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037ER

April 18, 2001

Certified Mail –
Return Receipt Requested

Mr. Roger Calloway
WWCMU Manager
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276 CAS19
Springfield, Illinois 62794-9276

Subject: Report on December, 2000 Clinton Lake Fish Kill

Dear Mr. Calloway:

In accordance with your April 2, 2001 telephone request, attached is a summary of the December, 2000 fish kill that occurred at the Clinton Power Station (CPS).

On January 23, 2001, the Illinois Department of Natural Resources (IDNR) District 10 Fisheries Manager notified the CPS Midwest Regional Operating Group (MWROG) of a reported fish kill on Clinton Lake in the vicinity of the Route 48 bridge that is located upstream from the discharge flume for CPS. IDNR had been made aware of the fish kill from a local fisherman. Consistent with IDNR reporting policy, IDNR also notified the Illinois Environmental Protection Agency (IEPA) Office of Emergency Response of the fish kill. On January 24, 2001, the CPS Environmental Staff, the Exelon Corporation MWROG, IDNR, and IEPA personnel began investigating the cause of the fish kill.

On January 29, 2001, representatives from the IEPA and the IDNR, in conjunction with the CPS Environmental Staff and the MWROG, concluded that the fish most likely died from cold shock following a reactor scram that occurred at CPS on December 18, 2000. The predominant species of fish involved were those attracted to the warm current where the CPS discharge canal enters the Clinton Lake. The attached table shows the approximate number and species of fish that were killed. These fish would have experienced the greatest thermal shock. Although approximately 7,000 fish were killed, the predominant species were rough fish including buffalo, shad, freshwater drum, and quillback. The number of fish killed are small in comparison to the total fish population in Clinton Lake and did not have a significant impact on the overall fish population in the lake.

On December 18, 2000, CPS was in Mode 1, at 100 percent reactor power. The plant had been running for over 30 days with a flume discharge temperature of between 59 and 73 degrees Fahrenheit. At about 1329 hours, while performing surveillance testing of the Division 2 Main Steam Line Tunnel Leak Detection System, a Group 1 Containment Isolation occurred. The Group 1 Isolation caused the Main Steam Isolation Valves (MSIVs) and main steam line drain valves to automatically close, resulting in an automatic scram. Subsequent to the reactor scram, because the MSIVs were closed, decay heat was removed through the suppression pool instead of the main condenser and discharge flume to Clinton Lake. With the sudden loss of heat input into the discharge flume, a rapid drop in lake temperature in the vicinity of the flume discharge occurred. This rapid drop in temperature was the most likely cause of the fish kill.

A historical review of scrams occurring at CPS during winter months did not reveal any other fish kills caused by thermally shocking fish in the vicinity of the discharge flume.

If you have any questions or if you should require additional information, please call me at (630) 663-5128.

Sincerely,

John R. Petro
Environmental Manager
Exelon
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Species	Approximate Number	Percentage of Total
Buffalo	3459	49.4%
Gizzard Shad	800	11.4%
Freshwater Drum	750	10.7%
Quillback	670	9.5%
White Bass	340	4.8%
Crappie	285	4.0%
Hybrid Striped Bass	245	3.5%
Flathead Catfish	155	2.2%
Channel Catfish	85	1.2%
Striped Bass	85	1.2%
Walleye	60	< 1%
Carp	50	< 1%
Largemouth bass	10	< 1%
Bluegill	6	< 1%
TOTAL	**7,000**	**100.0**

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ATTACHMENT A
Response to Request for Additional
Information Related to Cold Shock at Clinton Power Station

Question 1
Please provide the following background information on the December 2000 Cold-Shock Fish Kill Event.

a. Date when you received notification of the fish kill.
b. How were you notified of the fish kill?
c. What group or agency lead the investigation into the cause of the fish kill and identified the moribund fish? When was the identification of the moribund fish performed?
d. *How was the fish kill quantified and describe the method(s) used.*

Response 1
a. On January 23, 2001, Exelon Mid-West Regional Operating Group (MWROG) and Clinton Power Station (CPS) were notified of the fish kill.
b. The MWROG Environmental Manager was notified of the fish kill by the Illinois Department of Natural Resources (IDNR).
c. In accordance with the CPS Lake Management Agreement, the IDNR has the responsibility to patrol the lake and to conduct an initial assessment of any fish kill. On January 24, 2001, IDNR supported by Illinois Environmental Protection Agency (IEPA), MWROG Environmental Manager and the CPS environmental staff proceeded to investigate the fish kill. On January 24 and 25, 2001 shoreline surveys were performed by IDNR personnel to identify and quantify the number of fish that were killed.
d. The fish kill was quantified by IDNR as part of a shoreline survey.

Question 2
In your Environmental Protection Plan (EPP), it states that non-routine reports shall consist of an evaluation and analysis of the event. Please provide the evaluation and analysis relating to the fish kill event of December 2000.

Response 2
The attached non-routine report provides the results of the evaluation and analysis of the December 2000 fish kill event.

Question 3
What was the basis for the conclusion that the 2000 cold shock event did not have a significant impact on the total reservoir fish population?

Response 3
Although 7,000 fish were lost the total number and types of fish lost do not constitute a significant loss to the remaining fish community in Clinton Lake. Over 80% of the fish involved in the kill were rough fish. These rough species are those commonly targeted by fish management practices for removal by commercial fishing operations or other means to increase a lakes carrying capacity of sport fish. The most affected sport fish were white bass, crappie, and striped bass hybrids and the combination of these species represented only 12% of the kill. White crappie and white bass are relatively abundant fish and the loss of 285 and 340 respectively would only have a temporary and localized impact. Striped bass hybrids are not native to Clinton Lake and have been stocked to enhance the recreational fishery. Since these fish do not reproduce, the loss of 245 fish

will have no long-term impact on future populations. Striped bass and their hybrids were stocked with the understanding that although there would likely be losses in years with extreme summer temperatures, they would provide a bonus to the recreational fishery in most years. Each of the remaining species lost comprised less than 2.3% of the total loss.

Question 4

On a species-by-species basis, how does the number of fish killed in the cold-shock event compare with the carrying capacity of the lake? Provide any information by species affected by the cold shock event on the total reservoir populations, either by weight or number of adults from which a comparison can be made of total loses from a cold shock event relative to the population in the reservoir. If specific information is unavailable for the reservoir, can estimates be made by species on the populations based on typical carrying capacity estimates from other reservoirs/lakes in the vicinity?

Response 4

The Clinton Lake fish community has been monitored more intensively than most any reservoir in the state. Species by species estimates of carrying capacity are not widely used in Illinois reservoirs since the capacity can change dramatically with the morphology and habitat availability between reservoirs. Researchers commonly use indices such as catch-per-effort (CPE) to compare relative abundance of species within a community or compare populations between reservoirs.

Although some minor changes may have occurred in the community in the past ten years, the most complete data set on the Clinton Lake fish community is the CPS Environmental Monitoring Program Biological Report that summarizes data from 1983 to 1991. The most frequently observed species in the kill were bigmouth buffalo, gizzard shad, freshwater drum, and quill back. During operational years of 1987 to 1991 the CPE of these four species were, 0.3%, 68%, 1.6% and 1% respectively. Gizzard shad were the only major component of the Clinton Lake fish community. Gizzard shad are the most numerous species in the lake and the primary forage fish. Each winter a large portion of the population is lost due to winter stress and the population rebounds with the spring spawn. The number of gizzard shad lost in the kill was insignificant compared to normal winter mortalities.

Although recent declines in crappie have been noted, the CPE in 1987 to 1991 represented about 7% of the fish community. The 285 crappie lost in the kill represents only a small, localized loss to the population. The striped bass hybrids comprised 0.4% of the CPE during the same time period.

Largemouth bass, bluegill, and carp all constituted from 5 to 8% of the fish community but the small numbers lost in the kill are insignificant to the population. The relative abundance of the remaining species involved in the kill represented only a small portion of the Clinton Lake fish community. Only a fraction of these fish would have been in the immediate vicinity of the discharge canal and impacted by the cold shock.

Question 5

Is there any data, empirical or anecdotal, that suggests the recreational harvest of fish in the reservoir has changed since the cold-shock fish kill incident of December 2000?

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Response 5
There were no creel surveys being conducted on Clinton Lake just prior to or after the fish kill. In past creel surveys, angler harvest of the rough fish lost in the kill were insignificant and comprised less than 1% of the total harvest. The major sport fish involved was the striped bass hybrids and the impact was limited to the loss of several large trophy-sized fish. Striped bass hybrids typically represent less than 1 % of the harvest and the overall population of this stocked fish should not be greatly impacted. The loss of several large flathead catfish again represents the loss of some trophy-sized fish, but is probably not detectable in assessing angler success rates.

Question 6
Since initial start-up, how many plant trips have resulted in the plant heat load being deposited into the suppression pool. Of those trips, how many occurred during the winter months (October through March)?

Response 6
Since initial startup, there have been four plant trips that have resulted in the plant heat load being deposited in the suppression pool. In each event there was a Group 1 isolation which included closure of the main steam isolation valves. These four scrams took place on July 12, 1988; July 14, 1989; April 9, 1996; and December 18, 2000. Therefore, it has been determined that only one of these events occurred during the winter months and this was the event that was determined to have caused the subject fish kill.

Question 7
What procedures are in place to monitor fish kills due to cold shock?

Response 7
The current agreements in place between IDNR and CPS, provide for the necessary notification and investigation once a fish kill is identified. There are currently no procedures in place that direct plant personnel to monitor for a fish kill following a plant trip that results in the potential for cold shock to the fish population.

Question 8
Are there plans to institute procedures to better assess the effect of future fish kills?

Response 8
CPS will provide appropriate procedural guidance to plant staff to promptly identify and initiate evaluation of potential cold shock impact to the fish population of Clinton Lake as the result of a reactor scram during cold weather periods. This action will be complete by 10/1/02.

Question 9
Explain whether a 20% increase in power would correlate into a 20% increase in fish mortality observed in the December fish kill under a similar plant trip scenario.

Response 9
There is not a linear correlation between changes in power and changes in fish mortality. A 20% increase in power is unlikely to lead to a 20% increase in fish mortality under the same scenario associated with the December 2000 fish kill. Although there may be a 20

% increase in heat leaving the plant there would also be a greater temperature gradient between the discharge water and the air temperature which results in more heat loss as the water travels down the 3.1 mile discharge canal. When the water reaches the lake the greater buoyancy of the warmer water keeps it near the surface and in contact with the much cooler air temperatures. As a result, the area of the lake with elevated temperatures will not be increased by 20%. The fish that suffered mortality were likely in the immediate vicinity of the drop structure and had acclimated to the warmer temperatures. Therefore, these fish were unable to tolerate the rapid drop in temperature when the plant tripped. Had these same fish been acclimated to a higher temperature they would have still suffered the same fate. If the plant had been operating at a 20% higher power level in December 2000 and tripped under the same scenario, the number of fish killed could have been greater. However, it is unlikely that mortality would have increased by 20 % or that it would have been a significant increase over what occurred for the reasons described above.

Question 10
Could the higher water temperature and the larger area of influence result in a significantly larger fish kill given a plant trip scenario similar to that of December 2000?

Response 10
As described in response to question 9, it is unlikely that the area of influence, or elevated water temperatures would result is a significantly larger fish kill than in December of 2000.

Question 11
What is the basis for the conclusion that an approximately 20 percent increase in plant heat rejection to the receiving waters would not result in an unacceptable impact?

Response 11
In August of 1993 the Illinois Pollution Control Board granted Clinton Power Station a Site Specific Rule for thermal discharges into Clinton Lake. The petition for this Site Specific Rule contained extensive documentation on the potential impacts of the requested thermal limit on aquatic life in Clinton Lake. The Illinois Pollution Control Board concluded that the thermal limits in the Site Specific Rule would provide adequate protection for aquatic life. This Site Specific Rule is incorporated as the thermal limit in the current NPDES Permit. With the proposed power uprate, the Clinton Power Station must still comply with those limits that were designed to protect aquatic life.

As stated in the CPS Environmental Report for Extended Power Uprate, the plant will continue to be operated in compliance with the established limitations of the NPDES permit. Consequently, the evaluations on the impact to the lake remain unchanged.