Bayshore Power Plant: Impingement and Entrainment

On Tuesday, October 27th, Division of Surface Water (DSW) staff and a representative of ODNR's Division of Wildlife met with representatives of First Energy Corporation to discuss options for reducing impingement and entrainment (I&E) of fish at the Bayshore Power Plant's cooling water intake structure. DSW staff presented the following proposal for reducing I&E:

- Install a technology (e.g., a wedge wire screen or Ristroph screens) which will reduce impingement by approximately 90 percent from present levels;
- Shut down three of the four operating units during the critical spring spawning period (e.g., March through May) to reduce entrainment; and
- Re-rout the trough which contains fish washed off the traveling screens, from the thermal discharge canal to another location so that the sudden change in temperature does not compromise the survivability of the fish.

We also stated that cooling towers could be installed to reduce both I&E, and address potential thermal issues associated with the cooling water discharge. First Energy representatives expressed concerns that we were rushing to impose I&E requirements and being driven by public demands, when: 1) federal rules governing I&E will likely be available in the near future; 2) First Energy has not yet completed their own studies involving options for reducing I&E; and 3) an ongoing study being conducted at University of Toledo will provide information regarding the impact of the Bayshore intake structure operation on the Maumee Bay fishery.

We pointed out that the Clean Water Act which requires all cooling water intakes to use "best technology available" to reduce I&E, and requirements from U.S. EPA are the bases for the inclusion of I&E reduction strategies in the Bayshore Plant NPDES permit renewal at this time. However, the date when final federal rules will be adopted for this issue is unclear – it could be several years. Furthermore, given the large numbers of fish annually impinged (46 million) and entrained (2,261 million fish larva and juvenile fish) at this facility, we believe that moving forward to reduce I&E is important. While the Bayshore Plant's impact on the Maumee Bay fishery is undetermined, the fish catch in Lake Erie the last couple of years has not been encouraging for the most important sport fish species. The University of Toledo study should provide valuable information, but federal rule requirements (when adopted) will most likely be based upon achieving a certain level of I&E reduction, and not upon estimates of a facility's impact to the fish resource.

We believe that our proposal is reasonable and allows considerable flexibility to the company. DSW conveyed to First Energy representatives throughout the meeting our willingness to work with them to develop a set of requirements which will be acceptable to both Ohio EPA and the company. First Energy agreed to contact us within two to three weeks with a response to our proposal, and perhaps to present an alternative proposal. Our hope is to have the Bayshore draft permit public noticed before the end of 2009.

Meeting with First Energy: Bayshore Power Plant

First Energy Corporation representatives have requested a meeting with Division of Surface Water (DSW) staff as a follow-up to a meeting held on October 19th regarding options for reducing fish impingement and entrainment (I&E) at the Bayshore Power Plant located in Maumee Bay. During the October 19th meeting, DSW staff proposed strategies for reducing I&E at the intake structure for Bayshore. The follow-up meeting scheduled for November 13th will be an opportunity for First Energy representatives to respond our proposals and questions, and perhaps present alternative options for reducing I&E.

Meeting with First Energy: Bayshore Power Plant

Division of Surface Water (DSW) staff met with First Energy Corporation representatives on November 13th as a follow-up to a meeting held on October 19th regarding options for reducing fish impingement and entrainment (I&E) at the Bayshore Power Plant located in Maumee Bay. In response to DSW suggestions for I&E reduction offered at the previous meeting, First Energy representatives reported the following:

- One out of nine traveling screens at the intake structure will be replaced by January 2010 to reduce impingement. The performance of this screen will be evaluated to determine if replacement of additional screens is warranted.
- Modeling studies evaluating options for I&E reduction will be completed by the end of December 2009, and results will be made available at that time.
- A pilot study at Bayshore, involving small-scale implementation of modeling studies results will be initiated in the spring of 2010.
- First Energy stated that any permit condition requiring the shutdown (or reduced usage) of generating units during the time period critical for spawning is not an option. (DSW had proposed this option in the previous meeting as a low capital cost alternative for entrainment reduction.)

First Energy also agreed to investigate the impact of dumping the fish that are washed from the traveling screens into the heated once-through cooling water discharge, although the company continues to believe that this action does not reduce fish survival rates.

After considerable discussion, First Energy representatives agreed in concept to move forward towards the development of a draft NPDES permit which will include a compliance schedule with the following elements:

- Submittal of a plan which includes a number of strategies or activities for reducing I&E at the facility;
- Goals or targets for I&E reduction which will likely be based upon the national performance standards in the federal rules that have been suspended;
- Submittal of detailed plans for construction, if necessary;
- Completion of implementation within 3 to 4 years; and
- A permit re-opener for modifying the compliance schedule in the event that the revised federal rules are proposed during the summer of 2010, and the compliance schedule is inconsistent with the requirements in the proposed rules.

First Energy plans to send DSW a letter by mid-December identifying in greater detail the actions it proposes for I&E reduction and timelines that the company believes are acceptable for inclusion in the compliance schedule. DSW staff will use this information to develop a proposed compliance schedule and may share the proposed schedule with First Energy prior to public noticing a draft permit. We would hope to public notice a draft permit sometime in late winter / early spring of 2010.

Background

Bayshore Power Plant: Impingement and Entrainment

The Bayshore Power Plant is located at the mouth of the Maumee River in Maumee Bay. This facility withdraws approximately 640 million gallons of water each day from the Maumee River for cooling purposes, and discharges that heated water back into the Bay.

The NPDES permit for Bayshore is currently expired and needs to be renewed. One of the issues that Ohio EPA is required to address through the NPDES permit renewal for Bayshore is impingement/entrainment (I/E) of fish at the cooling water intake.

Magnitude of Impingement and Entrainment

First Energy recently conducted studies to determine the numbers of fish impinged and entrained in order to comply with federal water intake rules adopted in 2004. Each year, it is projected that the Bayshore Power Plant impinges approximately 46 million fish against their 3/8 inch opening traveling screens. Approximately 2.261 billion fish larva and juvenile fish are also entrained (and likely killed) as they pass through the screens and into the condenser units at this facility.

Included in the above numbers are walleye and yellow perch. Bayshore impinges approximately 200,000 walleye and yellow perch each year. An additional 12 million walleye and yellow perch larvae each year pass through the screens and are entrained (and likely killed) through the condenser units. Most of the impacts to walleye and perch occur in the spring months, mid-March through May.

Attached is a Table showing the total numbers of fish/larvae by species estimated to be impinged/entrained at Bayshore annually.

Impacts on Fishery

Bayshore is in a unique location at the mouth of the Maumee River with resulting I/E impacts that we don't see at other power plants in Ohio. Even though these are large I/E numbers, the impact is difficult to quantify in terms of it's overall impact on the fishery. Many variables can affect the fishery including river flow, pollution and weather patterns. In addition, even though large numbers of larvae entrained, the survival rates of larvae in the natural environment are low.

While the Bayshore Plant's impact on the Maumee Bay fishery is undetermined, the fish catch in Lake Erie the last couple of years has not been encouraging for the most important sport fish species.

Attached is a second Table showing the annual western Lake Erie basin harvest of walleye and yellow perch for 2004 through 2008.

Regulatory Issues

The I/E data collected by Bayshore was mandated by rules adopted in 2004 by U.S. EPA to implement Section 316(b) of the Clean Water Act, however, these rules were suspended in 2007 after a court decision overturned significant provisions of the rules.

Even though the specific federal technology regulations to implement Section 316(b) of the Clean Water Act are being re-written by USEPA, the Clean Water Act still requires Bayshore to employ Best Technology Available (BTA) to reduce I/E. Exactly what is BTA would be determined by the permitting authority (Ohio EPA) using their Best Professional Judgement. Implementation of BTA must be part of the NPDES renewal. There is no firm deadline for revised federal rules, although USEPA is expecting to come out with draft revised rules sometime in 2010.

Under the Clean Water Act, federal rule requirements (when adopted) will most likely be based upon installing what is the best currently available technology and will not be based upon estimates of a facility's impact to the fish resource.

To date, the Bayshore facility uses only the most basic technology (3/8 inch traveling screens) to reduce impingement, and has no controls to reduce entrainment.

Outreach

Local citizens, bait shops and environmental groups have raised concerns about the numbers of sport fish entrained/impinged for many years. Meetings have been held with these groups. Congresswoman Marcy Kaptur and the AGO have also been involved in some of these meetings. On March 3rd, 2009, Ohio EPA held a public meeting in Oregon, Ohio to discuss the renewal of the NPDES permit for the Bayshore Power Plant and the water intake issues. The meeting was attended by approximately 90 citizens and the local press. Ohio EPA and First Energy gave formal presentations and took questions at the meeting.

Ohio EPA Proposal to First Energy

On Tuesday, October 27th, Ohio EPA staff met with representatives of First Energy Corporation to discuss options for reducing I&E of fish at the Bayshore Power Plant's cooling water intake structure. ODNR also participated by phone. Ohio EPA presented the following proposal for reducing I&E:

- Install a technology (e.g., a wedge wire screen or Ristroph screens) which will reduce impingement by approximately 90 percent from present levels;
- Provide seasonal shut down of three of the four operating units during the critical spring spawning period (e.g., mid-March through May) to reduce entrainment and impingement.

The installation of screening technology (the first bullet item above) to deal with impingement is something Bayshore has been investigating over the past year. Ohio EPA conveyed to First Energy a willingness to work with Bayshore on a schedule and selection of technology that is cost effective and takes into account the schedule for the new federal regulations.

In regards to the second bullet above dealing with entrainment and impingement, Ohio EPA conveyed that it did not appear that a seasonal shutdown of three of the four units would impose an undue burden on First Energy. The Bayshore Plant operated only one of the four units (the unit that burns Petcoke from the adjacent BP-Husky Refinery) this past spring. First Energy has conveyed to Ohio EPA that summer is when the peak demand period occurs for power generation, and that spring is typically a lower demand period when units are scheduled for maintenance. In addition, several other First Energy Plants - Lakeshore and Ashtabula continue to operate at significant reduced levels as well. These units could possibly be used in lieu of Bayshore during the spring months.

From an environmental perspective, use of the other First Energy plants that don't have the same intake issues during the spring migration period is a preferable alternative that, at a minimum, would be BTA. In addition, modifying the operation of the facility would not impose any capital expenditures on the company while federal regulations are under development.

First Energy representatives expressed concerns that Ohio EPA was rushing to impose I&E requirements and being driven by public demands, when: 1) federal rules governing I&E will likely be available in the near future; 2) First Energy has not yet completed their own studies involving options for reducing I&E; and 3) an ongoing study being conducted at University of Toledo will provide information regarding the impact of the Bayshore intake structure operation on the Maumee Bay fishery.

Given the uncertain timeline for adoption of the federal regulations, the significant numbers of fish impacted and the uncertain impact of the I/E on this important fishery, Ohio EPA feels it is important to move forward with the NPDES permit and strategies to reduce the I/E.

Ohio EPA conveyed to First Energy representatives throughout the meeting a willingness to work with them to develop a set of requirements which will be acceptable to Ohio EPA, ODNR, and the company. First Energy indicated they will discuss this proposal with their upper management and agreed to contact Ohio EPA within two to three weeks with a response to this proposal, and perhaps to present an alternative proposal.

Numbers of Larvae and Juvenile Fish Estimated to be Entrained and Numbers of Fish Impinged on an Annual Basis

Species	No. Larvae Entrained	No. Juveniles Entrained	No. Fish Impinged
Freshwater Drum	978 Million	156 Thousand	226 Thousand
Rainbow Smelt/Clupeidae	536 Million	4.4 Million	
Unidentifiable	466 Million		
Morone sp.	138 Million		
Emerald Shiner	19 Million	4 Million	24 Million
White Bass	17.8 Million	1.1 Million	1.6 Million
Walleye	8.2 Million	0.7 Million	78 Thousand
Yellow Perch	3.2 Million	----------	123 Thousand
Percidae	2.3 Million		
Carp	2.1 Million		
Walleye/Yellow Perch	512 Thousand	----------	

Total Western Basin Harvest Numbers Walleye and Pounds Perch Ohio, Ontario, and Michigan Sport and Commercial Fisheries

Year	Walleye , Total Number	Perch, Total Pounds
2004	664 Thousand	2.9 Million
2005	438 Thousand	2.5 Million
2006	1.53 Million	2.4 Million
2007	1.61 Million	1.8 Million
2008	943 Thousand	1.0 Million