

**BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD**

AMEREN ENERGY GENERATING COMPANY,)	
)	
)	
Petitioner,)	
)	
v.)	PCB 09-38
)	(Thermal Demonstration)
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,)	
)	
Respondent.)	
)	

NOTICE OF FILING

TO:

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PLEASE TAKE NOTICE that I have electronically filed with the Office of the Clerk of the Pollution Control Board, **POST-HEARING BRIEF OF AMEREN ENERGY GENERATING COMPANY**, copies of which are herewith served upon you.

Ameren Energy Generating Company


By: Amy Antonioli

Dated: August 13, 2009
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CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 13th day of August, 2009, I have served electronically the attached, **POST-HEARING BRIEF OF AMEREN ENERGY GENERATING COMPANY**, upon the following persons:

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POST-HEARING BRIEF OF AMEREN ENERGY GENERATING COMPANY

NOW COMES AMEREN ENERGY GENERATING COMPANY (“Ameren” or “the Petitioner” of “the Company”), by and through its attorneys, SCHIFF HARDIN LLP, and provides this post-hearing brief for consideration by the Illinois Pollution Control Board (“Board”).¹

I. INTRODUCTION

On December 15, 2008, pursuant to Section 302.211(j) of the Board’s water quality rules and Section 106.200 *et al.* of the Board’s procedural rules, Ameren filed this Petition to Modify Specific Thermal Standard (“Petition”). In the Petition, Ameren requests a modification to the thermal limits granted by the Board in 1982 for the cooling water discharge from Coffeen Power Station (“Station”) to Coffeen Lake. Ameren seeks relief only during the months of May and October. May and October fall within the winter regime for thermal limits applicable to Coffeen Lake.

¹ New information provided with this brief in response to public comment received by the Board in this proceeding is provided in the nature of public comment.

The new limits Ameren seeks for May and October would not represent new or previously unseen temperatures for Coffeen Lake. Rather, Ameren seeks an intermediate limit between the summer and winter regimes that would apply only during those two months. The intermediate thermal limits would allow a more gradual transition between the winter and summer regimes. Ameren does not seek any other changes to the current limits.

This Petition follows both significant past investments as well as a thorough investigation of possible supplemental cooling technologies and in depth analysis of the impact of the requested relief on Coffeen Lake. Ameren has already made substantial investments in cooling technologies to control the Station's thermal effluent to Coffeen Lake. Ameren has spent \$26 million on the construction of a 70-acre cooling basin and a 48-cell, 200,000 gallon per minute (gpm) cooling tower system. These technologies have been effective at mitigating the thermal component of the discharge from the Station, but despite these additions, Ameren has still had to de-rate during May and October from time to time to meet the current limits at times when there is demonstrated consumer demand for power from the Station. In recent years, shifting weather patterns have brought warmer weather during these transition months making the winter limits less representative of ambient conditions and, therefore, more difficult for the Station to meet.

Ameren has also thoroughly examined possible enhancements to the existing cooling technologies that would allow the plant to operate without having to de-rate during the shoulder months. None of the alternatives that would have allowed Ameren to achieve this goal were technically feasible and economically reasonable. The relief requested in this Petition is the only economically reasonable and technically feasible alternative available that would allow Ameren to operate under forecasted operating conditions without having to de-rate during May and October. Given the minimal environmental impact the requested relief would have on Coffeen

Lake, the modified limit Ameren requests for May and October is the only economically reasonable alternative available.

Coffeen Power Station's economic and social value to the community and to the State of Illinois is undeniable. Coal and electric generation are essential parts of the Illinois economy. As a base-load generator with high reliability, Coffeen Power Station is a low-cost energy provider to the people of Illinois. Allowing Coffeen Power Station to operate throughout the year without having to de-rate or shut down altogether also provides a benefit to the retail customers in Illinois and throughout the Midwest region. Ameren has a strong record of environmental stewardship and, pursuant to a lease agreement with the Illinois Department of Natural Resources ("IDNR"), has made Coffeen Lake available for a wide range of public and recreational uses on and around this "hidden jewel" of a lake. However, for Coffeen Lake to remain such a valuable natural resource to the public and to the State of Illinois as a whole, Ameren must be able to fully utilize the lake to support its generating operations.

II. PROCEDURAL BACKGROUND

Ameren filed its Petition on December 15, 2008. On March 5, 2009, the Board accepted the Petition for hearing and ordered the Illinois Environmental Protection Agency ("Agency") to file its recommendation on the Petition within 30 days, or by April 6, 2009. On the same day, the Hearing Officer, Ms. Carol Webb, issued an order directing Ameren to answer a series of pre-hearing questions posed by the Board. On March 24, 2009, Hearing Officer Webb, together with the parties, set the public hearing for May 19, 2009 to be held in Litchfield, Montgomery County.

The Agency requested an extension until April 17, 2009 to file its recommendation, but did not file the recommendation ("Recommendation") until April 24, 2009, nearly three weeks past the deadline set by the Board and Hearing Officer. Ameren filed answers to the Board's

questions and the pre-filed testimony of three witnesses on May 12, 2009. Due to the late filing of the Recommendation, Ameren asked to postpone the hearing until June 23, 2009.

Hearing Officer Webb conducted the public hearing on June 23, 2009.² Four witnesses testified on behalf of Ameren, and all were found credible by Hearing Officer Webb. Ameren submitted three of the four pre-filed testimonies as exhibits at hearing. Ameren's first witness, James L. Williams, Jr., was the plant manager for Coffeen Power Station from 2001 through June, 2009. Mr. Williams testified as to the current thermal limits and Ameren's request for a modification to those limits, Ameren's past efforts to comply with the thermal limits, Ameren's analysis of additional cooling technologies, background on how the station operates, and Ameren's economic analysis of the alternatives investigated. Mr. Williams' pre-filed testimony was admitted as Hearing Exhibit 1 ("Exh. 1").

Ameren's second witness, Dr. James McLaren, is a fisheries biologist with ASA Analysis and Communication, Inc. ("ASA") with over 35 years experience. Dr. McLaren's pre-filed testimony along with his Curriculum Vitae and attachments were admitted as Hearing Exhibit 2 ("Exh. 2"). Dr. McLaren testified regarding the findings of his assessment, which evaluated the potential impacts, if any, associated with revising Ameren's thermal standards for the months of May and October for Coffeen Lake. His report and supporting testimony concluded that the proposed thermal limits would provide conditions capable of supporting shellfish, fish and wildlife.

Ameren's third witness was Dr. Ann Shortelle, a limnologist with MACTEC Engineering and Consulting, Inc. ("MACTEC"). Dr. Shortelle's pre-filed testimony along with her report and Curriculum Vitae were admitted as Hearing Exhibit 3 ("Exh. 3"). Ameren specifically retained

² The transcript of the June 23, 2009 hearing will be cited to as "Tr. at ___."

Dr. Shortelle to address the Agency's concerns, raised in the Recommendation, about any impact the requested relief might have on mercury and phosphorus loading to Coffeen Lake.

Ameren called a fourth witness, Mr. Michael Smallwood of Ameren's environmental sciences department, to answer questions raised by the Agency about the background and purpose of a 2009 addendum to the 2007 Total Maximum Daily Load ("TMDL") analysis for Coffeen Lake. Tr. at 221, 256. Mr. Smallwood also testified regarding certain conditions in the Coffeen Power Station NPDES permit.

The Agency submitted one exhibit at hearing: Chapter 1 of a report drafted by Southern Illinois University – Carbondale ("SIUC") in 2000 ("Exh. 4"). SIUC conducted studies of the effects of the thermal discharges and resulting temperatures on Newton Lake and Coffeen Lake from 1997 and 2006. SIUC studied fish species and habitat. Several of the annual reports were submitted as attachments to various filings, and the Agency filed the entire series of reports by CD on July 13, 2009.³

The Agency presented no witnesses. Two members of the public offered oral comments. The public comment period was set to end July 13, 2009. Four written comments were filed during the comment period. Ameren's deadline to submit its post-hearing brief was set for August 13, 2009.

**III. AMEREN HAS MET ITS BURDEN OF PROOF TO SHOW THAT
COFFEEN LAKE WILL CONTINUE TO BE ENVIRONMENTALLY
ACCEPTABLE AND WITHIN THE INTENT OF THE ACT**

An artificial cooling lake demonstration is a unique mechanism that provides a procedure specifically designed for steam-electric generating plants that discharge to artificial cooling lakes. It allows relief from the Board's temperature limits under appropriate circumstances and

³ The SIUC Reports will be cited to throughout this brief as "[Year] SIUC Report, pg. ___."

in a proceeding that is adjudicatory in nature. The generally applicable thermal water quality standard, 35 Ill. Adm. Code 302.211, provides this exception and sets forth the required level of justification. 35 Ill. Adm. Code 302.211(j)(3); *See also* In the Matter of: Water Quality and Effluent Standards Amendments, Cooling Lakes, R75-2 slip op. at 25 (Sept. 29, 1975).

To make a successful demonstration pursuant to Section 302.211(j), a petitioner must show that the artificial cooling lake will be environmentally acceptable and within the intent of the Act. 35 Ill. Adm. Code 302.211(j)(3). To meet the environmentally acceptable burden of proof, a petitioner must show that the cooling lake can provide conditions capable of supporting shellfish, fish and wildlife, and recreational uses consistent with good management practices. 35 Ill. Adm. Code 302.211(j)(3)(A). The standard also requires the Board to consider technical feasibility and economic reasonableness of controlling the thermal effluent when promulgating the specific thermal standard. 35 Ill. Adm. Code 302.211(j)(3)(B).

Past thermal demonstrations and Board proceedings are instructive on how to make the requisite showing and reveal three key points regarding thermal demonstrations. First, the regulations do not require that there necessarily be a fishery or recreational uses of the lake, but only that the artificial cooling lake be capable of supporting such conditions. Illustrating this point, when adopting the specific justification for artificial cooling lake demonstrations, the Board stated:

[U]nder subsection (cc) (1), [now. Section 302.211(j)] it is not absolutely required that there be a fishery, or that an artificial cooling lake provide recreational or any other uses except that for which it was designed. . . . [b]ut it is nonetheless felt that by requiring such conditions in a lake we will have taken a significant step in protecting water quality. In the Matter of: Water Quality and Effluent Standards Amendments, Cooling Lakes (Cooling Lakes), R75-2, slip op. at 40 (Sept. 29 1975) (emphasis in original).

Under the applicable standard, therefore, Coffeen Lake clearly need not support an *optimal* fishery, but simply *conditions capable* of supporting a fishery.

This standard does not require that the fishery meet all IDNR lake management objectives or even require a finding that no fish kills may ever occur under the requested relief. When granting the current thermal limits for Coffeen Lake, the Board found Coffeen Lake environmentally acceptable despite three reported fish kills. Central Illinois Public Service Co. v. IEPA, PCB 77-158, slip. op. at 6 (Apr. 27, 1978). Despite the fish kills, which the Board found were “not significant,” and the exception of the stunted condition of bluegills, which the Board noted was a common condition in reservoirs and probably caused by too great a population for the existing food supply, the Board found that Coffeen Lake appeared to be in good condition. CIPS, PCB 77-158, 78-100 (consol.), slip op. at 2. The Board found that CIPS had met its burden by demonstrating that the lake supported a variety of fish and had not sustained any dramatic fish kills.

Second, the regulations do not require a showing of no environmental impact. Notably absent from the thermal demonstration standard is the requirement to demonstrate a lack of environmental impact on the waterbody receiving the thermal effluent. Rather, the thermal limit must maintain conditions in the artificial cooling lake such that it remains capable of supporting shellfish, fish and wildlife, and recreational uses consistent with good management practices. For example, the Board found that minimal impacts to reproduction, growth and survival of some species did not constitute a significant ecological impact as long as the adjusted thermal limit would not inhibit the propagation of fish or other aquatic biota. Petition of Illinois Power Co. for Hearing Pursuant to 35 Ill. Adm. Code 302.211(j) to Determine Specific Thermal Standards (Petition of Illinois Power), PCB 92-142, slip op. at 7 (Aug. 26, 1993). Ameren’s proposed modification to the thermal limits in May and October does not limit Coffeen Lake’s capacity to maintain a sustainable biotic community.

Third, while the regulations suggest that the requisite showing may take the form of an environmental impact statement or Section 316(a) demonstration, that suggestion is not a regulatory requirement. When adopting this section of the regulations, the Board explained that subsection (dd), now Section 302.211(j)(4), was meant to minimize the duplication of paperwork. The Board stated:

It is hoped that if presentation of similar facts and data before other agencies or regulatory bodies is required, the same materials used there may be used to satisfy the showing requirements of subsection (cc). The specific instances listed in that section are for general guidance, and it is expected that any appropriate reports or materials which address the requirements of subsection (cc) may be used. Cooling Lakes, R75-2, slip op. at 41.

As the record shows, Ameren has met the elements of an artificial cooling lake demonstration both in form and in substance. For these reasons, Ameren asks that the Board grant the requested modified thermal limit for the months of May and October.

A. Coffeen Lake Will Continue to Provide Conditions Capable of Supporting Shellfish, Fish, and Wildlife

1. Aquatic Life

The record shows that Coffeen Lake supports shellfish, fish and wildlife under current thermal limits and will continue to do so even under the requested modification. Coffeen Lake exceeds the requisite showing and supports a thriving fishery that meets or approaches IDNR's stated objectives. Ameren's fisheries biologist consultant, Dr. McLaren of ASA Analysis & Communication, Inc., has conducted an exhaustive examination of data collected by SIUC, IDNR, Illinois Natural History Survey ("INHS"), and the Company to assess whether the lake has and would continue to support a balanced indigenous aquatic community and a thriving recreational fishery. Dr. McLaren analyzed the potential effects of raising the May and October thermal standards by performing first a retrospective assessment, which reviews historical data to determine whether or how fish populations have adapted to the thermal environment in the lake; and

second, a prospective assessment, which predicts how the lake's thermal environment during May and October might be altered under the proposed revised standards. Dr. McLaren has concluded from these assessments that Coffeen Lake does support a balanced indigenous community and robust recreational fishery and would continue to do so under the requested relief. Tr. at 26; Exh. 2, par. 6.

Dr. McLaren analyzed three species, largemouth bass, channel catfish and bluegill, as the representative important species ("RIS") in conducting its retrospective and prospective analyses of Coffeen Lake. These species are appropriate because IDNR manages these species and because they are recreationally important species, self-reproducing, and predatory species that reflect the status of lower trophic levels. Tr. at 158; Exh. 3, par. 6. Additionally, SIUC focused on these same three species in its multi-year studies, providing a very unique and fortunate opportunity to have a long-term database of hard data from which to assess the effects of the current thermal regime on these species of fish. Tr. at 28. Dr. McLaren determined that Coffeen Lake provides a diversity of habitat at any time, thermal refuge is available in various parts of the lake, and the epilimnion remains oxygenated with dissolved oxygen concentrations usually well in excess of 5 milligrams per liter ("mg/L"). Tr. at 29.

Ameren has addressed questions raised by the Board and concerns expressed by the Agency regarding current and anticipated lake conditions with respect to aquatic life. Ameren has also shown that Coffeen Lake has not sustained any dramatic fish kills, and those that have occurred have not had any lasting effect on current fish populations. Pet. Exh. 11, pg. 5-2; *see also* Ameren's Response, pg. 8 and 2004 SIUC Report, p. IX-X, 27. The evidence of record abundantly supports Dr. McLaren's conclusion that proposed warmer May temperatures are not expected to carry over throughout the remainder of the summer season. In sum, Ameren expects

aquatic life to continue to thrive under the requested relief and the record contains no evidence with which to conclude otherwise.

**a) The Requested Relief Will Have No Negative Impact to
Reproduction, Growth & Survival**

The Agency posed a series of questions regarding findings of the 2007 Lake Management Status Report by IDNR (*See* Pet. Exh. 12), implying that the fish populations in Coffeen Lake did not meet the agency's objectives. Dr. McLaren, however, has not found that any of these numbers conclusively demonstrate stress from the existing thermal regime in Coffeen Lake. *See* Ameren's Response to the Recommendation of the Illinois Environmental Protection Agency ("Ameren's Response"), pg. 8-9. All three RIS exhibit characteristics such as survival, growth, body condition, population size, and recruitment of young that are comparable to or exceed those for populations in other regional and national water bodies. Exh. 2, par. 7. While some annual variability in population characteristics of fish species has occurred, such annual variability is typical for any sustainable fish population. *Id.* More importantly, there has been no sustained declining trend in relative weight through time.

Depending on the species, the numbers in the 2007 Lake Management Status Report more likely reflect competition with other species for food, angling pressure, an increasing predator base, or the cyclical nature of a particular species. Tr. at 173-185. The catch per unit effort ("CPUE") for largemouth bass exceeded the lake management plan objectives for the previous four years. Pet. Exh. 12. According to very recent IDNR data, proportional stock density (the percentage of stock fish equal to or exceeding quality length) consistently has been higher than IDNR's goal, indicating a high quality fishery for large bass. Pet. Exh. 11, pg. 5-2.

Recruitment, growth, and condition of the RIS indicate that lower trophic levels in the lake⁴ are available to provide an adequate food supply. Pet. Exh. 11, pg. 5-2. The lack of evidence of detrimental effects of water temperatures on fish recruitment, growth, and condition indicate that these lower trophic levels also are adapted to the thermal environment of the lake. Game fish are positioned at the top of a finely-balanced food chain and the thermal effects on these species are a good indication of general conditions in the lake biota. See e.g. Cooling Lakes, R75-2, slip op. at 21. The record also shows that adequate suitable habitat is available in Coffeen Lake throughout the year that can provide optimal water temperatures or serve as a nursery for young fish or thermal refuge for adult fish. Pet. Exh. 11, pg. 5-2.

As for future conditions, Dr. McLaren predicts that the proposed thermal limits could benefit reproduction, survival and growth. Pet. Exh. 11, pg. 5-1. Dr. McLaren found that the survival and growth of the early life stages, particularly for largemouth bass, are actually improved by the stable warmer temperatures of Coffeen Lake in the late winter and early spring and prolonged growing season. Pet. Exh. 11, pg. 3-3. Dr. McLaren suggests that this gives the fish a better ability to “bulk up” for the winter to increase over-winter survival and ultimately achieve larger growths. Tr. at 168.

The proposed modified limits for May and October also will not negatively impact reproduction. The requested relief is not expected to affect the dates of spawning for largemouth bass because the large majority of spawning in the heated arm of the lake has been completed by May. Tr. at 142-43; Pet. Exh. 11, pg. 3-2. Higher May temperatures should also not adversely affect bluegills because the record shows that they spawn throughout summer when temperatures

⁴ Lower trophic levels include primary producers such as phytoplankton, epiphyton, and macrophytes, as well as primary and secondary consumers such zooplankton, benthos, and phytomacrobenthos.

are higher than the proposed limits. Pet. Exh. 11, pg. 5-1. Dr. McLaren states that the proposed October limits may even prolong the spawning season for bluegills, which in the past has extended into September and October. *Id.* Channel catfish have probably experienced earlier spawning in Coffeen Lake due to warmer water temperatures during spring months. *Id.* As is the case for largemouth bass, early spawning would allow channel catfish to complete early life stages prior to May leaving more thermally-tolerant juveniles resulting in improved summer and over-winter survival. *Id.* Dr. McLaren has found that diversity in water temperatures exists in the eastern and western arms of Coffeen Lake, and at depth, providing adequate refuge and that such temperature diversity would be advantageous for all fish species. Exh. 2, par. 20(b).

The Agency has expressed concern about whether the requested relief will lead to fish kills in Coffeen Lake. *See* Rec. at 20. Historically, fish kills have been rare events usually occurring only during exceptional conditions of prolonged calm, cloudy weather combined with unusually warm temperatures when the lake is stratified and DO levels are limited. Exh. 2, par. 13; Pet. Exh. 11, 5-3; 2007 SIUC Report, p. 8; 2006 SIUC Report, p.8 and 2005 SIUC Report, p. 5. These rare instances have never been reported in May or October. The proposed limits for May and October will not likely cause fish kills since water temperatures and dissolved oxygen levels associated with fish kills have not occurred and would likely not occur during those two months.⁵ Pet. Exh. 11, 5-3. The most extreme summer weather conditions are not likely to occur during May and October. Even if such conditions did occur, the proposed limits are well below the summer thermal standards and Ameren would be required to de-rate to comply with the requested limits during those months.

⁵ SIUC has found that from data collected between 1998 and 2004, the most critical habitat conditions in Coffeen Lake occurred only during the months of July and August. SIUC Report 2005, pg. 22, 25.

Moreover, historic fish kills have not resulted in any long-term negative effects to Coffeen Lake or the fish populations. Pet. Exh. 11, pg. 5-2; *see also* Ameren's Response, pg. 8 and 2004 SIUC Report, p. IX-X, 27. In fact, the objective of the SIUC studies was to determine if the 1999 fish kill and subsequent smaller fish kills adversely affected the three sport fish populations (channel catfish, largemouth bass, and bluegill). 2007 SIUC Report, pg. 1. SIUC concluded that even the most significant fish kill observed on Coffeen Lake, in July 1999, was relatively insignificant to the sportfish populations. 2007 SIUC Report, p. 9; *see also* 2006 SIUC Report, pg. 10 and 2005 SIUC Report, p. 6. The number of largemouth bass that died represented 1% of the population. To put this into perspective, the average total annual mortality rate for largemouth bass in Coffeen Lake from 1997 through 2004 is approximately 42%. 2006 SIUC Report, pg. 9.

The record also shows that the 1999 fish kill was not induced by Ameren's thermal effluent to Coffeen Lake.⁶ In the July 1999 event, the fish kill was attributable to conditions beyond high discharge water temperatures which included a combination of prolonged periods of hot air temperature, and low levels of dissolved oxygen due to atmospheric conditions; conditions which also resulted in fish kills in non-cooling lakes such as East Fork Lake near Olney. 2007 SIUC Report, p. 8; *see also* 2006 SIUC Report, p.8 and 2005 SIUC Report, p. 5

The results of Dr. McLaren's retrospective and prospective assessments demonstrate that under the proposed limits for May and October, Coffeen Lake will continue to provide conditions capable of supporting the reproduction, growth and survival of aquatic life.

⁶ "In Coffeen Lake, the temperatures were actually warmer in 2003, 2004, 2005, and 2006 than in 1999. However, weather patterns (and not water temperatures) in 2000-2006 likely were responsible [for] the lack of fish kills versus 1999. In 1999, temperatures remained very hot for a number of weeks. In most instances following 1999, very hot weather was followed for a few days by cooler weather, and in some cases, heavy rain events." 2007 SIUC Report, pp 13-14.

b) The Requested Modifications to Thermal Limits During May and October Will Not Lead to Higher Maximum or Average Temperatures During Summer Months

The new limits Ameren seeks for May and October would not represent new or previously unseen temperatures for Coffeen Lake. Because they are new limits for these two months of the year, however, Dr. McLaren analyzed the impact of the requested relief on lake temperatures and concluded that warmer lake temperatures in May would not carry over into the summer months of June through September, when ambient temperatures are the highest and habitat could become limited. Pet. Exh. 11, 2-4, 5-1; Tr. at 30; Ameren's Response, pg. 10-11.

Based on the evidence of record, Dr. McLaren concludes that raising water temperatures in the mixing zone during May does not automatically result in warmer temperatures throughout the remainder of the season. Pet. Exh. 11, pg. 2-4; Exh. 2, par. 19. Dr. McLaren used the results of thermal modeling done by Sargent & Lundy ("S&L") to evaluate future potential near-worst case operating conditions. The modeling shows that increasing the thermal limits in May would not result in a carry-over effect into the summer months. Exh. 2, par. 19. Dr. McLaren explained that this is because meteorological conditions are the controlling factors of the lake water temperatures. Tr. at 32. The lake dissipates heat through surface exchange with the atmosphere. Atmospheric conditions influencing the ability of the lake to dissipate heat include ambient air temperatures, relative humidity, wind and wave reaction, and solar radiation. Tr. at 32; Exh. 2, par. 9. SIUC repeatedly highlights the significant impact that meteorological conditions have on lake biological conditions, independent of water temperature. *See* 2007 SIUC Report, pg. 8; 2006 SIUC Report, pg. 8, 2005 SIUC Report, pg. 5.

Dr. McLaren states that the relief Ameren requests for the months of May and October would more realistically reflect a natural thermal environment by allowing for a more gradual shift between winter and summer limits. Tr. at 91. A more gradual shift in temperature would

provide more opportunity for fish to acclimate to the changing temperatures and, possibly, allow the fish a greater opportunity to leave higher temperatures to seek more suitable temperatures. Tr. at 197.

c) Coffeen Lake Will Continue to Provide Adequate Suitable Habitat

At hearing the Agency asked many questions regarding upper incipient lethal temperatures (“UILT”) for various fish species, suggesting that the proposed limits are inappropriate for the months of May and October or for a particular species found in Coffeen Lake. The Agency’s argument, however, ignores the fact that Coffeen Lake is a large cooling lake that mitigates heat with time, depth, and distance, and that fish seek cooler environs when necessary. Coffeen Lake is not isothermal. Tr. at 156. The proposed thermal limits of 96°F and 102°F apply to the near-surface temperatures at the boundary of the 26-acre mixing zone. Pet. Exh. 11, pg. 4-1. Meanwhile, the temperatures at depth and at distance from the mixing zone can be very much cooler and available to provide suitable habitat. The record shows that temperatures at depth in May can be as much as 18°F cooler than at the surface, and in October, 13°F to 14°F cooler at depth than at the surface. *Id.* Also, water temperatures at the intake on the western arm of the lake can be as much as 10°F or 15°F cooler than in the discharge zone. Pet. Exh. 11, pg. 2-2. In January, mean daily water temperature reaches lows of approximately 44°F-55°F

SIUC has also noted “striking” water temperature differences recorded between the surface and at depths in the mixing zone. 2005 SIUC Report, pg. 4. Mixing zone water temperatures were recorded as usually 10°F cooler at 3.0 meters than 1.5 meters. SIUC concluded that “[i]f air temperatures and humidity are not excessively high, the cooling capacity of water within a meter or so of the surface seems to be such that, at least in Coffeen Lake, surface water temperatures are mitigated quickly and do not drive temperatures up at lower

depths.” *Id.* at 4. Thus, the record shows that at times when the water approaches the thermal limits during May and October, temperatures in many areas and depths in the lake would be in the 80s or lower – well within the range of temperatures tolerated by RIS life stages. Pet. Exh. 11, pg. 4-1.

The record confirms that juvenile and adult fish avoid temperatures exceeding their species-specific preferences. Tr. at 34; Pet. Exh. 11, pg. 4-1. The record shows that largemouth bass, for example, respond to the higher temperatures by seeking out cooler portions of the lake during the summer months and migrating towards the discharge throughout the remaining seasons. 2000 SIUC Report, Ch. 14, pg. 14-13 (Fig. 14.31).

There may be a point under hypothetical conditions at which too much of the lake could become unsuitable habitat for fish populations. However, Coffeen Lake has not reached that point to date. The proposed limits for May and October are lower than the temperatures the lake has experienced in the past and the minimal increased thermal loading in May and October is not expected to have a cumulative impact on water temperatures or dissolved oxygen concentrations in succeeding summer months leading to habitat erosion. Ameren’s Response, pg. 12-13. The record confirms that Coffeen Lake currently supports a healthy fishery and that the request for relief during May and October will not affect the maximum temperatures that occur at the edge of the mixing zone during summer months in the lake.

d) Fish Will Adapt to Their Unique Thermal Environment

The Agency’s arguments about the proper UILT also fails to consider that fish in Coffeen Lake are chronically exposed to warmer temperatures and have adapted to this temperature regime. *See* Tr. at 150-51. Laboratory studies of temperature tolerance used to develop UILTs measure rapid responses to changes in temperature. As a result, states Dr. McLaren, their use tends to conservatively underestimate thermal tolerance in the field. Pet. Exh. 11, pg. 4-2.

SIUC has repeatedly recognized the adaptability and thermal tolerance of fish populations in Coffeen Lake. SIUC notes there is a preferred laboratory temperature for largemouth bass, but that the mean internal body temperatures exceeded the preferred temperature in July and August of 1998 and 1999. SIUC concluded that “[t]his suggests that the preferred temperatures in these lakes are higher than those found in the literature.” 2000 SIUC Report, Ch. 14, pg. 14-14. SIUC also notes that the absence of a fish kill during critical water quality conditions that occurred on certain dates in 2006 “underscores the resilience and adaptability of fishes to extreme environmental conditions over time.” 2007 SIUC Report, p. 5. Further evidencing the thermal tolerance of largemouth bass, SIUC found that even in years with relatively high mean water mixing zone temperatures relative to other years of the study, largemouth bass growth rates were comparable to the other years’ rates. 2005 SIUC Report, pg. 19.

The Board has also recognized that fish are adaptive to unique site-specific thermal conditions. Petition of Commonwealth Edison Co. (ComEd) for an Adjusted Standard from 35 Ill. Adm. Code 302.211(d) and (e), AS 96-10 (Oct. 3, 1996). Therefore, it is generally accepted that fish species adapt to their thermal environment. Ameren expects that the current fishery in Coffeen Lake will adapt to and continue to thrive under the requested relief.

2. Water Quality

In the Recommendation, the Agency stated a concern about whether the requested relief would prolong the stratification period in the lake, thereby promoting the internal loading of phosphorus and mercury methylation and exacerbating dissolved oxygen concentrations. See Rec. at 18, 19. The Agency’s concerns about water quality with respect to phosphorus, mercury and dissolved oxygen are unfounded. First, there are no data that indicate that the proposed modifications to the thermal limits in May and October will have a cumulative impact and

exacerbate water quality conditions in other months throughout the year. Exh. 2, par. 20(c). Second, as demonstrated below, these water quality parameters are more dependent on air deposition, surrounding land uses and resulting runoff from the watershed rather than the thermal effluent from Coffeen Power Station. Third, Coffeen Lake is listed by the Agency, and approved by the United States Environmental Protection Agency ("USEPA") on October 22, 2008, as fully supporting aquatic life. Below Ameren explains in more detail how the intermediate limits Ameren seeks will have no measurable impact on water quality in Coffeen Lake. Ameren notes that the Agency has made no effort to dispute the testimony of Ameren's experts by introducing its own expert testimony on these issues.

a) Dissolved Oxygen

In the Recommendation, the Agency seems to argue that increased heat loading in May and October may have an adverse effect on dissolved oxygen ("DO") levels and therefore lead to erosion of habitat, and ultimately fish kills. Rec. at 14-15. The record shows, however, that temperatures warmer than those being proposed have not adversely affected the aquatic community during the summer months. Dr. McLaren analyzed DO data at varying depths collected by SIUC during 2000, 2001, 2003, 2004, 2005 and 2006 to evaluate whether DO cumulatively decreased from May through October in Coffeen Lake, and found that it does not. Exh. 2, par. 10. As discussed above for water temperature, meteorological conditions can modify DO on a daily basis. *Id.* Thus, Dr. McLaren concluded that dissolved oxygen concentrations will likely remain sufficient to sustain the aquatic community even under the proposed May and October limits. *Id.*; Ameren's Response, pg. 12-13.

As it did with temperature, however, the Agency argues that increased loading in May could have a cumulative effect on dissolved oxygen levels in June through September. An extensive examination of the SIUC data with respect to dissolved oxygen at depth in segments 1

and 2 of Coffeen Lake did not reveal any discernable pattern that oxygen depletion increases as summers progress. Exh. 2, par. 10; Ameren's Response, pg. 13. This pattern (or lack thereof) is evident in every year SIUC performed dissolved oxygen and temperature profiling. See Exh. 2, par. 10. The record simply does not show that the proposed modification to thermal limits in May and October will result in decreased oxygen levels in summer months or other months throughout the year.

b) Phosphorus

The Agency asked many questions at hearing implying that the requested relief for the months of May and October would promote the internal loading of phosphorus in Coffeen Lake. The evidence of record indicates otherwise. Coffeen Lake is listed by the Agency as impaired for phosphorus for aesthetic quality. Illinois Integrated Water Quality Report and Section 303(d) List – 2008, App. B-3. After thoroughly reviewing Coffeen Lake data gathered by SIUC and the 2007 TMDL analysis performed by IEPA, Dr. Shortelle concludes that no significant internal loading of phosphorus is occurring in Coffeen Lake. Support for this conclusion is the lack of any seasonal trends with regard to phosphorus and chlorophyll-*a*. Exh. 3, Att. 2, pg. 2-2. Dr. Shortelle explained that chlorophyll-*a* is an indicator of how much phytoplankton there is in the lake. Chlorophyll-*a* is produced by plants, such as phytoplankton or algae in the water, and grow better with more nutrients such as phosphorus. Tr. at 44. Chlorophyll-*a* is produced in the epilimnion where phosphorus can fuel primary production. Tr. at 246. The impairment for aesthetic quality in Coffeen Lake focuses on the epilimnetic phosphorus. Tr. at 246.

An in-depth analysis of the potential for increased internal loading of phosphorus due to the requested change in thermal limits in May and October demonstrates that at best there would be 1.5% increase in internal phosphorus loading under the revised thermal standard. Dr. Shortelle concludes, however, that this additional phosphorus would not reach the epilimnion.

Exh. 3, Att. 2, pg. 2-25. With no additional phosphorus reaching the epilimnion, this incremental increase would not contribute to the lake's impairment for aesthetic quality because it could not, for example, fuel an algal bloom. Tr. at 230.

Dr. Shortelle states that the phosphorus in Coffeen Lake is primarily coming in from the watershed due to runoff from agricultural operations. Tr. at 47; *see also* Exh. 3, Att. 2, pg. 2-7. The 303(d) listing for Coffeen Lake supports this conclusion by listing "crop production" as a source of the phosphorus impairment. Illinois Integrated Water Quality Report and Section 303(d) List – 2008, App. B-3. Overall, Dr. Shortelle concluded that only Segments 1 and 2 would potentially experience additional days of stratification during the months of May and October sufficient for the small change in internal loading, but that the frequency and duration of stratification and anaerobic activity would not result in a measurable increase in surface water phosphorus concentrations. Tr. at 246; *see also* Exh. 3, Att. 2, pg. 2-22.

c) Mercury

The Agency also asked questions at hearing about whether higher temperatures during May and October would contribute to mercury methylation. While warmer temperatures are one of many factors that may contribute to mercury methylation in the environment, a dominant factor in Coffeen Lake is the mass of mercury entering the lake watershed due to atmospheric deposition.

Coffeen Lake is listed by IEPA as impaired for fish consumption due to mercury levels. Illinois Integrated Water Quality Report and Section 303(d) List – 2008, App. B-3. Coffeen Lake fish, however, have relatively low mercury concentrations. Tr. at 53. Largemouth bass in Coffeen Lake rank among the lowest in mercury concentration among fish data from state and federal studies. Tr. at 52; Exh. 3, Att. 2, Fig. 3-2, Table 3-1. Mercury is constantly cycled through a biogeochemical cycle in the environment. Exh. 3, Att. 2, pg. 3-1. Methylmercury is

the biologically active form of mercury and bioaccumulates up the food chain. *Id.* Methylation of mercury in ecosystems is affected by multiple parameters such as mercury loadings, nutrient content, pH, oxidation-reduction conditions, bacterial activity, and other variables. *Id.* However, one of the primary drivers for mercury concentration in fish tissue, regardless of cycling dynamics, is the quantity of mercury in the watershed (primarily from atmospheric deposition). Tr. at 53-54. The larger the watershed, the larger the potential for mercury to get into the lake. Tr. at 54.

Dr. Shortelle opines that the primary source of mercury loading is due to atmospheric deposition. Tr. at 244. IEPA clearly recognizes this fact since it has cited “atmospheric deposition” as a source of mercury in the impairment listing for Coffeen Lake. Illinois Integrated Water Quality Report and Section 303(d) List – 2008, App. B-3. New air emissions limits will significantly reduce regional mercury loading. Ameren will spend more than \$600 million to install flue gas desulphurization systems (“scrubbers”) on both of its units at Coffeen Power Station to comply with new air emission limits. Tr. at 18, 80. The scrubber on one unit at Coffeen Power Station will begin to operate at the end of 2009, and the second scrubber will begin to operate at the end of 2012. Tr. at 254. The scrubbers are designed to remove SO₂, but a co-benefit of their operation is the removal of mercury from air emissions. Tr. at 254. These emission limits are applicable statewide and are expected to result in regional mercury load reductions. Using the maximum observed mercury concentration in largemouth bass, a thirty-three percent reduction in mercury loading is necessary to remove the impairment in Coffeen Lake. Proportional reductions are expected from decreased regional atmospheric loads of mercury. Tr. at 55; see In the Matter of: Proposed New 35 Ill. Adm. Code 225 Control of Emissions from Large Combustion Sources (Mercury), R06-25, Testimony of Marcia Willhite, at

162-172 (Jun. 14, 2006). Such reductions are expected to, in turn, reduce the mass of mercury available for methylation in Coffeen Lake.

In summary, although the requested relief may cause some theoretical changes in mercury cycling, any effect on rates of mercury methylation that may occur would be very minor and not likely result in measurable changes in fish mercury concentrations. Exh. 3, Att. 2, pg. 3-8. In fact, pollution controls that Ameren will initiate in a matter of months will likely have an overriding beneficial impact to Coffeen Lake by actually reducing mercury loading due to air deposition.

B. Coffeen Lake Will Continue to Support a Wide Range of Recreational Uses Consistent With Good Management Practices

There is no doubt that Coffeen lake is a valuable asset to the State of Illinois as a public place for recreational activities such as fishing, boating, picnicking, and hunting. Through May of this year, approximately 30 fishing tournaments have already been held on the lake, demonstrating that the Lake supports excellent gamefish populations. See http://dnr.state.il.us/lands/Landmgt/Parks/R4/CFL/CFL_fishingschedule.htm.

The Board itself has recognized that the addition of heat to artificial cooling lakes from electric generating plants allows fish and other aquatic organisms to grow continually during the winter, which is not usually the case for Illinois lakes. Cooling Lakes, R75-2, slip op. at 22. Even if unusual, the Board noted, the phenomena contributes to the recreational value of an artificial cooling lake, and moreover, can actually indicate the general environmental quality and acceptability of an artificial cooling lake. *Id.* at 22. The Board reasoned that the State of Illinois needs general recreational facilities, and that by creating these areas, cooling lakes provide a considerable public benefit to be weighed against any possible environmental harm. *Id.* at 23.

The wide range of recreational uses that Coffeen Lake supports are appropriate for its function as an artificial cooling lake. The lease agreement between Ameren and the IDNR recognizes that the primary purpose of Coffeen Lake is to support the operation of Coffeen Station as well as Ameren's right to vary the lake's level and temperature. Pet. Exh. 6. The lease further recognizes Ameren's right to use the lake for cooling water purposes and that public use shall not conflict with that right. *Id.*

Accordingly, the lease does not allow swimming in Coffeen Lake and restricts public use of the lake near the power station and around the mixing zone. Pet. Exh. 6. The lease identifies recreational areas and restricted access zones. *Id.* at 2. Areas that are off limits to public include the intake, spillway, discharge, and dam. *Id.* at 2, 7. In addition to swimming, the original lease executed in 1986 also prohibits water skiing, diving, scuba diving, windsurfing, sailboating or hunting in the recreational areas of Coffeen Lake. *Id.* at 3. In 1995, the parties executed an amendment to the lease that expanded the recreational uses of Coffeen Lake to include hunting of specified wild game, fish management, hiking, the observation, study or research of soil, plants or animals, and other outdoor activities that the parties may agree are appropriate. *Id.* at 48.

Various commenters have stated that they or their members have participated in recreational uses of Coffeen Lake. Ms. Blumenshine states she has "done hiking and bird watching in the Coffeen Lake Upland Management Unit" PC#3. Prairie Rivers Network states that "Coffeen Lake has been increasingly known by many, including members of Prairie Rivers Network, as an outstanding recreational site; particularly for fishing as well a boating, picnicking, bird watching, and other nature-based activities." PC#2. Ms. Bates commented: "I visit the Coffeen Lake frequently and have friends who boat and fish on the lake." PC#1. Based

on these facts and assertions, the record clearly shows that Coffeen Lake supports a wide range of recreational uses and that these uses will not be impacted by the requested relief. There is no evidence of record to the contrary.

IV. AMEREN HAS SHOWN THAT NONE OF THE AVAILABLE TREATMENT ALTERNATIVES ARE ECONOMICALLY REASONABLE

In promulgating a thermal standard, the Board considers the cost and practicality of eliminating or controlling the thermal component of an effluent and the benefits to be derived from an effluent source. *See Cooling Lakes*, R75-2, slip op. at 2. It is well-recognized that public utilities are vital to the social and economic structure of Illinois. The Coffeen Power Station plays a significant role in supplying power to Illinois consumers. Ameren's requested relief is necessary for Coffeen Power Station to accommodate the increasing demand for power in Illinois given a variety of factors including a deregulated power market, new environmental pollution control requirements, and a developing pattern of meteorological conditions resulting in warmer ambient temperatures during the transition months of May and October.

Coffeen Power Station pays significant taxes and employs 400 people. *See* Pet. Exh. 5. Ameren has recently invested hundreds of millions of dollars in installing state of the art pollution control equipment. Such construction projects employ hundreds of skilled, union employees. An economically viable and profitable power station will benefit not only the Company but will also provide a stable tax base and well-paying jobs in one of the more rural parts of the State. Moreover, allowing Coffeen Power Station to operate throughout the year without having to de-rate or shut down altogether also provides a benefit to the retail customers in Illinois and throughout the Midwest region. Tr. at 18.

The Board has also noted that technologies to cool coal-fired electric generating plant discharges to cooling lakes are expensive. *Cooling Lakes*, R75-2, slip op. at 8. In fact, this was

one of two findings the Board relied on in promulgating this exception for dischargers to artificial cooling lakes as it applied to existing lakes and would apply to all lakes built in Illinois in the future. *Id.*

A. None of the Investigated Supplemental Cooling Technologies Are Economically Reasonable

Of all of the supplemental cooling technologies Ameren examined, none are economically reasonable solutions that will allow Coffeen Power Station to run under anticipated operating conditions when weighed against the minimal impact, if any, to the environment of the requested relief. Ameren retained S&L to propose and evaluate additional enhancements to the lake's cooling systems. S&L evaluated eight alternative capital projects designed to reduce further thermal loading on the lake. *See* Pet. Exh. 15. Of these alternatives, the one providing the best economics was identified: the installation of a 175,000 gpm cooling towers with a capital cost of \$18 million dollars. Exh. 1, par. 9.

Ameren analyzed the economic viability of the 175,000 gpm cooling tower in comparison to the alternative of continuing as-is by using de-rates to comply with the thermal limits. That analysis, performed in 2006, estimated that it would take approximately 11.5 years for the Company to recover the costs of its investment in the new cooling tower. Pet. Exh. 15; Exh. 1, par. 9. Because these were extraordinary costs with a long payback period, the Company concluded that these investments, added to the initial investments made in the cooling basin and existing cooling tower, and other capital funding needs of Ameren were not justified.

In preparing for the hearing in this case, Ameren re-ran its analysis of the helper cooling tower with updated information and assumptions. In updating the analysis, two critical assumptions were added into the economic analysis: The future market prices for power and the likelihood of additional costs in the form of a CO₂ tax or other compliance cost. When such

considerations are taken into account, the costs associated with the capital investment in the 175,000 gpm cooling towers cannot be recovered before the equipment itself needs to be replaced. The power generation industry in Illinois now operates in a deregulated environment and as such capital expenditures are not subject to rate-based regulation or recovery. Accordingly, capital expenditures must be supported by sales of power and associated power prices that are the source of cash flow and earnings. Power prices began a precipitous drop in July 2008 and have continued to be depressed during this prolonged recession that has resulted in record job losses, bankruptcies and lay offs. Market participants expect this trend to continue over the next few years. *See Ameren's Response to Information Requested During Public Hearing, pg. 4.*

The original economic analysis of the 175,000 gpm cooling tower also did not consider the cost of compliance with carbon regulation. An energy cost adjustment for pollution control equipment needed for compliance with carbon regulation beginning in 2014 was factored into the updated economic viability analysis. When these two critical assumptions are considered, Ameren calculated that the cooling tower equipment would reach its end of life and need to be replaced before the capital investments could be recovered. As a result, Ameren cannot consider this an economically reasonable alternative.

B. Continuing to De-rate to Meet the Current Thermal Limits in May and October is not Economically Reasonable

Operating in a deregulated market places additional demands on power generators. Additionally, operating as a baseload generator benefits the consumers. Ameren expects to approach a 90% capacity factor by 2011 as demand continues to increase. Tr. at 63. While Coffeen Power Station will gain operating capacity, this increase in capacity does not translate to greater heat load because the units will operate more efficiently. Tr. at 125. It also will not

translate to more revenue for Ameren, since a significant portion of the gain in operating capacity will be used to power new pollution control equipment. Coffeen Power Station currently operates in the high 90% capacity factor during summer months and has for years. Tr. at 255. The expected increase in capacity is to the *annual* capacity factor, which mostly includes periods of time that are unaffected by the relief Ameren is requesting in this proceeding. Tr. at 256.

The calculated generation shortfall for the month of May, considering historical weather data from 1980 through 2007, shows a gradual increase in average losses over time. For example, losses went from 12% in 1980 to 21% in 2007. The average loss per year is 16%, which equates to \$2,334,000 in losses, based on 2007 dollars, and is a trend that is not economically reasonable for Ameren to sustain. Pet. Exh. 15, pg. 7.

C. Ameren's Requested Modified Thermal Limit is a Technically Feasible and Economically Reasonable Method of Controlling the Thermal Effluent

Under the Board's economic analysis, the question is not whether the discharger can profit from the installation of a treatment technology or even whether the discharger can recoup its costs. The standard for the Board to consider is whether the cost of the treatment technology is reasonable given the environmental benefit gained from installing the technology. Heat is a very unique pollutant, the concentration of which can be mitigated not just by control technology, but also by weather conditions and the morphology of the receiving water body. It has also been recognized that in some instances heat can be beneficial to the lake biota. For these reasons, a standard analysis comparing costs to the amount of heat kept out of the water by various cooling technologies does not suffice. A case-by-case analysis evaluating the cost to control the thermal component of a particular effluent to a particular waterbody compared to the benefit to that lake biota is required.

S&L concluded that installing the 175,000 gpm helper cooling tower will reduce temperatures enough to allow Ameren to operate during the months of May and October even under worst-case conditions without having to de-rate. However, spending millions of dollars on installing the tower is not expected to result in any measurable benefit to aquatic life in Coffeen Lake. Based on these facts, there is no environmental need for add-on treatment technology such as the helper cooling tower.

As part of the alternatives analysis, Ameren also asked S&L to model the performance of the existing cooling system under warmer-than-normal summer conditions, but with the modified thermal limits being requested in this proceeding. S&L concluded the proposed alternative May and October thermal limits would be able to accommodate the same rate of generation as any of the other proposed additional cooling system modifications.

Based on these results, the Company concluded that the substantial additional investment costs necessary to meet the existing temperature limits outweighed the marginal benefits to be gained by having a helper cooling tower at the ready, but that would realistically be deployed an average of only 31 days per year during time periods when market prices and operating margins are low. The Company concluded that the proposed project would be uneconomical, particularly when modifying the thermal limits for Ameren's thermal effluent during the months of May and October will have no measurable negative impact to the environment and when compared to other capital projects that compete for finite capital dollars and promise greater benefit per dollar spent.

Also to be factored into the economic analysis are the existing technologies Ameren has recently constructed and implemented at the Coffeen Power Station. Ameren on its own initiative and within the past 10 years, has undertaken a number of efforts to maintain

compliance with the current thermal limits without having to resort to de-rates. These capital projects included the construction of a 70-acre cooling basin and a 48-cell, 200,000 gallon per minute (gpm) cooling tower system. Realized within the past 10 years, these projects totaled \$26 million in capital costs alone. Despite these efforts, Ameren has still had to de-rate from time to time in the recent past during the shoulder months of May and October. At hearing, the Board asked how many times Ameren has implemented planned or forced outages since 1999 to comply with the standards. Tr. at 75 A chart summarizing the economic impact of de-rates to Ameren from January 1999 through September 2007 is attached to the Petition as Exhibit 14. Between the two units, the economic costs associated with de-rates have amounted to \$5.6 million.

Cooling lakes themselves are an acceptable and effective cooling technology. Utilizing Coffeen Lake for its intended purpose requires no capital investment, nor does it emit any additional pollutants, or require any loss of habitat or delay in implementation. An additional cooling tower would also impose additional water consumption demands at a time when Ameren has an immediate need of an additional two million gallons of water per day to operate new pollution controls required by state law. *See* Tr. at 83-86.

V. PUBLIC COMMENTS

The Board has received two oral and four written public comments in this proceeding. The two members of the public that gave oral public comment at hearing, Ms. Bates and Ms. Blumenshine, also submitted written comments. Public comments, whether written or oral, do not constitute evidence in this proceeding. The commenters were not sworn or subject to cross examination. Ameren addresses each of the comments in turn below:

A. Ms. Mary Bates – Public Comment #1

Ms. Mary Bates is a resident of Hillsboro and is a member of Citizens Against Longwall Mining and the Illinois Sierra Club. Ms. Bates states she will be adversely affected if the temperature is allowed to be raised at any time during the year, but does not explain in what way she might be affected. Ms. Bates is concerned about the effect of activities at the Deer Run Mine in combination with this proposal on lake levels in Coffeen Lake. PC #1, Tr. at 249. Ameren is not familiar or associated with the mining project and does not believe that such activities are related or germane to its requested relief. Ameren nonetheless notes that this request for modified thermal limits for the months of May and October will draw less water from Coffeen Lake than installing a helper cooling tower. Cooling towers use evaporation as the principle cooling mechanism and are extremely water consumptive.

Ms. Bates is also concerned about impacts from the U.S. Minerals site. Again, there is insufficient information in the record, and it is, therefore, not within the Board's authority, to address this issue.

B. Prairie Rivers Network – Public Comment #2

In a public comment filed by Prairie Rivers Network (“PRN”) (PC#2), PRN opposes Ameren's Petition for modified thermal limits. PRN first contends that Ameren has failed to meet its burden because “increased temperature loading to Coffeen Lake is likely to further contribute to the release of phosphorus bound to lake sediments and exacerbate the phosphorus impairment.” PC#2 at 2. PRN provides no support for this statement. The only evidence of record on this point is Dr. Shortelle's exhaustive review and analysis of data the internal loading of phosphorus in Coffeen Lake. PRN disputes the use of the 2009 addendum to the TMDL for Coffeen Lake. Dr. Shortelle did not rely on the 2009 addendum, but rather on her own research and analysis of the 2007 TMDL and Coffeen Lake data to counter the conclusions of the

Agency's 2007 TMDL. Exh. 3, Att. 2, pg. 2-9 – 2-11. This work identified technical flaws in the 2007 TMDL document. These flaws led directly to the Agency's conclusion of significant internal loading in Coffeen Lake; however, the data and analyses do not support this conclusion.

Second, PRN asserts that Coffeen Lake does not support its fish consumption use due to excessive levels of mercury. Ameren contends that Coffeen Lake does support its existing use as a fishable lake because the lake supports thriving fish communities. PRN comments that increasing temperature loading to Coffeen Lake will likely contribute to an increase in the size of the anoxic zone in the lake facilitating mercury methylation. Based on the available Coffeen Lake data, mercury concentrations are low and conditions do not appear to be favorable for methylation. While increases in the temperatures during May and October may contribute to mercury methylation, these changes are within the current temperature range for the lake, and thus, that amount is considered very minor (Exh. 3, Att. 2, pg. 3-12) and will not have an impact on the existing use of Coffeen Lake as a fishable lake. A greater factor in mercury methylation is the loading of mercury to Coffeen Lake and its watershed through atmospheric deposition. As discussed above, a co-benefit of installing scrubbers to reduce SO₂ emissions at the Coffeen Power Station will be the reduction of mercury emissions. These scrubbers will be in place by the end of the year and will operate throughout the year to reduce mercury emissions.

Third, PRN notes that Biologically Significant Stream Reaches have been identified in the Shoal Creek watershed. Coffeen Lake is upgradient of these reaches, and PRN is concerned that discharges from Coffeen Lake will degrade these downstream resources. Discharges from Coffeen Lake are relatively rare, but can be categorized as an improvement to water quality within the East Fork Shoal Creek. Phosphorus concentration, for which Coffeen Lake is considered impaired, is much lower within the lake than in the creek. *See* Illinois EPA, 2009a,

Coffeen Lake and East Fork Shoal Crook TMDL Addendum, Hanson Prof. Serv., Apr. 2009. Thus, any overflow from Coffeen Lake actually lowers the phosphorus concentration within the creek.

Fourth, PRN argues that Ameren has not met its burden to show that the cost of installing the 175,000 gpm helper cooling tower is economically infeasible. Of the supplemental technologies Ameren investigated, Ameren determined that none were economically reasonable given the minimal impact, if any, the requested relief would have on the environment. To date, the Company has expended more than \$26 million to address the thermal component of the effluent from Coffeen Power Station. It has also shown that the only technically feasible alternative would cost an additional \$18 million and would provide virtually no additional benefit. PRN points to no evidence to the contrary.

Fifth, PRN inquires why Ameren is no longer considering raising the dam level by three feet. Installation of the new pollution control equipment requires Ameren to find a mechanism to provide additional water supply to Coffeen Lake. Ameren proposes to transfer water from the East Fork Shoal Creek to Coffeen lake and has applied to both the U.S. Army Corp of Engineers and Agency for the requisite permits. Those authorizations are pending.

Sixth and finally, PRN contends that the Board cannot grant a modified thermal limit that is inconsistent with federal law. In response, Ameren states that no federal law prohibits granting a modified thermal limit. In fact, the authority for granting alternate thermal limits is derived from the Clean Water Act ("CWA"). 33 U.S.C. § 1251 *et seq.* The CWA establishes a national goal eliminating discharges of pollutants into navigable waters by 1985, and includes heat as a pollutant. 33 U.S.C. § 1251(a)(1); 33 U.S.C. § 1362(6). Congress recognized, however, "that a basic technological approach to water quality control could not be applied in the

same manner to discharge of heat as to other pollutants since the temporary localized effects of thermal discharges might, in certain instances, be beneficial.” Appalachian Power Co. et al. v. Train, 545 F.2d 1351 (4th Cir. 1976). For this reason, Congress included the variance provision of §316(a) of the CWA for thermal discharges from point sources. Accordingly, any review of a modified thermal limit must consider Congress’ recognition of heat as a unique pollutant and express provision for alternate thermal limits in the CWA.

Contrary to PRN’s assertions, the record shows that Ameren has demonstrated that Coffeen Lake will provide conditions capable of supporting shellfish, fish and wildlife. Any standard different from that provided in the Board rules must undergo the notice and comment requirements of a rulemaking proceeding.

C. Ms. Joyce Blumenshine – Public Comment #3

In PC #3, Joyce Blumenshine asks the Board to deny the requested relief, stating that if the climate continues to warm, Ameren could be back for additional regulatory relief and questioning whether there will continue to be adequate water resources for the operation of the power plant. Ms. Blumenshine also inquires how the proposed longwall mining might impact water levels of the McDavid Branch Creek. Again, the record does not contain any facts with which to address this inquiry. Ms. Blumenshine finally raises the issue of “why such large companies should not be required to come up with better solutions to problems [than] what Ameren is requesting in this case.” PC#3 at 2. If granted by the Board, the requested relief will not allow Ameren to realize a profit at the cost of the environment.

As amply supported by the record, Ameren has incurred tens of millions of dollars to address the thermal component of the discharge from Coffeen Power Station. Throughout this petition, the Company has shown that expending tens of millions more will not provide benefits

commensurate with the cost of installing supplemental cooling technologies when conditions in the lake will continue to support a healthy and diverse biological community under the requested relief.

The modified thermal limits for the months of May and October merely allow Ameren to avoid having to de-rate during the months of May and October at a loss to the facility or the economic losses associated with constructing the helper cooling tower. The requested relief also mitigates the losses in net generation that will accompany the operation of pollution control equipment Ameren is required to install over the next few years.

D. Ms. Mary Ellen DeClue – Public Comment #4

Ms. DeClue asked at hearing whether Ameren could implement aeration to address oxygen levels in Coffeen Lake. Tr. at 251. Ameren notes that in 2007, the Company began experimenting with solar-powered aerators, known as “solar bees,” which stimulate circulation of water within the perched cooling basin from lower depths to the surface. Ameren intends to continue using the solar bees in the cooling basin of Coffeen Lake to mix and cool the water, thereby enhancing heat dissipation within Coffeen Lake.

Regarding Ms. DeClue’s question about the reference to 5 mg/L dissolved oxygen (Tr. at 252), Ameren responds that the choice of 5mg/L as a reference for the epilimnetic content of dissolved oxygen was used because that concentration is considered indicative of good water quality and conducive to the well-being of aquatic organisms. This concentration is frequently used as a water quality standard. In Illinois, the dissolved oxygen concentration standard for the epilimnion of stratified lakes and reservoirs ranges from 3.5 to 6 mg/L depending on the seasonal period and the measurement method (*e.g.*, minimum or time-averaged mean). At 90°F, 5 mg/L represents a 70 percent saturation level for dissolved oxygen.

Ms. DeClue's written comment raises issues such as the Deer Run Mine and a suggestion to pursue alternative energy. Though there are not sufficient facts in the record to address many of Mary Ellen DeClue's comments in PC#4, Ameren does respond to her comments about whether Coffeen Lake is capable of supporting the Coffeen Power Station cooling demands presently and in the future. Fortunately, Ameren has the unique benefit of reviewing many years of empirical data showing that Coffeen Lake presently receives Ameren's thermal effluent while simultaneously providing conditions capable of supporting shellfish, fish and wildlife. Further, studies show that Coffeen Lake will continue to be able to support Ameren's cooling demands while providing adequate suitable conditions even under the requested relief.

VI. CONCLUSION

Ameren has addressed in detail in the Petition and exhibits, and at public hearing, all of the requirements of an artificial cooling lake demonstration. Two experts, Dr. Shortelle and Dr. McLaren, have offered opinions in this proceeding. Both of these outside experts testified in favor of the Petition and provided the Board and the Agency the opportunity to address the issues and any questions that may have remained after their technical reviews of the data and analysis of Coffeen Lake.

The Agency's position with regard to Ameren's Petition has been inconclusive at best. The Agency recommended denying the Petition claiming that Ameren had failed to address certain issues directly related to the burden of proof in an artificial cooling lake demonstration. The Agency, however, made no effort to rebut the evidence presented by Ameren and chose not to pre-file testimony or present any witnesses or data at hearing .

Ameren seeks permanent relief from the current standards for the months of May and October. The request seeks to apply an intermediate average during those shoulder months to allow for a more gradual transition between currently applicable summer and winter thermal

limits. Although there is no maximum temperature in Ameren's current or proposed thermal limits, there is an effective limit built into the monthly average and percent of excursion hours. All high temperatures are factored into the monthly average and the higher the excursion hour temperatures, the more Ameren must compensate by operating to discharge at lower temperatures throughout the rest of the month. *See* Tr. at 101, 104-05, 106. The monthly average is Ameren's limiting factor. For this reason, Ameren is seeking relief in the form of an intermediate average for the months of May and October rather than seeking additional excursion hours to apply to the winter regime temperature limits.

The record amply supports the finding that Coffeen Lake will continue to provide conditions capable of supporting shellfish, fish and wildlife under the requested modified thermal limits for May and October. The record also demonstrates the wealth of recreational uses that Coffeen Lake supports and can continue to support under the requested relief. The record contains no evidence to dispute these facts and predictions.

The record also shows that the requested modified thermal limits for May and October is the only economically reasonable and technically feasible option for Ameren. Ameren cannot afford to do nothing, nor are any of the supplemental cooling technologies economically reasonable given their high costs when compared to the minimal environmental impact, if any, of operating under the requested relief. Again, the record contains no evidence to the contrary.

Should the Board grant Ameren's request for relief, Ameren would renew its commitment to continue monitoring Coffeen Lake for fish mortality and to continue to manage Coffeen Lake at all times utilizing best management practices. In addition, as provided in the draft MOU Ameren submitted in its Response to Information Requested During Public Hearing, Ameren would also agree to conduct studies in conjunction with IDNR to monitor the status of

key fish populations in the lake and document the long-term effects, if any, of the revised thermal limits for the months of May and October on these populations. The studies would also investigate the ability of fish to avoid exposure to stress by seeking preferred temperatures within the Lake's environment and will locate available thermal refuges during peak temperatures. Ameren intends to retain Dr. Heidinger, the author of the SIUC reports, to conduct such studies. The years of historical data on the thermal effects on key fish species and habitat in Coffeen Lake have been a valuable tool for the status of this waterbody, and the potential continued studies on the effects of the requested limits would further add to their value.

Illustrating Ameren's commitment to implement best management practices at Coffeen Lake, Ameren would agree to modify the requested thermal limit language as follows:

- (A) *The thermal discharge to Coffeen Lake from Ameren Energy Generating Company's Coffeen Power Station shall not result in a temperature, measured at the outside edge of the mixing zone in Coffeen Lake, which:*
1. *Exceeds 105 degrees Fahrenheit as a monthly average, from June through September, and a 112 degrees Fahrenheit as a maximum for more than three percent of the hours during that same period.*
 2. *Exceeds 89 degrees Fahrenheit as a monthly average, from November through April, and 94 degrees Fahrenheit as a maximum for more than two percent of the hours during that same period.*
 3. *Exceeds 96 degrees Fahrenheit as a monthly average, in each of the months of May and October, and 102 degrees Fahrenheit as a maximum for more than two percent of the hours in each of those same months.*
- (B) *Ameren and IDNR will monitor Coffeen Lake during the period May through October for fish mortality. In the event excessive fish mortality occurs during these months, Ameren shall implement appropriate mitigation measures including the following:*
1. *Immediately notify the IDNR;*

2. *Maximize operation of the cooling basin and existing cooling towers to reduce thermal temperatures;*
3. *Make operational revisions to the station's typical dispatch order (e.g. "last on and first off");*
4. *Reduce nighttime capacity factors;*
5. *Monitor intake and discharge temperatures and visually inspect intake and discharge areas; and*
6. *No later than November 15 of each year, document mitigation measures taken employed during periods of excessive fish mortality.*

WHEREFORE, Ameren respectfully requests that the Pollution Control Board grant the requested modified thermal limit, as set forth in the Petition and subject to the conditions provided in this section.

Respectfully submitted,

AMEREN ENERGY GENERATING
COMPANY

by:



One of Its Attorneys

Dated: August 13, 2009

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