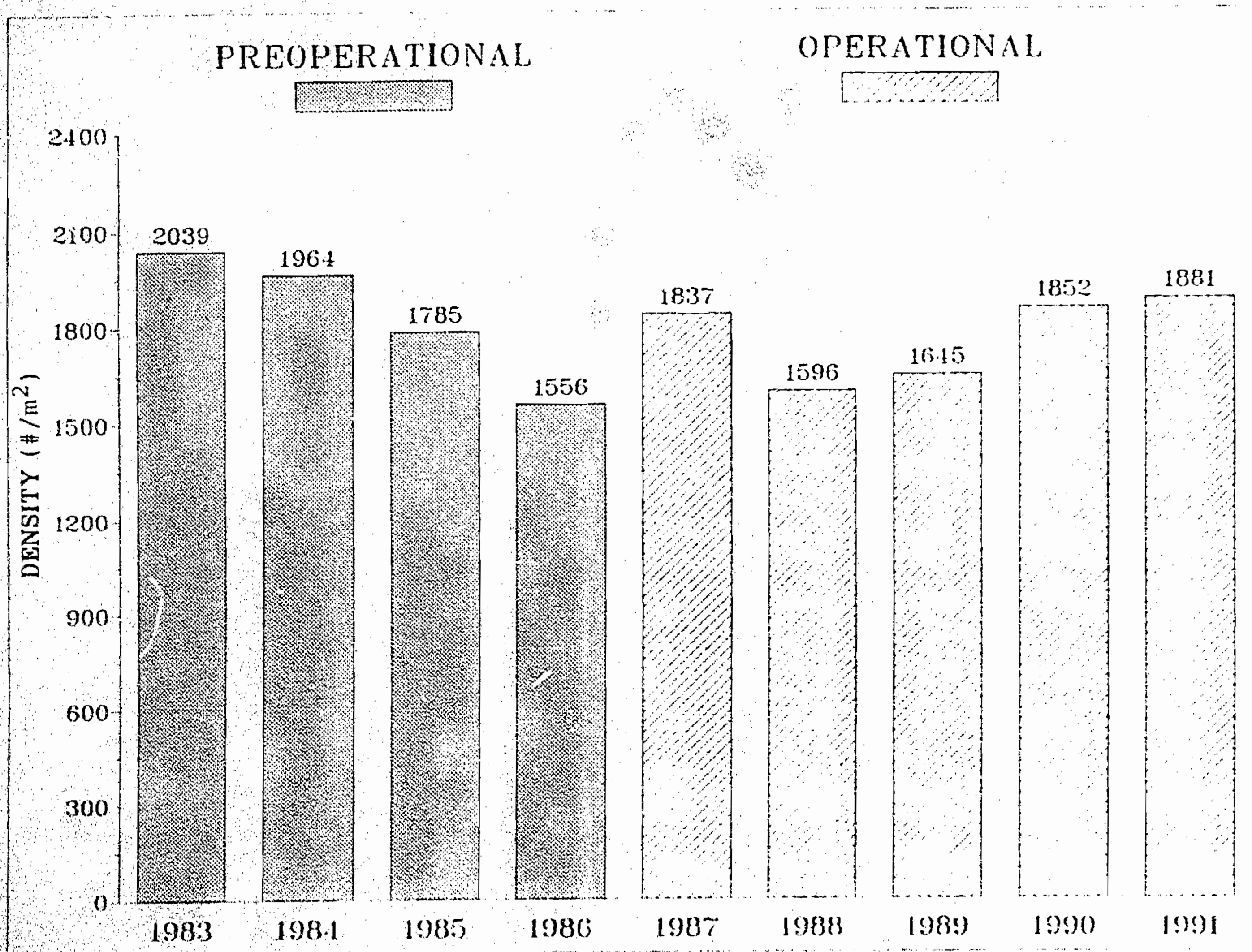


Figure 10: Density of benthic macroinvertebrates, by year, collected from 1983 through 1991 in Clinton Lake, Clinton, Illinois.

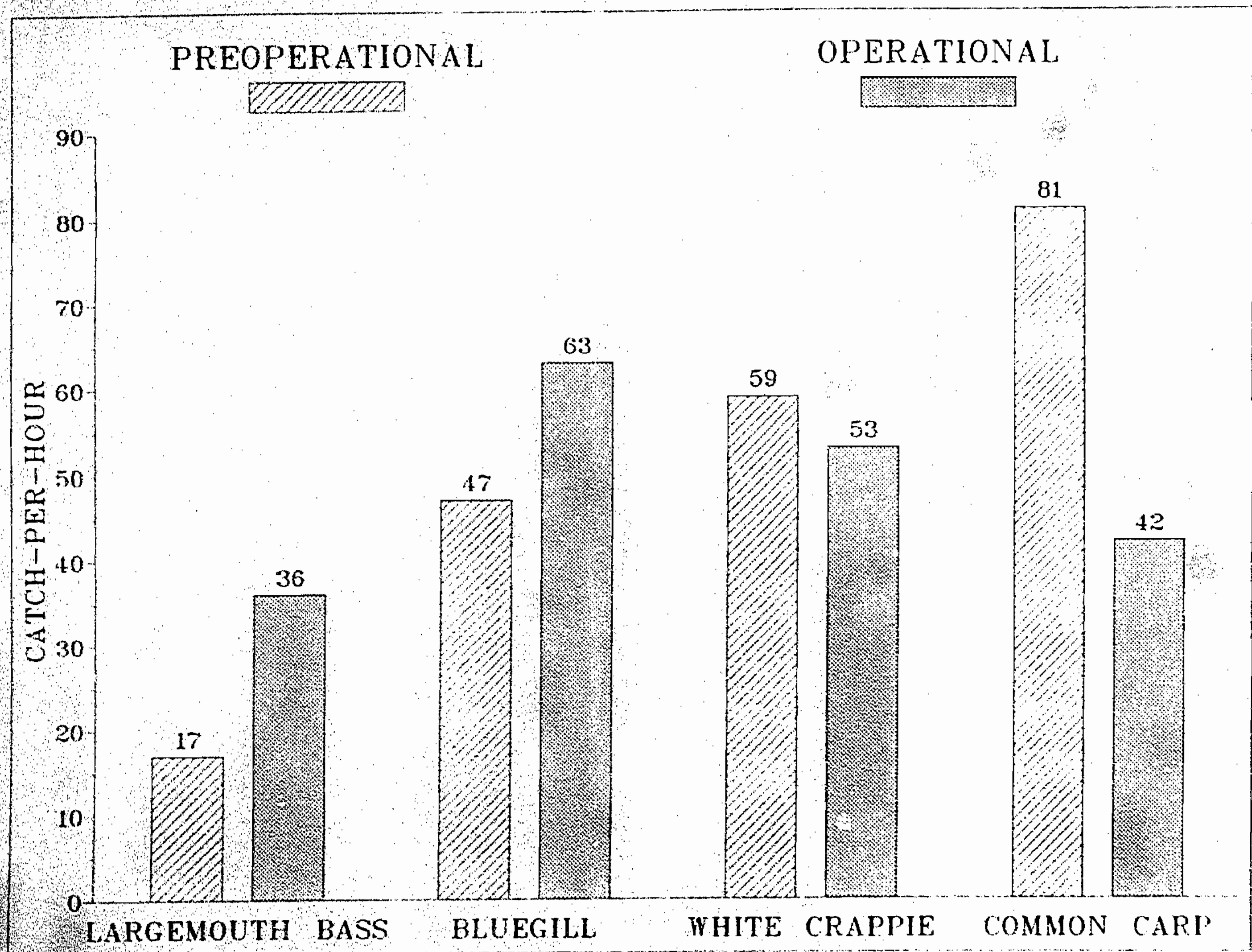


Figure 11: Summary of important fishes collected (number per hour) during preoperational years (1983-1986) and operational years (1987-1991) of Clinton Power Station, Clinton Lake, Clinton, Illinois.

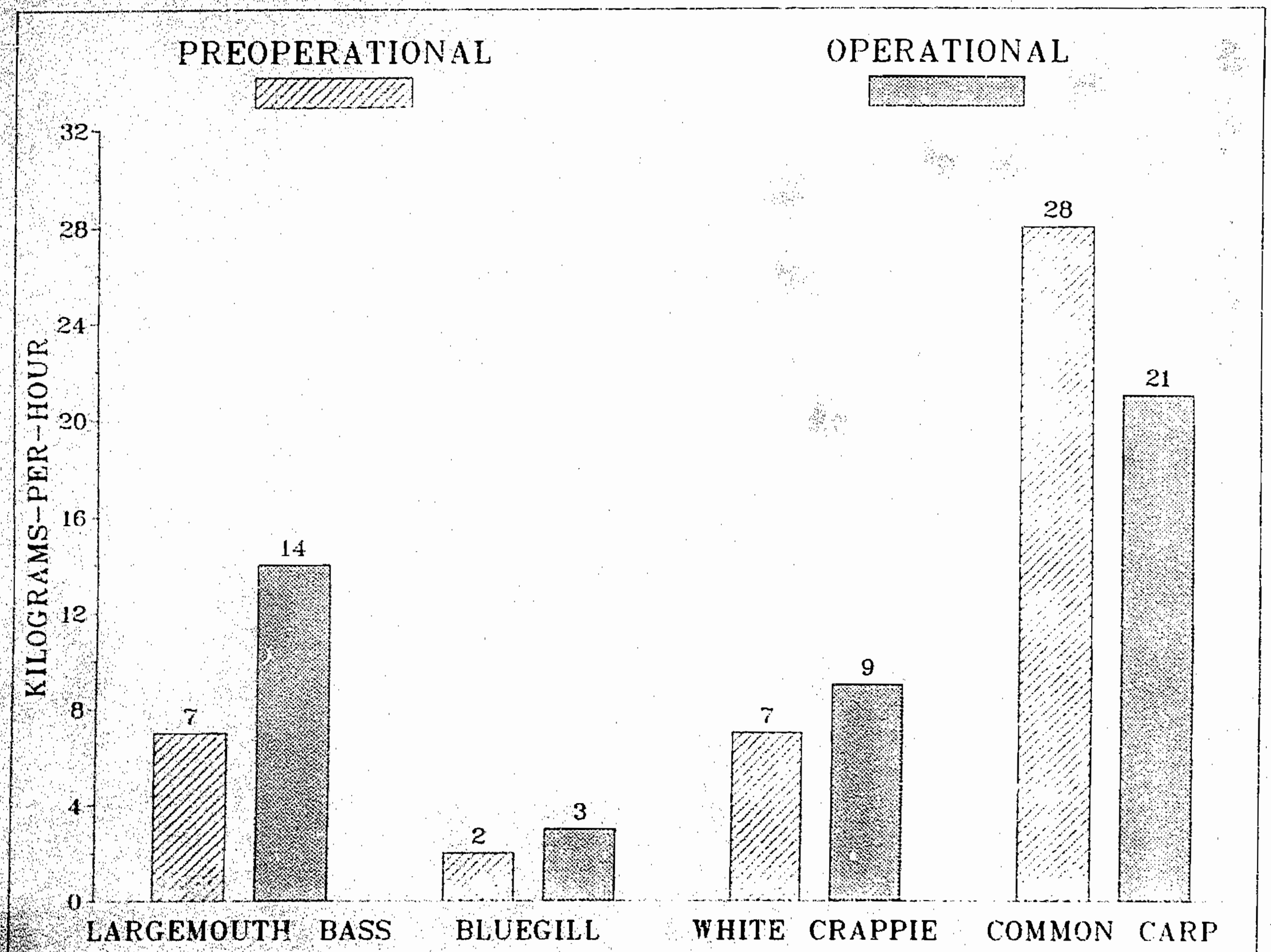


Figure 12: Summary of important fishes collected (kilogram per hour) during preoperational years (1983-1986) and operational years (1987-1991) of Clinton Power Station, Clinton Lake, Clinton, Illinois.

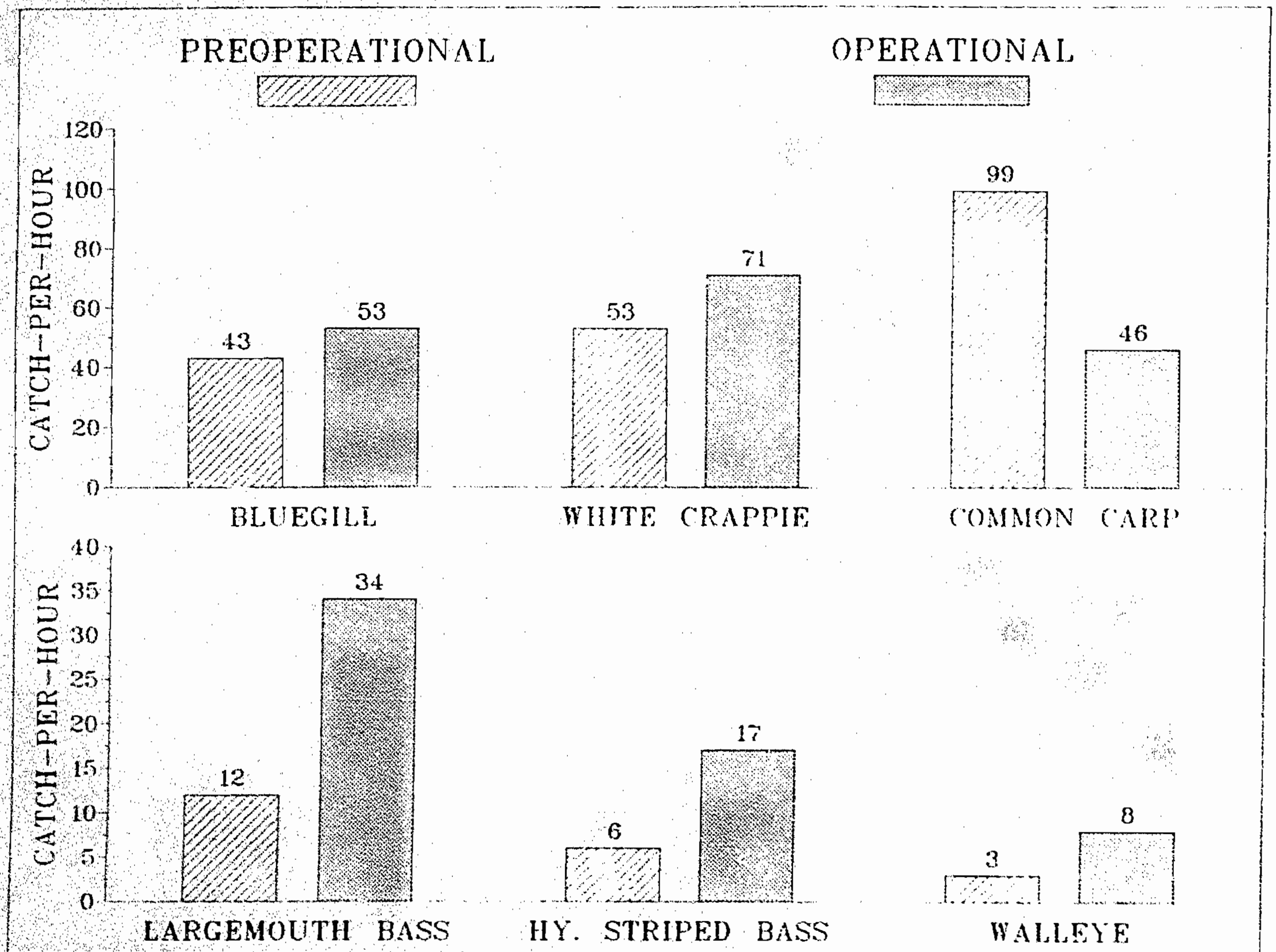


Figure 13: Major fishes attracted to (or which avoided) the warmed discharge waters (Site 2) during cool seasons (spring, fall, and winter), Clinton Lake, Clinton, Illinois.

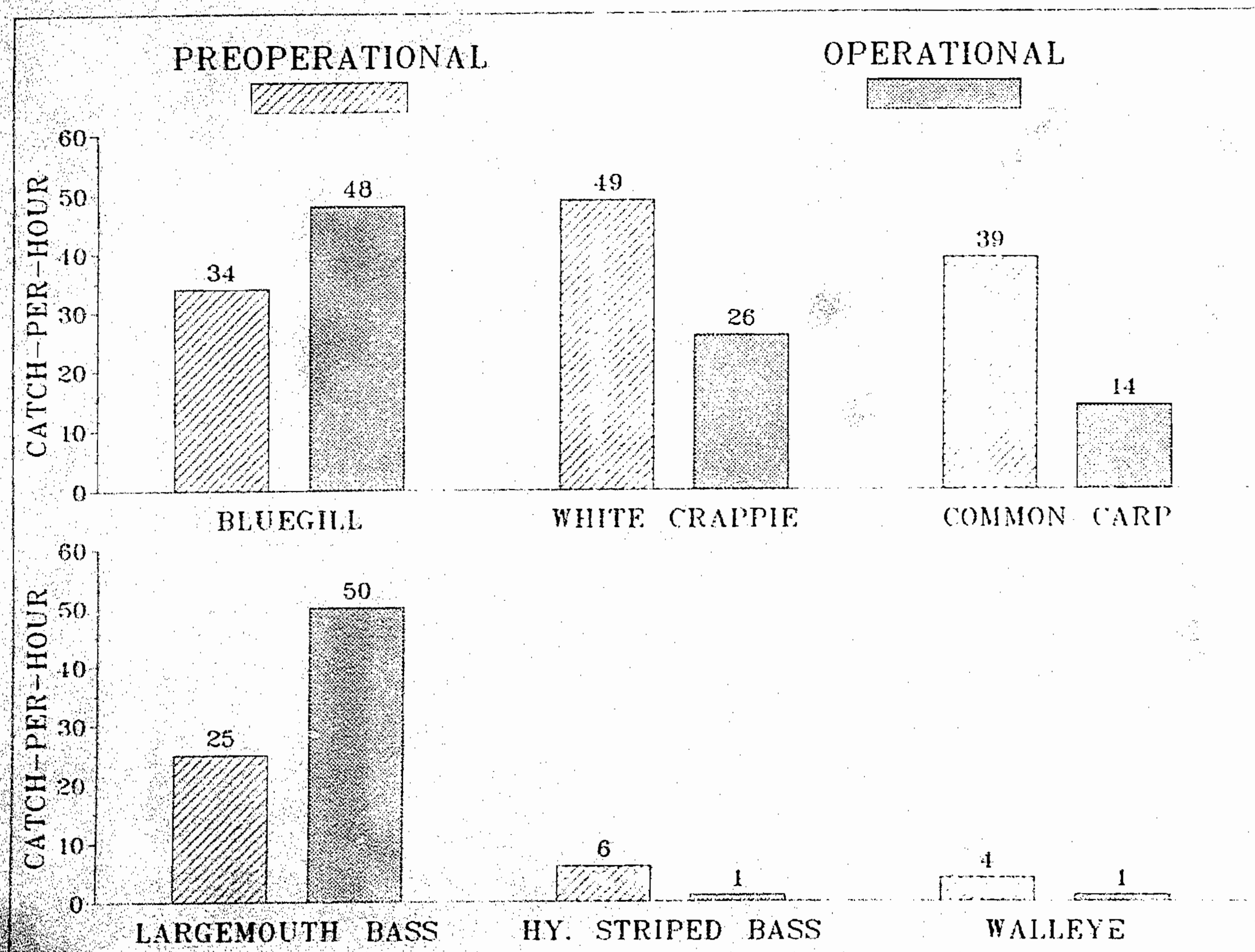


Figure 14: Major fishes which avoided (or were attracted to) the warmed discharge waters (Site 2) during summer, Clinton Lake, Clinton, Illinois.

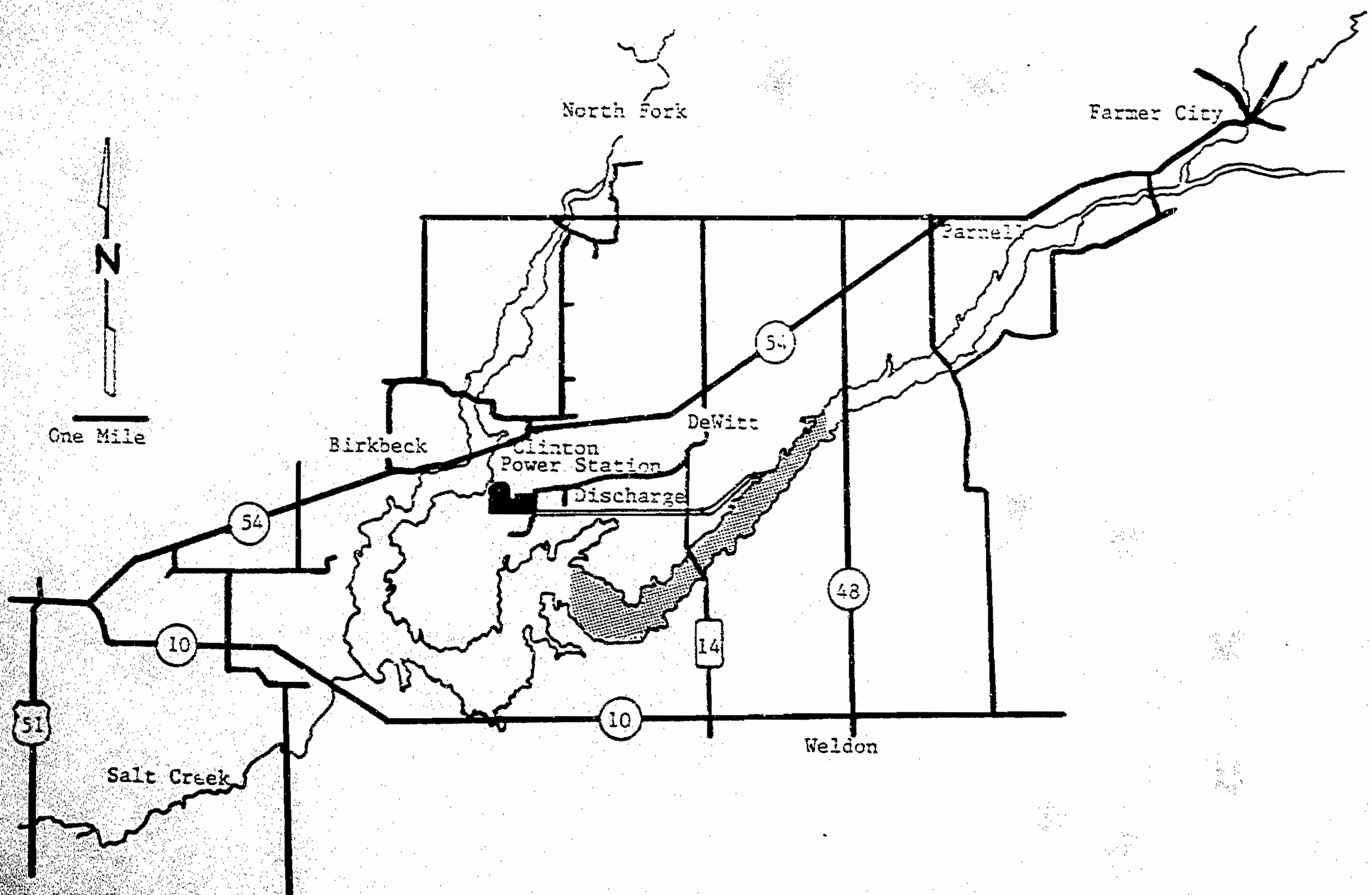


Figure 15 General indication of ice-free areas during typical winter condition, Clinton Lake, Illinois.

APPENDIX B TO

PETITION FOR HEARING TO DETERMINE SPECIFIC THERMAL STANDARDS PURSUANT TO 35 ILL. ADM. CODE § 302.211(j)

LIST OF TABLES
(Attached hereto)

Clinton Power Station
Thermal Demonstration

History of Station Shutdowns

TABLE 1

Since it began supplying full power November 24, 1987, through February 29, 1992, Clinton Power Station has provided electrical power for 1048 days and been shut down for 511 days. Below is a list of the outages:

Dates	Scheduled Duration	Duration	Reason
March 18-May 5, 1988	39 days	47.6 days	Scheduled planned outage for general maintenance.
June 24-26, 1988		1.6 days	Failure of feedwater system relay caused reactor water level to decrease to the protection system setpoint, resulting in an automatic reactor shutdown.
July 12-13, 1988		1.4 days	All three circulating water pumps shut down because of a false indication of high water in condenser pit. As a result, condenser vacuum was lost and a manual reactor shutdown was performed.
November 11-25, 1988		13.5 days	Fire in one of the main power transformers resulted in an automatic turbine trip and automatic reactor shutdown.
January 2-May 28, 1989	69 days	146.0 days	Scheduled planned outage for first refueling of nuclear core. Corrective and preventive maintenance also performed. Electrical equipment environmental qualification issues raised by the Nuclear Regulatory Commission resulted in approximately 34.0 days of the outage duration.
June 1-21, 1989		20.5 days	Reactor recirculation pump seal failed, forcing a manual reactor shutdown.
June 28-30, 1989		2.3 days	Failure of a sudden-pressure sensor relay in a main power transformer resulted in a generator trip and an automatic reactor shutdown.

<u>Clinton Power Station Outages</u>
(Continued)

Dates	Scheduled Duration	Duration	Reason
July 14-26, 1989		12 days	Rubber expansion joint on condenser tore, resulting in loss of vacuum in the condenser and manual shutdown of reactor.
July 31-August 8, 1989		7.1 days	Feedwater heater steam relief valves malfunction resulted in loss of vacuum in the condenser and manual shutdown of reactor.
November 12-19, 1989	7 days	7.3 days	Maintenance outage scheduled approximately a month in advance to repair steam leaks and perform other maintenance.
December 11-16, 1989	5 days	4.9 days	Maintenance outage scheduled approximately two weeks in advance to adjust an instrument in one of two reactor recirculation systems that helps regulate the amount of cooling water flowing through the reactor. Without the adjustment, the reactor would have been limited to 65 percent capacity.
February 13-21, 1990		8.0 days	To repair isolation valves in a ventilation system that failed routine leak rate test. Manual reactor shutdown made as required by Technical Specifications.
February 21-April 10, 1990	30 days	48.7 days	Scheduled maintenance outage started early due to the previous shutdown to upgrade electrical connections in the containment building and repair fuel-handling equipment. Flow problems identified in a cooling water system required an outage extension of approximately 14.9 days.
April 13-24, 1990		10.9 days	Management directive to retrain control room operators after an error was made in starting up the plant from the previous outage.

Clinton Power Station Outages
(Continued)

Dates	Scheduled Duration	Duration	Reason
May 9-17, 1990		7.9 days	Manual reactor shutdown when Division I and II Diesel Generators declared inoperable per Technical Specifications due to finding cooling water supply piping expansion bellows not installed per design.
May 17-19, 1990		1.6 days	Manual reactor shutdown when feedwater control power supply failed causing reactor flow to enter unstable operations region.
July 9-11, 1990		1.8 days	Turbine trip and automatic reactor shutdown when an out-of-calibration instrument sensed a VOLTS/HERTZ mismatch on the generator output.
July 12-27, 1990		15.5 days	Erratic response from reactor recirculation flow control valve during startup resulted in management decision to shutdown to repair valve and replace reactor recirculation pump seals.
October 14, 1990-March 8, 1991		145.8 days	Scheduled planned outage for second refueling of nuclear core, corrective and preventive maintenance also performed.
March 9, 1991		0.7 days	Turbine manually tripped off line during startup due to problems encountered when transferring loads to the generator.
November 16-19, 1991		3.7 days	Manual reactor shutdown due to loss of condenser vacuum after isolation of one-half of the condenser to check for tube leaks.
November 27, 1991		0.4 days	Took generator off-line to repair an overheating disconnect switch on the generator output breaker. Reactor remained critical.

Clinton Power Station Outages
(Continued)

Dates	Scheduled Duration	Duration	Reason
December 22-26, 1991		4.6 days	Manual reactor shutdown due to the failure of one of the Reactor Recirculation flow control valve position feedback circuitry resulting in unstable reactor flow.
January 4-16, 1992		12.2 days	Automatic reactor shutdown due to failure of the "B" phase Main Power Transformer (MPT). Replaced MPT with a spare.
February 27-29, 1992		2.3 days	Automatic reactor shutdown due to failure of the "B" Turbine Driven Reactor Feed Pump control valve/controller during a feedwater transient resulting in a low reactor vessel water level. Remained shutdown to start the third refueling outage (RF-3).
March 1, 1992- May 31, 1992		91 days	Scheduled planned outage for third refueling of nuclear core, corrective and preventive maintenance also performed. (RF-3)

Clinton Power Station
Thermal Demonstration

Projected Capacity Factors
and
Planned Outages

TABLE 2

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Period Days	365	366	365	365	365	366	365	365	365	366	365	365
Refueling Outage Days	59	70	80	0	55	65	0	55	55	0	55	55
Planned Maintenance Outage Days	0	0	0	0	0	0	0	0	0	0	0	0
Planned Unit Available Days	306	296	285	365	310	301	365	310	310	366	310	310
Forced Outages												
Rate(%)	9.5	7.7	7.9	8.8	8.5	8.2	5.8	10.6	11.7	7.2	12.0	13.0
Equivalent EFPD Loss	28.9	22.7	22.4	32.1	26.3	24.7	21.2	32.9	36.3	26.3	37.1	40.4
EOC Coastdown Derate												
% Power Range	0.0	0.0	12.0	0.0	12.0	12.0	0.0	12.0	12.0	0.0	12.0	12.0
Duration(Days)	0	0	47	0	50	56	0	59	64	0	61	65
Equivalent EFPD Loss	0.0	0.0	2.6	0.0	2.7	3.1	0.0	3.3	3.4	0.0	3.4	3.4
Other Planned/Seasonal Derates												
Rate(%)	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Equivalent EFPD Loss	3.0	2.7	2.6	3.3	2.8	2.8	3.4	2.8	2.7	3.4	2.7	2.7
Forced Derates												
Rate(%)	1.2	2.0	2.2	2.8	2.8	2.8	2.7	2.9	3.0	3.0	3.0	3.0
Equivalent EFPD Loss	3.3	5.5	5.9	9.3	8.0	7.7	9.3	8.1	8.2	10.2	8.2	8.1
Equivalent Availability												
Year(%)	74.2	72.4	68.9	87.7	74.0	71.8	90.7	72.0	71.1	89.1	70.9	70.0
Past 3 Years(%)	53.8	64.3	71.8	76.4	76.9	77.8	78.8	78.2	77.9	77.4	77.0	76.6
Load Cycling Losses												
Rate(%)	1.7	3.2	3.5	3.5	3.5	3.5	3.4	3.5	3.6	3.6	3.6	3.6
Equivalent EFPD Loss	4.7	8.6	9.2	11.7	9.9	9.6	11.7	9.8	9.8	12.2	9.8	9.7
Manuevering/Efficency Losses												
Rate(%)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Equivalent EFPD Loss	5.5	5.5	5.3	6.7	5.7	5.5	6.9	5.5	5.5	6.8	5.5	5.4
Capacity Factor												
Year(%)	71.4	68.6	64.9	82.7	69.7	67.6	85.6	67.8	66.9	83.9	66.7	65.9
Past 3 Years(%)	50.2	61.3	68.3	72.1	72.5	73.4	74.3	73.7	73.4	72.9	72.5	72.1
MAIN Net Capacity Rating(MWe)	940	940	940	940	940	940	940	940	940	940	940	940
Electrical Generation(MWH)	5878009	5662419	5347851	6811400	5743356	5584729	7050909	5584052	5505544	6926824	5489527	5422545

ILLINOIS POWER COMPANY
Decatur, Illinois

CLINTON POWER STATION

Clinton Lake Thermal Proceedings
Chronology of Events

TABLE 3

Month	Year	Description
May	1981	The IPCB orders (PCB 81-82) site-specific temperature limits on cooling water discharge to Clinton Lake. The IPCB orders daily average discharge temperature shall not exceed 108.3F on any day and not exceed 99F more than 44 days in 365 days.
Summer	1987	IPC notices flume discharge temperatures are approaching site-specific temperature limits while ascending to full power.
December	1987	IPC retains J.E. Edinger Associates to remodel Clinton Lake using best available station operating data.
June	1988	IPC files a petition (PCB 88-97) before IPCB for a variance from temperature limits of IPCB 81-82. IP petitions the IPCB to raise the maximum daily average temperature limit to 110.7F and increase the number of days average daily flume discharge temperatures may exceed 99F to 90 for 1988 and 1989.
July	1988	IP files a petition for a provisional valiance because one circulating water pump rails and must be taken out of service.
August	1988	IP receives a provisional variance from PCB 81-82.
February	1989	IP files a petition to amend its June, 1988 variance petition. IP requests the IPCB to extend the requested variance through October 1, 1990.
June	1989	The IPCB grants IP a variance through October 1, 1990 in PCB 88-97 as petitioned in February, 1989.
December	1989	IP petitions the IPCB (PCB 89-213) to extend the variance of PCB 88-97 through October 1, 1993. The 1989 summer period capacity factor was very low because of station operating problems and the capacity for the summer of 1990 was also expected to be low because of approaching refueling.
June	1990	The IPCB extends the variance of 89-213 until October 1, 1992. In its order the IPCB indicates it will extend the variance until October 1, 1993 if IP files its site-specific thermal standards petition by October 1, 1992.

APPENDIX C TO

PETITION FOR HEARING TO DETERMINE SPECIFIC THERMAL STANDARDS PURSUANT TO 35 ILL. ADM. CODE § 302.211(j)

LIST OF EXHIBITS
(Submitted separately)

Exhibit 1.	Condenser Cooling Water and Cooling Lake Discharge Temperature Evaluations.
Exhibit 2.	Illinois Power Company, Clinton Power Station, Environmental Monitoring Program Water Quality Report, 1978-1991. (Separately bound.)
Exhibit 3.	Illinois Power Company, Clinton Power Station, Environmental Monitoring Program Biological Report, Comparison of Preoperational Date (1983-1986) with Operational Data (1987-1991). (Separately bound, and including a separate appendix.)
Exhibit 4.	Clinton Power Station Artificial Cooling Lake Demonstration: Clinton Lake Hydrothermal Model Verification for 1989, 1990, 1991, and Determination of Adequacy of Variance Limits for Clinton Station, prepared by J.E. Edinger Associates, Inc.
Exhibit 5.	References Cited in Support of Evaluation of Thermal Impacts.
Exhibit 6.	Biological Evaluation of Predicted Thermal Discharges in Clinton Lake, prepared by Environmental Science & Engineering, Inc.
Exhibit 7.	Prepared Testimony of Richard E. Hall in Proceeding PCB 88-97.
Exhibit 8.	Study, entitled Supplemental Passive Cooling of Circulating Water at Clinton Power Station - Unit 1, prepared by Sargent & Lundy.
Exhibit 9.	Letter to Mr. T.L. Davis from Edward F. Stoneburg, regarding Clinton Power Station Electric Production Costs Associated with Constraining the Station to Not Exceed Current Discharge Flume Thermal Limit.
Exhibit 10.	Affidavit of Thomas L. Davis.
Exhibit 11.	Affidavit of John E. Edinger, Ph.D.
Exhibit 12.	Affidavit of Gary D. Matthews.
Exhibit 13.	Affidavit of James A. Smithson.
Exhibit 14.	Affidavit of Edward F. Stoneburg.

CERTIFICATE OF SERVICE

I, Eric L. Lohrenz, hereby certify that on September 30, 1992, I served the foregoing Notice of Filing and documents referenced therein, by causing the requisite number of copies to be hand-delivered to:

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board
100 W. Randolph St., Suite 11-500
Chicago, Illinois 60601

and by causing a copy to by sent by the United States mail, properly addressed, first-class postage prepaid, to:

Illinois Environmental Protection Agency
Enforcement Programs
2200 Churchill Road
Springfield, Illinois 62706

Eric L. Lohrenz

One of the Attorneys for Petitioner
Illinois Power Company