BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
WATER QUALITY STANDARDS AND	)	R08-9
EFFLUENT LIMITATIONS FOR THE	)	(Rulemaking – Water)
CHICAGO AREA WATERWAY SYSTEM	)	
AND LOWER DES PLAINES RIVER	)	
PROPOSED AMENDMENTS TO 35 ILL.	)	
ADM. CODE 301, 302, 303, and 304	)	

NOTICE OF FILING

TO:

John Therriault, Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

Marie Tipsord, Hearing Officer
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

Deborah J. Williams, Assistant Counsel
Stefanie N. Diers, Assistant Counsel
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Persons included on the attached
SERVICE LIST

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Pollution Control Board PRE-FILED TESTIMONY OF JULIA WOZNIAK, by Midwest Generation, a copy of which is herewith served upon you.

MIDWEST GENERATION, L.L.C.

Susan M. Franzetti

Date: August 4, 2008

Susan M. Franzetti
Nijman Franzetti LLP
10 S. LaSalle St., Suite 3600
Chicago, IL 60603
(312) 251-5590 (phone)
(312) 251- 4610 (fax)

Kristy A. N. Bulleit
Brent Fewell
Hunton & Williams, LLP
1900 K. Street, NW
Washington, DC 20006
(202) 855-1500 (phone)
(202) 778-7411 (fax)

CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 4th day of August, 2008, I have served electronically the attached PRE-FILED TESTIMONY OF JULIA WOZNIAK, by Midwest Generation, and NOTICE OF FILING upon the following persons:

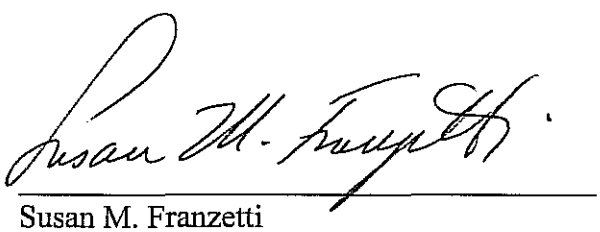
John Therriault, Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

Marie Tipsord, Hearing Officer
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

and by U.S. Mail, first class postage prepaid, to the following persons:

Deborah J. Williams, Assistant Counsel
Stefanie N. Diers, Assistant Counsel
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

The participants listed on the attached
SERVICE LIST



Susan M. Franzetti

SERVICE LIST

Frederick M. Feldman
Ronald M. Hill
Margaret T. Conway
Metropolitan Water Reclamation District
of Greater Chicago
111 East Erie Street
Chicago, IL 60611

Matthew Dunn, Chief
Environmental Bureau
Office of the Attorney General
100 West Randolph, 12th Floor
Chicago, IL 60601

Bill Richardson, Chief Legal Counsel
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271

Ann Alexander
Natural Resources Defense Counsel
101 N. Wacker Dr., Ste. 609
Chicago, IL 60606

Keith Harley
Elizabeth Schenkier
Chicago Legal Clinic, Inc.
205 West Monroe, 4th Floor
Chicago, IL 60606

Thomas V. Skinner
Thomas W. Dimond
Kevin Desharnais
Jennifer A. Simon
Mayer Brown LLP
71 South Wacker Drive
Chicago, Illinois 60606-4637

Katherine D. Hodge
Monica T. Rios
Hodge Dwyer Zeman
3150 Roland Avenue
P.O. Box 5776
Springfield, IL 62705-5776

Albert Ettinger
Jessica Dexter
Environmental Law & Policy Center
35 E. Wacker Dr., Suite 1300
Chicago, IL 60601

Richard Kissel
Roy Harsch
DrinkerBiddle
191 N. Wacker Dr., Suite 3700
Chicago, IL 60606-1698

Lisa Frede
Chemical Industry Council of Illinois
1400 E. Touhy Ave., Suite 110
Des Plaines, IL 60018

Claire Manning
Brown Hay& Stephens LLP
700 First Mercantile Bank Bldg
205 S. Fifth St
Springfield, IL 62705-2459

Charles Wesselhoft
James Harrington
Ross& Hardies
150 N. Michigan Ave
Chicago, IL 60601-7567

Frederick Keady
Vermillion Coal Company
1979 Jolms Drive
Glenview, IL 60025

Fred L. Hubbard
P.O. Box 12
16 West Madison
Danville, IL 61834

Georgia Vlahos
Naval Training Center
2601A Paul Jones St
Great Lakes, IL 60088-2845

W.C. Blanton
Blackwell Sanders LLP
4801 Main St, Suite 1000
Kansas City, MO 64112

Jerry Paulsen
Cindy Skukrud
McHenry County Defenders
132 Cass Street
Woodstock, IL 60098

Kay Anderson
American Bottoms
One American Bottoms Road
Sauget, IL 62201

Robert VanGyseghem
City of Geneva
1800 South St
Geneva, IL 60134-2203

Fredric Andes
Erika Powers
Bames & Thornburg
1 North Wacker Dr
Suite 4400
Chicago, IL 60606

Bernard Sawyer
Thomas Granto
Metropolitan Water Reclamation District
6001 W. Pershing Rd
Cicero, IL 60650-4112

Jack Darin
Sierra Club
70 E. Lake St
Chicago, IL 60601-7447

Marc Miller
Jamie S. Caston
Office of Lt. Governor Pat Quinn
Room 414 State House
Springfield, IL 62706

Tom Muth
Fox Metro Water Reclamation District
628 State Route 31
Oswego, IL 60543

Bob Carter
Bloomington Normal Water Reclamation
PO Box 3307
Bloomington, IL 61702-3307

Vicky McKinley
Evanston Environmental Board
223 Grey Avenue
Evanston, IL 60202

Kenneth W. Liss
Andrews Environmental Engineering
3300 Ginger Creek Drive
Springfield, IL 62711

James L. Daugherty
Thorn Creek Basin Sanitary District
700 West End Avenue
Chicago Heights, IL 60411

Jeffrey C. Fort
Ariel J. Tesher
Sonnenschein Nath & Rosenthal LLP
7800 Sears Tower, 233 S. Wacker Drive
Chicago, IL 60606-6404

Tracy Elzemeyer
American Water Company
727 Craig Road
St. Louis, MO 63141

Irwin Polls
Ecological Monitoring and Assessment
3206 Maple Leaf Drive
Glenview, IL 60025

Dr. Thomas J. Murphy
2325 N. Clifton St
Chicago, IL 60614

Stacy Meyers-Glen
Openlands
Suite 1650
25 East Washington
Chicago, IL 60602

James Huff
Huff & Huff, Inc.
915 Harger Road, Suite 330
Oak Brook, IL 60523

Susan Hedman
Andrew Armstrong
Environmental Counsel
Environmental Bureau
Suite 1800
69 West Washington Street
Chicago, IL 60602

Traci Barkley
Prairie Rivers Networks
1902 Fox Drive, Suite 6
Champaign, IL 61820

Cathy Hudzik
City of Chicago
Mayor's Office of Intergovernmental Affairs
121 North LaSalle Street, Room 406
Chicago, IL 60602

Sharon Neal
Commonwealth Edison
125 South Clark Street
Chicago, IL 60603

Beth Steinhorn
2021 Timberbrook
Springfield, IL 62702

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
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WATER QUALITY STANDARDS AND	)	
EFFLUENT LIMITATIONS FOR THE	)	R08-9
CHICAGO AREA WATERWAY SYSTEM	)	(Rulemaking - Water)
AND THE LOWER DES PLAINES RIVER:	)	
PROPOSED AMENDMENTS TO 35 Ill.	)	
Adm. Code Parts 301, 302, 303 and 304	)	

PRE-FILED TESTIMONY OF JULIA WOZNIAK

Good morning, my name is Julia Wozniak. I am currently employed as an Environmental Project Manager with Midwest Generation ("MWGen" or "Midwest Generation"). I have worked in the electric power industry since 1982. I have been employed by MWGen since December 1999, and prior to that time, its corporate predecessor, Commonwealth Edison ("ComEd"). My career began with ComEd in the Nuclear Technical Services Group (from 1982 to 1984), and then as a biologist with ComEd and MWGen (from 1984 to present). I have a Bachelor of Science in Environmental Sciences from the University of Illinois.

For the past 24 years (8 years with MWGen and 16 years with ComEd), I have been directly involved in overseeing, coordinating and implementing water quality related biological and physicochemical monitoring and analytical sampling activities for all Midwest Generation facilities, modeling the complex thermo-hydrodynamics of power plant and waterway interactions, and participating actively in state and federal policy and rulemakings. I am responsible for overseeing thermal compliance monitoring and developing and running complex models that are used to optimize station loads during critical generation periods, while maintaining environmental compliance.

My testimony will focus on the following areas: (1) providing an overview of MWGen's generating stations along the Chicago Area Waterways (CAWS) and the Lower Des Plaines River ("LDP"), (2) describing the existing thermal water quality standards applicable to MWGen, (3) describing the procedures used by MWGen to achieve compliance with existing thermal water quality standards, and (4) describing MWGen's active involvement in the public participation process related to the Illinois Environmental Protection Agency's ("IEPA") Proposed UAA Rules.

Midwest Generation's UIW Stations

MWGen is an independent power producer that owns and operates seven electric generating stations in Illinois and one in western Pennsylvania. MWGen has the generating capacity to provide electricity to more than eight million households. As depicted on Attachment 1, Five of MWGen's stations (Fisk, Crawford, Will County, Joliet 6 and Joliet 7&8) are located along and discharge heated water into the Upper Illinois Waterway ("UIW"), although only the Fisk, Crawford, and Will County stations are located along the CAWS. With the exception of Joliet 7&8, which began operations in 1966, the other stations have been in operation since the mid- to late-1950s. Collectively, these five facilities employ over 600 individuals and have a generating capacity of a little over 3,500 gross megawatts of electricity.

MWGen Chicago Area Waterway Facilities

The generating units at each of MWGen's CAWS Stations are coal-fired, and each utilizes an open cycle, once-through condenser cooling system. The MWGen Stations are steam-electric generating process that require the use of large volumes of surface water. For open cycle, once-through cooling, water from a lake, river or canal enters the plant, is circulated through the station's condensers to cool steam produced by the electric generating process, and

then is discharged directly back into the same receiving waterbody from which it was taken at a higher temperature. The Fisk station is located on the South Branch of the Chicago River near downtown Chicago, just upstream of the South Fork and the confluence with the Chicago Sanitary and Ship Canal ("CSSC") at River Mile 322. Fisk is a one-unit steam electric generating facility capable of producing 342 megawatts of electricity, with a design circulating water flow rate of approximately 324 million gallons per day ("MGD"). The Crawford station is located in Chicago near the intersection of the Stevenson Expressway and Pulaski Avenue at River Mile 318.5 on the CSSC. Crawford is a two-unit steam electric generating facility which is capable of producing 581 megawatts of electricity, with a design circulating flow rate of approximately 585 MGD. The Will County station is located in Romeoville at River Mile 295.5, and is a four-unit steam electric facility with a 1154 megawatt capacity and a design circulating water flow rate of approximately 1292 MGD.

The three CAWS facilities (Fisk, Crawford and Will) are designed and operated with open-cycle, once through cooling system technology, and engineered so that the maximum temperature rise for cooling water discharge is 12.2°F, 12.0°F, and 11.1°F, respectively. In contrast to the Joliet stations, none of the CAWS located stations is equipped with cooling towers.

MWGen Lower Des Plaines River Facilities (a/k/a "Joliet Facilities")

MWGen's Joliet Facilities, located in Will County, consist of two separate generating stations, (1) Unit 6 along the east bank of the river and (2) Units 7&8 along the west bank. All three units are located approximately one mile southwest of the City of Joliet, adjacent to the Lower Des Plaines River in the Upper Dresden Pool ("UDP"). Both Joliet 6 and Joliet 7&8 are steam electric coal-fired generating facilities, and utilize open-cycle once through cooling

systems. Both thermal discharges from the Joliet facilities flow into the Des Plaines River within the approximately one mile segment downstream of the Brandon Road Lock and Dam, (between River Miles 285 and 284), which is about seven miles upstream from the I-55 Bridge.

Unit 6 is capable of producing 341 megawatts of electricity and has a design circulating water flow rate of approximately 376 MGD. The design maximum temperature rise in the circulating cooling water is approximately 10.7°F. Unit 6 has been in operation since 1959. Units 7&8 are capable of producing approximately 1100 megawatts, with a design circulating water flow rate of approximately 1325 MGD. The design maximum temperature rise in the circulating cooling water is approximately 12.4°F.

Joliet Facilities – Units 7&8 Cooling Towers

The cooling towers for Units 7&8 were voluntarily installed in 1999 at a cost of approximately $23,000,000 (1999 dollars), with ongoing annual operating costs of $300,000 (2008 dollars). These costs do not include the cost of station labor associated with the operation and maintenance of the cooling towers. The annual costs reflect the fact that the towers are used on an as-needed basis and run an average of about 46 days per year (2003-2007)). They are "helper cooling towers" which are not designed for long-term, continuous runs. They are capable of cooling approximately one-third of Units 7&8's total design discharge. The purpose of the towers is to minimize potential thermal impacts to the river ecosystem and maintain compliance with existing thermal water quality standards, while optimizing MWGen's ability to produce needed power during critical weather conditions.

The towers are currently used primarily to maintain compliance with existing far-field adjusted thermal water quality standards that apply at the I-55 Bridge, pursuant to the terms of the Adjusted Standard issued by the Board in AS 96-10, as further discussed below. The towers

are also used to meet near-field thermal standards during critical low flow periods that occur in the Dresden Pool. The use of the towers is necessary during the summer months and also at times of unseasonably warm spring and fall periods. Operation of the towers (the number of towers turned on and the duration of run time) is largely determined by a thermal model that assesses weather, station load, discharge temperature, river flow and intake temperature conditions on a real-time basis. Generally, the towers are used when the circulating water discharge temperature exceeds 93°F for an extended period of time. The towers do not work efficiently when the temperature of the station condenser discharge flow is less than 90°F or when the dew point temperature (*i.e.*, temperature to which the air must be cooled at constant pressure for it to become saturated) approaches 78-80°F. The towers cool warm water through an evaporative process, which requires that the ambient air be relatively dry, or the existence of a relatively low dew point (*i.e.*, less than 78-80°F). The tower pumps are also not equipped with freeze protection and associated appurtenances needed to sustain winter usage under rapidly changing winter weather conditions. Further, the towers are neither designed nor equipped with plume arrestors to minimize misting and vapor plumes and, therefore, cannot be used during the winter months due to the potential for creating hazardous icing conditions on nearby power lines and roadways.

Adjusted Thermal Standards Currently Applicable to MWGen

All five MWGen stations are currently subject to Secondary Contact and Indigenous Aquatic Life Water Quality Standards on a near-field basis. This means that the point of compliance for thermal discharges from each of the stations is the edge of the allowed mixing zone, which is currently the maximum area of 26 acres. All five stations are also subject to the I-55 Adjusted Thermal Standards (the "Adjusted Standards"), which were adopted pursuant to AS

96-10, and whose limits must be achieved further downstream at the I-55 Bridge. Extensive multi-year biological, physical and chemical monitoring and modeling work was performed as part of the UIW Studies to support the Adjusted Standards. The Adjusted Standards were originally proposed by ComEd, adopted by the Board in 1996, and transferred to MWGen in 2000.

The IEPA and Board agreed to the Adjusted Standards based on a number of factors, including the fact that ComEd had successfully demonstrated that the heat discharges from the Joliet facilities did not cause nor could be reasonably expected to cause significant ecological damage to the waters of the Five-Mile Stretch (the Lower Des Plaines below I-55). *See Attachment 2, Opinion and Order of the Board in AS96-10, dated October 3, 1996 ("1996 Board Opinion"); see also, Response of the Illinois EPA to the Amended Petition of Commonwealth Edison Company Adjusted Standard from 35 Ill. Adm. Code 302.211 (d) and (e) filed in AS96-10 ("1996 IEPA Response").* Both the Board and IEPA also agreed as part of the AS 96-10 proceedings that heat was not a factor limiting the quality of the aquatic habitat of the Five-Mile Stretch, but rather other factors such as the loss of habitat due to channelization, disruption of habitat due to barge traffic, and the presence of heavy metals and other pollutants in the system, were overriding the effect of temperature on the waterway. *See 1996 IEPA Response at pp. 5, 9-10.* In 1996, IEPA did not view the thermal discharges as limiting aquatic diversity in the receiving waters. *Id. at 9.* And although the IEPA believed that the installation of cooling towers may be technically feasible to reduce temperature of the effluents, the Agency ultimately concluded as part of the AS 96-10 proceedings that the cost of providing this cooling was not economically reasonable when compared to the likelihood of no improvement in the aquatic community. *Id. at 7.*

The Adjusted Standards are in-stream temperature limits applicable specifically to the I-55 Bridge location and consist of a set of monthly/semi-monthly temperature limits which vary on a seasonal basis. The Adjusted Standards have been incorporated into each of the NPDES Permits issued to the five MWGen stations. The following NPDES Permits thermal limits must be met at the I-55 Bridge by all five upstream MWGen UIW generating stations: :

January:	60 °F
February:	60 °F
March:	65 °F
April 1-15:	73 °F
April 16-30:	80 °F
May 1-15:	85 °F
May 16-31:	90 °F
June 1-15:	90 °F
June 16-30:	91 °F
July:	91 °F
August:	91 °F
September:	90 °F
October:	85 °F
November:	75 °F
December:	65 °F

These standards may be exceeded by no more than 3°F during 2% of the hours in the 12-month period ending December 31, except that at no time shall MWGen's plants cause the water temperature at the I-55 Bridge to exceed 93°F. The Adjusted Standards replace the General Use numerical limits in 35 Ill. Adm. Code 302.211(d) and (e), which limit monthly temperatures and the maximum temperature rise above natural temperatures up to 5°F or less.

The Adjusted Standards are identical to the existing General Use numeric thermal standards during the months of January and February, and are within 1°F of the General Use numeric thermal standards during June, July and August. During the transitional months of the year, the Adjusted Standards limits at the I-55 Bridge are actually more stringent than the corresponding General Use Standards:

Period	Gen. Use Limit	AS 96-10 Limit
April 1-15	90°F	73°F
April 16-30	90°F	80°F
May 1-15	90°F	85°F
October	90°F	85°F
November	90°F	75°F

March and December are the only months in which the Adjusted Standards allow a temperature up to 65°F, when the General Use numeric standard is 60°F. Thus, for the remaining ten months of the year, the thermal standards applicable at the I-55 Bridge are at least as stringent as or more stringent than the existing General Use thermal standards that apply to the UIW waterway downstream of the I-55 Bridge.

Applicability of these Adjusted Standards was transferred to MWGen by the Board on March 16, 2000. *See Attachment 3, AS 96-10, Opinion and Order of the Board, dated March 16, 2000 ("2000 Board Opinion").* Since that time, MWGen has performed physicochemical and biological studies of the waterway in order to determine whether there are any adverse impacts from the thermal discharges on the resident aquatic community (the "UIW Studies"). The monitoring data collected during the annual UIW Studies is submitted to IEPA each year and continues to serve as the basis for the continuation of the Adjusted Standards at the I-55 Bridge. The UIW Studies will be discussed in greater detail by other witnesses providing pre-filed testimony on behalf of MWGen

Based on my experience and first hand observations through the UIW Studies, the Adjusted Standards provide an adequate level of protection for the aquatic community below I-55, and provide a more representative normal, seasonal fluctuation than either the Secondary Contact or the General Use numeric standards. These Adjusted Standards were also designed to be complementary to the Secondary Contact thermal water quality standards upstream, in that by adhering to compliance with these far-field thermal limits, thermal inputs from upstream are

regulated such that both sets of thermal water quality standards are met at the point at which they are applicable. This provides a needed transition zone from Secondary Contact to General Use waters.

MWGen's Compliance with Applicable Thermal Water Quality Standards

Since October 1996, when the Adjusted Standards went into effect, there have been no instances of noncompliance by MWGen Stations with thermal standards. Control over the thermal discharges and effect on ambient stream temperature is achieved by: (1) use of supplemental cooling towers at Joliet Facilities Units 7&8; (2) a process known as "unit derating" or lowering the megawatt load for one or more of the Joliet Facilities' units; or (3) a combination of both.

Through subsequent studies and modeling efforts, MWGen determined that the Joliet Facilities (and not the three CAWS stations) had the greatest influence on water temperature at the I-55 Bridge. Therefore, efforts by MWGen to maintain thermal compliance at the I-55 Bridge revolve mostly around the operations of the Joliet Facilities. Maintaining compliance with thermal standards at the I-55 Bridge, located seven miles downstream from the Joliet Facilities, is a very complex process. Ambient stream temperature is largely associated with the volume of flow in the river. MWGen's compliance efforts are therefore largely dictated by the upstream flow manipulations and perturbations in the CAWS that in turn affect the volume of flow to the Upper Dresden Pool.

To factor and account for the many constantly changing variables that affect heat dissipation in the waterway over the seven mile stretch between the Joliet Facilities and the I-55 Bridge, a customized thermo-hydrodynamic model of the waterway is used. This model (known as JOLDER) was originally developed in 1988 by ComEd, in conjunction with researchers at the

Iowa Institute of Hydraulic Research at the University of Iowa. The model has undergone several rounds of revision and refinement since its inception. To run the model, numerous factors, such as river flow, weather, megawatt loading, and conditions that affect cooling tower module operations, must be routinely monitored to determine what operational steps need to be taken by the Joliet Facilities to ensure continuing compliance at the I-55 Bridge Adjusted Standards. Thus, while MWGen must closely monitor river conditions and its thermal discharges for both Secondary Contact and Adjusted Standards compliance purposes, it is more often the Adjusted Standards compliance needs that dictate unit deratings and the use of the cooling towers.

River Flow

River flow in the CAWS can fluctuate dramatically (*e.g.*, thousands of cubic feet per second over several hours or less) depending upon weather or regulated flow. *See Attachment 4, Example Flow Graphs.* The regulated flow stems from the artificially controlled nature of the flow of the Lower Des Plaines River. Flow in the Lower Des Plaines River is largely dictated by upstream wastewater effluents, as well as storm events and ensuing flood control measures instituted by the U.S. Army Corps of Engineers ("Corps") at the two existing upstream lock and dams—Lockport and Brandon Road). Flow conditions at any given time cannot be predicted with great precision and flow does not follow any type of normal trend. As such, MWGen obtains continuous electronic flow data at the Brandon Road Lock and Dam from the Corps, Rock Island District, as a primary thermal model input. In addition to recent past (3 days prior) and real-time current flow conditions, the model must also take into account the potential for changes in flow conditions within approximately a three-day period, by two hour increments, which is the frequency at which the Corps provides updated flow information. These future flow

conditions are manually inputted, based on the modeler's experience, and take into consideration weather forecast information available at the time, as well as upstream canal manipulation data from the Corps' website. Predicted future flow inputs to the model are then adjusted every two hours, depending on how well the predicted flow matches the actual value reported by the Corps for each two hour increment. This iterative process often requires continuous attention by MWGen (24 hours a day, 7 days a week), especially during critical periods when river flows are often low and the demand for power is high.

Weather Conditions

Past and future predicted hourly air temperature, relative humidity, dew point and local wind speed/wind direction are critical in determining ambient river cooling potential. Along with these factors, the effectiveness of cooling tower operation under such conditions must also be taken into consideration. MWGen subscribes to an on-line weather forecasting service, and also uses local newspaper, weather channel and on-site meteorological data to fine-tune model weather inputs to the extent reasonably possible.

Station Megawatt Load

Megawatt loading is also a factor which must be entered into the computational modeling. Hourly Joliet unit load data is automatically entered into the model. Future predictions of load are made based on the past day's load cycle, as well as weather forecast predictions.

Cooling Tower Module Operation

There are total of 24 cooling tower modules at Joliet Units 7&8, each with a fan and two pumps. Each of these individual components must be monitored on a real-time basis, and

operating data is manually inputted into the model. Individual towers are cycled on and off manually by station personnel, in accordance with model projections.

The thermal model is used by MWGen on a real-time basis to assimilate existing and projected variable data and provide predictions of what the future water temperature at the I-55 Bridge will be, based on modeled conditions. The model has been field-verified and has been shown to be accurate to within 2°F (assuming that model input parameters are also accurate). The model can project out three days, although accuracy tends to fall off with time. For this reason, the model is constantly updated with real-time data and manually run in an iterative, continuous manner during critical periods, in order to gage compliance and provide continuing operating guidance to Joliet station personnel in order to both optimize station load, as well as maintain thermal compliance.

MWGen's Participation In The UAA Stakeholder Process

Beginning in 2000, when the IEPA first invited MWGen to join the LDP UAA Workgroup, MWGen has participated extensively in the stakeholder process, sharing data and information, providing informational presentations, and attending each and every meeting. I have personally participated in each and every meeting. Our participation in the ad-hoc UAA Biological Committee for the LDP UAA was also requested based on the fact that, aside from the MWRDGC, MWGen had the most extensive biological monitoring database in the UIW waterway system, particularly for the LDP portion of the UIW. MWGen made several informational presentations over the course of the UAA Stakeholder meeting process to both the LDP and the CAW UAA Stakeholder workgroups. Included in Attachment 5 is a chronology and summary of no less than 16 examples of correspondence between MWGen and IEPA spanning from March 2002 through August 2007. As reflected in the correspondence, MWGen

has provided extensive comments over many years on the LDP and CAWS UAA processes, the significant issues involved in those processes and the draft UAA and thermal standards reports prepared by IEPA's consultants. MWGen also consistently participated on the CAWS Stakeholder's Advisory Committee, which began in 2002.

The sole purpose of the LDP UAA stakeholder process was for IEPA to bring all interested parties together on a regular basis to discuss use designation and water quality issues to help develop the basis and support for the conclusions of the UAA Report. Representatives from IEPA, USEPA Region 5, municipalities, industries, environmental groups and academia were all invited to share information and data that could be used to inform and improve the UAA process. Over the course of the first two to three years of the stakeholder meetings, it became abundantly clear that major differences existed between IEPA and the stakeholders regarding what the appropriate thermal and bacterial standards should be for the waterway; consequently, at IEPA's direction, the workgroup set aside these two parameters from further general discussion and focused on other issues. With respect to thermal standards, in a draft version of the LDP UAA Report, circulated to stakeholders in August 2003, it was generally stated by the UAA contractor that the General Use thermal standards could be applied to the LDP without supporting data or justification that such standards would be appropriate. MWGen provided extensive comments showing that the potential applicable of the General Use thermal standards to the LDP was not warranted or justified based on the lack of adequate habitat to support an aquatic community that needed such stringent thermal standards, as well as identifying numerous inaccuracies contained in the draft report. *See Attachment 7.* Subsequently, IEPA issued a revised LDP UAA report, but only a few of the inaccuracies identified by MWGen had been corrected (the report still contained many inaccuracies noted in prior MWGen comments). *See,*

e.g., Attachments 8 and 13. MWGen's comments regarding the draft report also raised substantive issues that were seemingly ignored as part of the revised UAA report. In December 2003, the issuance of the revised final draft LDP UAA report marked the cessation of further LDP UAA stakeholder meetings.

It was only after the cessation of the UAA LDP stakeholder meetings that information on the proposed methodology for the development of thermal standards for the LDP started to be distributed to stakeholders. In early 2004, USEPA Region 5 enlisted the services of Mr. Chris Yoder of MBI to develop temperature standards for the Lower Des Plaines River, based on the methodology that Mr. Yoder had used in Ohio. Several draft reports from MBI were subsequently circulated by IEPA to the LDP UAA Workgroup for review, but no stakeholder meetings were held to discuss these reports. Extensive written comments on the MBI reports were prepared by MWGen and submitted to IEPA, as well as a request for a meeting with Mr. Yoder to discuss his findings, all without any response from either IEPA or Mr. Yoder. *See Attachment UU to IEPA's Pre-filed Testimony.* MWGen also submitted two alternative thermal standards reports to IEPA and the LDP workgroup during the2004 to 2006 time period, but no stakeholder meetings were held to discuss this matter, nor were any comments received by MWGen from IEPA on these alternative thermal standards proposals. *See Attachment 5.*

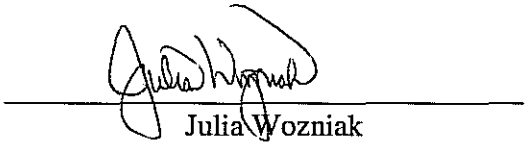
It was not until January 2007, when IEPA issued its draft UAA proposal that MWGen became aware of the intended thermal water quality standard values for the Lower Des Plaines River. The IEPA meetings on March 20 and 22, 2007, were the first public forum in which the proposed thermal standards were publicly discussed. In response, MWGen developed another alternative thermal standards proposal for the Lower Des Plaines River, which was submitted to

IEPA in August 2007. This proposal, according to IEPA, was not reviewed because it was submitted "too late". *See March 11 Hearing Transcript at p. 192.*

Similarly, for the CAW UAA process, which began in early 2003, there were no thermal water quality standard options put forth for open discussion throughout the course of the stakeholder meetings. General language was developed for each proposed use designation (as proposed by the CDM CAWS UAA report), but no specific thermal numbers were discussed. *See Attachment K to IEPA's Pre-filed Testimony.* It was also MWGen's understanding that no additional standard derivation work was being conducted by or for IEPA/USEPA Region 5 specifically for the CAWS. Once again, however, in January 2007, MWGen and the other stakeholders were presented with IEPA's proposed numeric thermal water quality standards for the CAWS without the benefit of stakeholder participation. Moreover, the proposed numeric limits were modified during the intervening period between January 2007 and October 2007, when IEPA submitted its proposal currently pending before the Board. These modifications were made without any prior notification, clarification or discussion with any of the CAWS or LDP stakeholders.

In conclusion, over the past eight years, MWGen has expended substantial time and effort in helping to inform the UAA process, including providing key, long-term biological monitoring program data and comprehensive UIW Study information. Based on the extensive amount of data and information collected as part of this comprehensive effort, it is my professional belief that IEPA has ignored an overwhelming amount of information and data that, if fairly considered, would not only not support the Agency's current proposal, but rather would support the ultimate conclusion (1) that the physical features of the waterway are the primary factors limiting further biological improvements, and (2) that the current contribution of heat

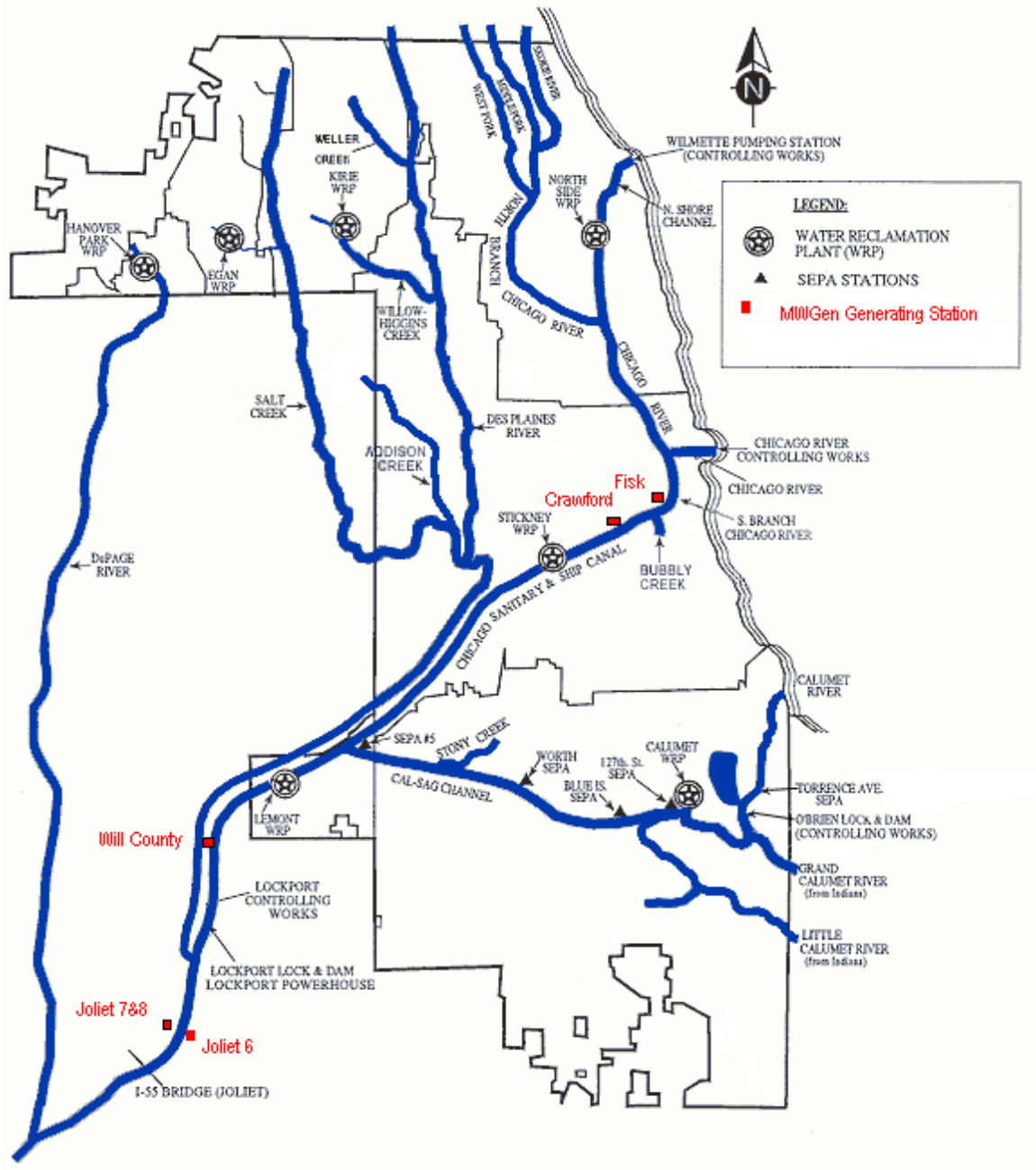
from MWGen's generating station discharges is not having an adverse impact on the biological communities of the CSSC or the LDP.



Julia Wozniak

ATTACHMENT 1

Map of Upper Illinois Waterway Showing Location of MWGen Plants



ATTACHMENT 2

1996 AS 96-10 BOARD OPINION

ILLINOIS POLLUTION CONTROL BOARD
October 3, 1996

IN THE MATTER OF:	)	
	)	
PETITION OF COMMONWEALTH	)	
EDISON COMPANY FOR ADJUSTED	)	AS 96-10
STANDARD FROM 35 ILL. ADM. CODE	)	(Adjusted Standard-Water)
302.211 (d) and (e)	)	

OPINION AND ORDER OF THE BOARD (by E. Dunham):

This matter comes before the Board on an adjusted standard petition filed by Commonwealth Edison Company (ComEd) on May 16, 1996. ComEd filed an amended petition on June 20, 1996 which was supplemented and corrected on July 11, 1996. The Illinois Environmental Protection Agency (Agency) filed its recommendation instanter on August 9, 1996. ComEd has published a request for waiver of hearing on the petition and no request for hearing was received from the public. Therefore, hearing is waived.

Based upon the record and review of the factors involved in consideration for alternate thermal standards and adjusted standards, the Board finds that ComEd has demonstrated that the adjusted standard is warranted. Therefore, the Board will grant the adjusted standard for temperature as proposed by ComEd.

ALTERNATE THERMAL STANDARD/ADJUSTED STANDARD PROCEDURE

ComEd requests that the Board grant alternate thermal standards for ComEd's Joliet, Will County, Crawford and Fisk generating stations in place of the requirements of 35 Ill. Adm. Code 302.211(d) and (e). The authority for granting alternate thermal standards is provided by 35 Ill. Adm. Code 304.141(c) and the Clean Water Act (CWA) at 316(a) (33 U.S.C. 1326(a)). The Board's rules at 35 Ill. Adm. Code 304.141(c) provides as follows:

> The standards of this chapter shall apply to thermal discharges unless, after public notice and opportunity for hearing, in accordance with Section 316 of the CWA and applicable federal regulations, the Administrator and the Board have determined that different standards shall apply to a particular thermal discharge. (35 Ill. Adm. Code 304.141(c).)

Section 316(a) of the Clean Water Act provides:

> With respect to any point source otherwise subject to the provisions of Section 306 of this Act, whenever the owner or operator of any such source, after opportunity for public hearing, can demonstrate to the satisfaction of the Administrator (or, if appropriate, the State) that any effluent limitation proposed for the control of the thermal component of any discharge from any such source

> will require effluent limitations more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made, the Administrator (or, if appropriate, the State), may impose an effluent limitation under such section on such plant, with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on that body of water.

USEPA's regulations establish the showing necessary to demonstrate alternate thermal limitations:

> Existing dischargers may base their demonstration upon the absence of prior appreciable harm. . . . Any such demonstration shall show: (1) That no appreciable harm has resulted from the normal component of the discharge (taking into account the interaction of such thermal component with other pollutants and the additional effect of other thermal sources) to a balanced, indigenous community of shellfish and wildlife in and on the body of water into which the discharge has been made.. . .
> (40 C.F.R. 125.73(c).)

The Board's procedural rules do not specify the procedural requirements for an alternate thermal standard determination. In its June 20, 1996 order the Board determined to follow the procedures of Section 106. Subpart G for an adjusted standard.

The Board's responsibility in this matter arises from the Environmental Protection Act (Act) (415 ILCS 5/1 et seq. (1994)). The Board is charged therein to "determine, define and implement the environmental control standards applicable in the State of Illinois" (415 ILCS 5/5(b)(1994)) and to "grant ..... an adjusted standard for persons who justify such an adjustment" (415 ILCS 5/28.1(a)(1994)). More generally the Board's responsibility is based on a system of checks and balances integral to Illinois environmental governance: the Board is charged with the rulemaking and principal adjudicatory functions, and the Agency is responsible for carrying out the principal administrative duties.

The adjusted standard provision of the Act, at Section 28.1 (415 ILCS 5/28.1 (1994)), was created by the legislature to provide an expedited alternative to site-specific rulemaking. The result of either an adjusted standard or a site-specific rule proceeding is the same (i.e., relief from a particular rule). In both a general rulemaking proceeding and a site-specific rulemaking proceeding, the Board, pursuant to Section 27 of the Act, is required to take the following factors into consideration: the existing physical conditions, the character of the area involved, including the character of surrounding land uses, zoning classifications, the nature of the existing air quality, or receiving body of water, as the case may be, and the technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution. (See specifically, Section 27(a).)

Section 28.1 of the Act establishes the level of justification required for an adjusted standard and also requires the adjusted standard to be consistent with Section 27(a). The level of justification required, as set forth in Section 28.1(c), is that the petitioner present adequate proof that:

1) Factors relating to that petitioner are substantially and significantly different from the factors relied upon by the Board in adopting the general regulation applicable to that petitioner;

2) The existence of those factors justifies an adjusted standard;

3) The requested standard will not result in environmental or health effects substantially or significantly more adverse than the effects considered by the Board in adopting the rule of general applicability; and

4) The adjusted standard is consistent with any applicable federal law.

BACKGROUND

ComEd is a public utility serving approximately eight million customers in the northern fifth of Illinois. (Pet. at 1.) Four of ComEd's generating stations (Joliet, Will County, Crawford and Fisk) discharge heat to the Des Plaines River or other waterways that ultimately combine with the Des Plaines River. (Am. Pet. at 4.) The discharges from these stations are subject to Secondary Contact and Indigenous Aquatic Life Water Quality Standards (35 Ill. Adm. Code 303.441.)

Joliet Station

Joliet Station is a steam-electric generating facility capable of producing 1,414 gross megawatts of electricity. (Am. Pet. at 9.) The station is located in Will County, approximately one mile southwest of the City of Joliet, Illinois, adjacent to the Des Plaines River. (Am. Pet. at 9.) Joliet Station consists of three coal-fired units, all of which utilize open cycle, once-through condenser cooling systems.

The station has two thermal discharges to the Des Plaines River; one from Station #9 on the east bank of the river and the other from Station #29 on the west bank. The maximum design temperature rise in the circulating cooling water is approximately 9.4°F, with a total circulating water flow rate of 2, 620 cubic feet per second. (Am. Pet. at 9.) Both thermal discharges flow into the Des Plaines River approximately one-half mile downstream of the Brandon Road Lock and Dam, at river mile 285, which is about seven miles upstream of the I-55 Bridge. (Am. Pet. at 9.)

Will County, Fisk, and Crawford Stations

Will County, Crawford, and Fisk Stations (collectively, the "Canal Stations") are steam electric generating facilities capable of producing 1154, 581, and 342 gross megawatts of electricity, respectively. (Am. Pet. at 10.) Will County Station is located in Romeoville, Illinois, near the intersection of the Chicago Sanitary and Ship Canal and Romeo Road. (Am. Pet. at 10.) Crawford Station is located in Chicago, near the intersection of the Stevenson Expressway and Pulaski Avenue. (Am. Pet. at 10.) Fisk Station is located near downtown Chicago, at the intersection of Loomis Street and the Chicago Sanitary and Ship Canal. (Am. Pet. at 10.) The generating units of each Canal Station are coal-fired, and each utilizes open cycle, once-through condenser cooling systems

The Canal Stations discharge into the Chicago Sanitary and Ship Canal: Will County at river mile 295.5, Crawford at river mile 318.5, and Fisk at river mile 322. (Am. Pet. at 10.) The maximum design temperature rise in the circulating cooling water is approximately 11.1°F for Will County, 12.0°F for Crawford, and 12.2°F for Fisk. (Am. Pet. at 10.)

APPLICABLE REGULATIONS

Each of the discharges from these four generating stations is subject to secondary contact and indigenous aquatic life water quality standards (35 Ill. Adm. Code 303.441). The temperature standard for secondary contact waters requires that temperature not exceed 34°C (93°F) more than 5% of the time, or 37.8°C (100°F) at any time. (35 Ill. Adm. Code 302.408.)

However, the lower Des Plaines River between the Interstate 55 Bridge and the head of the Illinois River (confluence of the Des Plaines River with the Kankakee River), a segment known as the "Five-Mile Stretch", is subject to the more stringent general use water quality standards. Among other requirements, the general use standards governing temperature require that maximum temperature rise above natural temperatures not exceed 2.8°C (5°F) and water temperature not exceed 16°C (60°F), during winter months (Dec. through Mar.) or 32°C (90°F), during summer months (Apr. through Nov.), more than 1% of the hours in a 12 month period ending in any month, and never exceed these temperatures by more than 1.7°C (3°F) (35 Ill. Adm. Code 302.211(d) and (e)).

RELATED PROCEEDINGS

In 1987, ComEd requested that the Board determine, pursuant to 35 Ill. Adm. Code 302.211(f), that the thermal discharges from the Joliet Station have not caused and cannot reasonably be expected to cause significant ecological damage to the general use waters. The Board found that ComEd had made the requisite showing under 302.211(f). (In the Matter of: Proposed Determination of No Significant Ecological Damage for the Joliet Generating Station (November 15, 1989), PCB 87-93.)

In the course of PCB 87-93, the Sierra Club, participating as an intervenor, argued that ComEd had failed to make a sufficient showing of no significant ecological impact because, among other reasons, the Joliet plant contributed to violations of Section 302.211(d) and (e) in the waters of the Five-Mile Stretch. In response, ComEd argued that these provisions were inapplicable, principally because Joliet Station discharges into secondary contact waters. ComEd further committed to implement an operating plan for the Joliet Station which would ensure that the Joliet Station would limit its megawatt output as necessary to avoid exceedences of the monthly maximum temperature standard of Section 302.211(e).

In PCB 87-93, the Board addressed these issues as follows:

> The Board finds that 302.211(d) and (e) do apply to the effect of [ComEd's] discharges. Although Secondary Contact Standards may govern at the point of a particular discharge, it is possible for an entity located upstream of the beginning of the General Use waters to cause or contribute to exceedences of the General Use Water Quality Standards. In fact, the reason the Board required [ComEd] to perform a thermal demonstration under subsection (f) is because the Board recognized that a source which discharges to Secondary Contact waters could affect downstream General Use waters.
>
> The Board finds, however, that in this proceeding the issues of whether violations of the 302.211 standards have occurred in the Five-Mile Stretch and, if they have, whether [ComEd] is responsible for them, is at best ancillary to the matters at hand. The only proper forum for the Board to hear allegations of violation of the Board's rules is an enforcement action brought pursuant to Title VIII of the Illinois Environmental Protection Act. The Board cannot and will not here reach the issue of whether [ComEd] is in violation of any Board water quality standard.
>
> Consideration of whether there is non-compliance of the waters of the Five-Mile Stretch with the Board's water temperature standards can enter the immediate case only where non-compliance stands as proof of significant ecological damage associated with [ComEd's] discharge.
>
> The Board finds that there is no substantive indication that any of the observed temperatures in the Five-Mile Stretch have caused significant ecological damage. (PCB 87-93 at 19; 105 PCB Op. at 167.)

Regarding whether ComEd's operating plan was acceptable to satisfy the requirements of Section 302.211(e), the Board found:

> The Board believes that [ComEd] has a viable monitoring program . . . which, although not field tested at the time of hearing, is capable of assuring adjustments to operations should they prove necessary to ensure compliance. (PCB 87-93 at 21.)

In PCB 87-93, the Board found that ComEd successfully demonstrated that the heat discharges from the Joliet Station have not caused and cannot be reasonably expected to cause significant ecological damage to the waters of the Five-Mile Stretch. In so doing, the Board also found that the temperature of the waters of the Five-Mile Stretch was not a factor limiting its quality, and that other factors continue to override the effect of temperature on the waterway. These overriding factors include loss of habitat due to channelization, disruption of habitat due to barge traffic, and the presence of heavy metals and other pollutants in the system. (PCB 87-93 at 20).

ComEd was granted a variance from the temperature standards of 35 Ill. Adm. Code 302.211(d) for these facilities for a period of five years. (Commonwealth Edison v. IPCB (November 21, 1991), PCB 91-29.) As part of the variance, ComEd agreed to initiate a study to establish thermal standards for the facilities. In 1991, ComEd initiated a study of the entire stretch of the Upper Illinois Waterway (UIW) into which its plants discharge. (Am. Pet. at 4.) ComEd has submitted the report from this study as Exhibit 1 of the petition.

ENVIRONMENTAL IMPACT

The upstream reach of the South Branch of the Chicago River, the Chicago Sanitary and Ship Canal, and the Des Plaines River is greatly modified by use as a shipping channel with habitat limited to deep pools without shallows, structure, riffles of suitable substrates. (Ag. at 6.) The area affected by the proposed adjusted standard is heavily developed with industries, including a refinery, a chemical plant and a boatyard. (Ag. at 6.) The waterway is a very artificial and significantly modified waterway that is limited in terms of habitat. (Am. Pet. at 12, Exh. 1- Ch. 2.) Historical practices have caused substantial residual chemical contamination to be present in the sediments of the waterway. (Am. Pet. at 13, Exh. 1 Ch.4.)

The UIW study concludes that the above ambient water temperatures in the UIW during the winter months are due primarily to discharges from municipal treatment plants, limiting the organisms that can be maintained in the waterway. (Am. Pet. at 13, Exh.1 Ch. 10 Sec. 10.6.4.) The report also maintains that the organisms limited by the above conditions are tolerant of water temperatures warmer than those associated with rivers in the region. (Am. Pet. at 13, Exh. 1 Ch. 8, 9 and 10.)

ComEd contends that its proposed alternate thermal standards are compatible with protecting species in the UIW. (Am. Pet. at 14.) The proposed standards provide for a gradual, stair-step increase into the spring and decrease in the fall rather that the 30°F change that would be permitted by Section 302.211(e), were the requirements of 302.211(d) nonexistent. (Am. Pet. at 15.)

The task force that compiled the UIW study believe it is appropriate to continue to monitor and study various ecological aspects of the UIW. (Am. Pet. at 15.) ComEd has committed to conduct further investigations on the UIW in cooperation with the Sierra Club and the appropriate governmental agencies. (Am. Pet. at 16.)

COMPLIANCE ALTERNATIVES

While ComEd maintains that compliance costs are not a factor to be considered for determining applicable thermal standards under the Clean Water Act, it has analyzed costs for cooling towers or derating its units to comply with the generally applicable thermal requirements. (Am. Pet. at 11.) ComEd estimates that the cost of installing cooling towers at Joliet would be $68 million. (Am. Pet. at 11.) ComEd estimates that the cost of derating the plants to meet the thermal requirements would be in the range of $3.5 to $16 million annually. (Am. Pet. at 11.)

The Agency believes that it is technically feasible to reduce the temperature of the effluents by use of cooling towers and spray ponds. However, the Agency believes that the cost of providing this cooling may not be economically reasonable when compared to the likelihood of no improvement in the aquatic community. (Ag. at 7.)

CONCLUSION

For all of the above reasons, the Board finds that petitioner has presented adequate proof of justification for the requested adjusted standard as set forth in Section 28.1(c) of the Act and the requested adjusted standard, as presented in this proceeding, is consistent with the factors set forth in Section 27(a) of the Act. Petitioner has also provided the necessary showing for alternate thermal standards pursuant to the Clean Water Act.

This opinion constitutes the Board findings of fact and conclusions of law in this matter.

ORDER

The following Alternate Thermal Standards shall apply at the I-55 Bridge as limitations for discharges from ComEd's plants (Joliet, Will County, Crawford and Fisk) in lieu of the requirements of Section 302.211 (d) and (e):

January	60°F	February	60°F
March	65°F	April 1-15	73°F
April 16-30	80°F	May 1-15	85°F
May 16-31	90°F	June 1-15	90°F
June 16-30	91°F	July	91°F
August	91°F	September	90°F
October	85°F	November	75°F
December	65°F		

The standards may be exceeded by no more than 3°F during 2% of the hours in the 12-month period ending December 31, except at no time shall ComEd's plants cause the water temperature at the I-55 Bridge to exceed 93°F. ComEd's plants continue to be subject to the Secondary Contact Standards at the point of discharge.

IT IS SO ORDERED.

Section 41 of the Environmental Protection Act (415 ILCS 5/41 (1994)) provides for the appeal of final Board orders within 35 days of the date of service of this order. The Rules of the Supreme Court of Illinois establish filing requirements. (See also 35 Ill. Adm. Code 101.246 "Motions for Reconsideration.")

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the _____ day of _____, 1996, by a vote of _____.

_____
Dorothy M. Gunn, Clerk
Illinois Pollution Control Board

ATTACHMENT 3

2000 AS96-10
ILLINOIS POLLUTION CONTROL BOARD OPINION

ILLINOIS POLLUTION CONTROL BOARD
March 16, 2000

IN THE MATTER OF:	)	
	)	
PETITION OF COMMONWEALTH	)	AS 96-10
EDISON COMPANY FOR AN ADJUSTED	)	(Adjusted Standard - Water)
STANDARD FROM 35 ILL. ADM. CODE	)	
302.211(d) AND (e)	)	

OPINION AND ORDER OF THE BOARD (by E.Z. Kezelis):

This matter is before the Board on a February 25, 2000 motion (motion)[1] by Commonwealth Edison Company (ComEd) and Midwest Generation, LLC (Midwest), to reopen this docket, AS 96-10, and substitute Midwest as the petitioner and holder of the adjusted standard. Both ComEd and Midwest have waived hearing in the matter.

On March 9, 2000, the Illinois Environmental Protection Agency (Agency) filed a response to the motion. In its response, the Agency states that it does not dispute any of the factual allegations set forth in the motion and that it concurs with the request by ComEd and Midwest to reopen the docket and substitute Midwest as the petitioner and holder of the adjusted standard.

BACKGROUND

The Board granted ComEd an adjusted standard from 35 Ill. Adm. Code 302.211(d) and (e) in an order dated October 3, 1996. *In re* Petition of Commonwealth Edison Company for an Adjusted Thermal Standard from 35 Ill. Adm. Code 302.211(d) and (e) (October 3, 1996), AS 96-10. The October 3, 1996 order granted ComEd an adjusted standard from the thermal standards for discharges of cooling water from ComEd's generating stations located in Joliet, Will County, Crawford, and Fisk (Generating Stations). In its motion, ComEd states that, in response to the October 3, 1996 adjusted standard, the Agency issued revised National Pollutant Discharge Elimination System (NPDES) permits to each of these Generating Stations, and that these permits remain in full force and affect. Mot. at 3.

Pursuant to the Electric Service Customer Choice and Rate Relief Law (220 ILCS 5/16-101 *et seq.* (1998)), ComEd agreed, in March 1999, to sell the Generating Stations to Edison Mission Energy, an indirect, wholly owned subsidiary of Edison International that specializes in the development, acquisition, construction, management, and operation of global power production facilities. Mot. at 3-4. Edison Mission Energy in turn, assigned all of its rights under the purchase agreement with ComEd to Midwest. Mot. at 4-5. Midwest is a limited liability company that is indirectly owned by Edison Mission Energy. Mot. at 5. On December 15, 1999, title to the Generating Stations was transferred to

[1] Citations to the motion will be referred to as "Mot. at __."

Midwest. *Id.* As a result, Midwest has assumed all rights and obligations associated with the operation of the Generating Stations. *Id.*

ComEd and Midwest state in their motion that the operations of the Generating Stations will not change as a result of the title transfer. Mot. at 5. The Generating Stations will continue to produce electricity through the use of coal-fired boilers. *Id.* Midwest has retained almost the entire workforce previously employed by ComEd, including a senior biologist who has been and remains primarily responsible for developing and implementing the model used by ComEd to ensure compliance with the adjusted thermal standards set by the Board in its October 3, 1996 order. Mot. at 6.

DISCUSSION

The Board's authority for granting alternate thermal standards is found both in the Clean Water Act (CWA) (33 U.S.C. 1326(a)) and in 35 Ill. Adm. Code 304.141(c), that provides:

> The standards of this chapter shall apply to thermal discharges unless, after public notice and opportunity for hearing, in accordance with Section 316 of the CWA and applicable federal regulations, the Administrator and the Board has determined that different standards shall apply to a particular thermal discharge. 35 Ill. Adm. Code 304.141(c).

Likewise, Section 28.1 of the Environmental Protection Act (Act) (415 ILCS 5/28.1 (1998)) establishes the level of justification required for the Board to grant an adjusted standard. Section 28.1(c) provides:

> (c) If a regulation of general applicability does not specify a level of justification required of a petitioner to qualify for an adjusted standard, the Board may grant individual adjusted standards whenever the Board determines, upon adequate proof by petitioner, that:
>
> (1) factors relating to that petitioner are substantially and significantly different from the factors relied upon by the Board in adopting the general regulation applicable to that petitioner;
>
> (2) the existence of those factors justifies an adjusted standard;
>
> (3) the requested standard will not result in environmental or health effects substantially and significantly more adverse than the effects considered by the Board in adopting the rule of general applicability; and
>
> (4) the adjusted standard is consistent with any applicable federal law. 415 ILCS 5/28.1(c) (1998).

ComEd sought and, after providing sufficient justification, obtained an adjusted standard from the temperature standards of 35 Ill. Adm. Code 302.211(d) and (e), which provide:

Section 302.211 Temperature

* * *

d. The maximum temperature rise above natural temperatures shall not exceed 2.8° C (5° F).

e. In addition, the water temperature at representative locations in the main river shall not exceed the maximum limits in the following table during more than one percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature at such locations exceed the maximum limits in the following table by more than 1.7° C (3° F).

	° C	° F		° C	° F
JAN.	16	60	JUL.	32	90
FEB.	16	60	AUG.	32	90
MAR.	16	60	SEPT.	32	90
APR.	32	90	OCT.	32	90
MAY	32	90	NOV.	32	90
JUNE	32	90	DEC.	16	60

In the Board's October 3, 1996 order, ComEd was granted the following alternate thermal standards for discharges from the Generating Stations:

	° F		° F
JAN.	60	JUNE 16-30	91
FEB.	60	JULY	91
MAR.	65	AUG.	91
APR. 1-15	73	SEPT.	90
APR. 16-30	80	OCT.	85
MAY 1-15	85	NOV.	75
MAY 16-31	90	DEC.	65
JUNE 1-15	90		

See *In re* Petition of Commonwealth Edison Company for an Adjusted Thermal Standard from 35 Ill. Adm. Code 302.211(d) and (e) (October 3, 1996), AS 96-10, slip op. at 7.

In the motion presently before the Board, ComEd and Midwest maintain that the relevant factors that justified the grant of alternative thermal standards in 1996, are not affected by the transfer of the facility today. Mot. at 7. Specifically, the petitioners assert that the factors justifying the adjusted standard involved not the identity of the discharger, but rather "the nature of the discharge and the conditions in the receiving waterway, in particular, the lack of impact that the adjusted standards would have on the ecosystem of the receiving waterway . . . ." Mot. at 7-8. A change in ownership of the Generating Stations should not impact these factors at all. Mot. at 8.

Neither the Act nor the Board's procedural rules address the specific type of relief being sought by these petitioners. However, ComEd and Midwest identified a previous situation in which the Board granted similar relief. See *In re* Petition of Envirite Corporation for an Adjusted Standard from 35 Ill. Adm. Code 721 Subpart D: List of Hazardous Substances, Appendix I (November 7, 1996), AS 94-10. In the Envirite proceeding, Envirite was originally granted an adjusted standard from the listing of a particular waste from the lists in 35 Ill. Adm. Code 721.Subpart D. At some point after the adjusted standard was granted to Envirite Corporation, ownership and operation of the facility at issue was transferred to Envirite of IL, Inc. Both Envirite Corporation and Envirite of IL, Inc. petitioned the Board to reopen the adjusted standard docket and substitute the named petitioner. The basic factor in support of the Board's decision to grant the Envirite motion was the fact that the relevant factors required to justify the Board's original decision to grant an adjusted standard had not changed. See *In re* Petition of Envirite Corporation for an Adjusted Standard from 35 Ill. Adm. Code 721 Subpart D: List of Hazardous Substances, Appendix I (November 7, 1996), AS 94-10.

ComEd and Midwest urge the Board to apply similar reasoning in this case. As previously stated, the Agency concurs in this request and, in fact, has already transferred NPDES permits for these Generating Stations to Midwest. Mot. at 5.

CONCLUSION

Based upon the assurances of ComEd and Midwest that the management and operation of the Generating Stations will continue unchanged, and upon the Board's previous findings of justification in its October 3, 1996 order, the Board will officially reopen this docket and substitute the name of Midwest Generation, LLC, for Commonwealth Edison Company in its October 3, 1996 order.

ORDER

1. The Board hereby amends its October 3, 1996 order in this matter, and grants to Midwest Generation, LLC an adjusted standard from 35 Ill. Adm. Code 302.211(d) and (e) for the Joliet, Will County, Crawford, and Fisk generating stations.

2. The alternate thermal standards shall apply at the I-55 Bridge as limitations for discharges from the above listed generating stations.

3. In lieu of the requirements of 35 Ill. Adm. Code 302.211(d) and (e), the following standards will apply:

	°F		°F
JAN.	60	JUNE 16-30	91
FEB.	60	JULY	91
MAR.	65	AUG.	91
APR. 1-15	73	SEPT.	90
APR. 16-30	80	OCT.	85
MAY 1-15	85	NOV.	75
MAY 16-31	90	DEC.	65
JUNE 1-15	90		

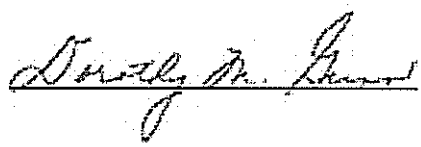
4. The standards may be exceeded by no more than 3 degrees Fahrenheit during 2% of the hours in the 12-month period ending December 31, except at no time shall Midwest's generating stations cause the water temperature at the I-55 Bridge to exceed 93 degrees Fahrenheit.

5. Midwest's generating stations continue to be subject to the Secondary Contact Standards at the point of discharge.

IT IS SO ORDERED.

Section 41 of the Environmental Protection Act (415 ILCS 5/41 (1998)) provides for the appeal of final Board orders to the Illinois Appellate Court within 35 days of the date of service of this order. Illinois Supreme Court Rule 335 establishes such filing requirements. See 172 Ill. 2d R. 335; see also 35 Ill. Adm. Code 101.246, Motions for Reconsideration.

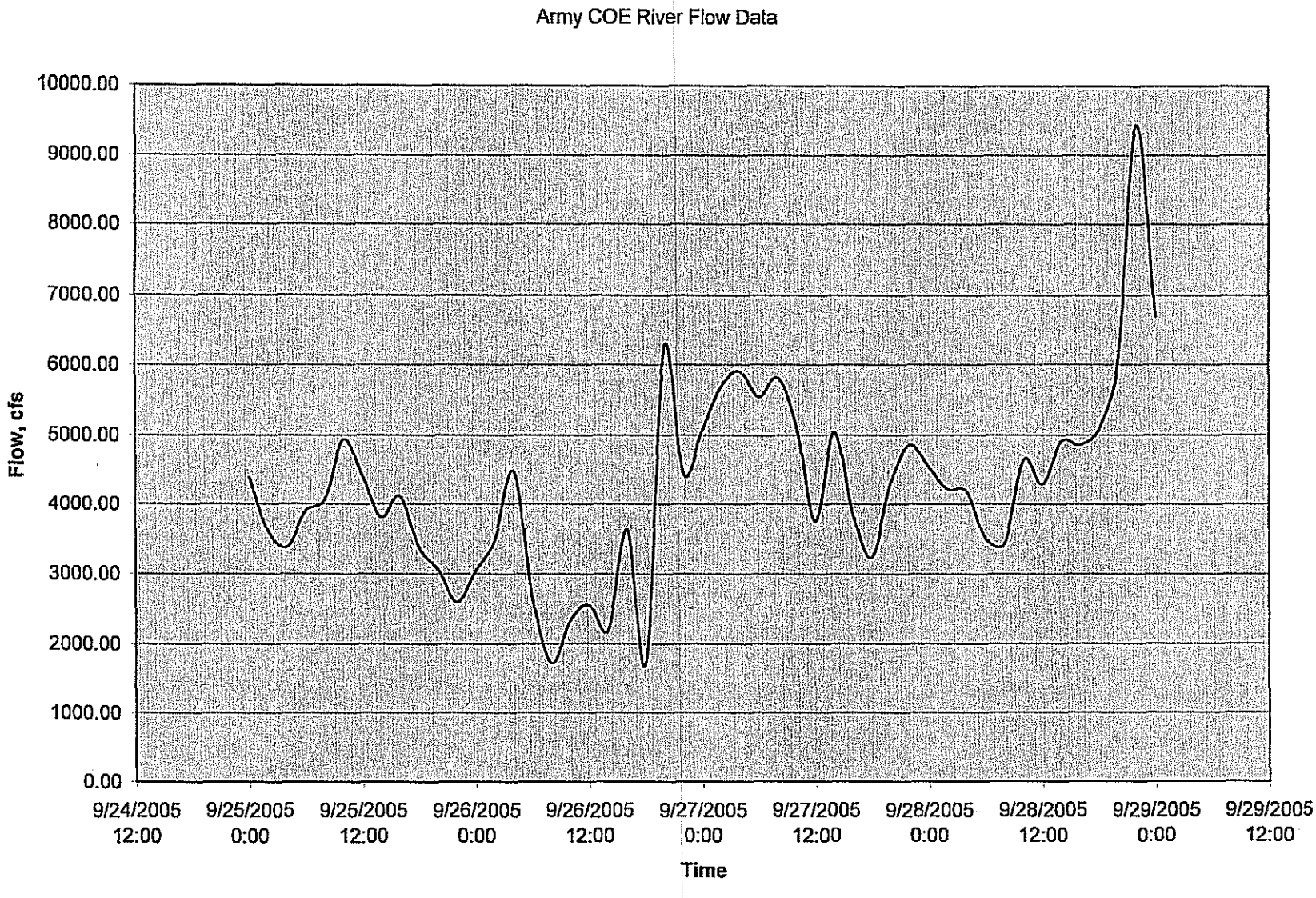
I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 16th day of March, 2000 by a vote of 5-0.



Dorothy M. Gunn, Clerk
Illinois Pollution Control Board

ATTACHMENT 4

EXAMPLE OF BRANDON POOL FLOW FLUCTUATIONS FOR THE PERIOD 2005 – 2008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Flow, cfs
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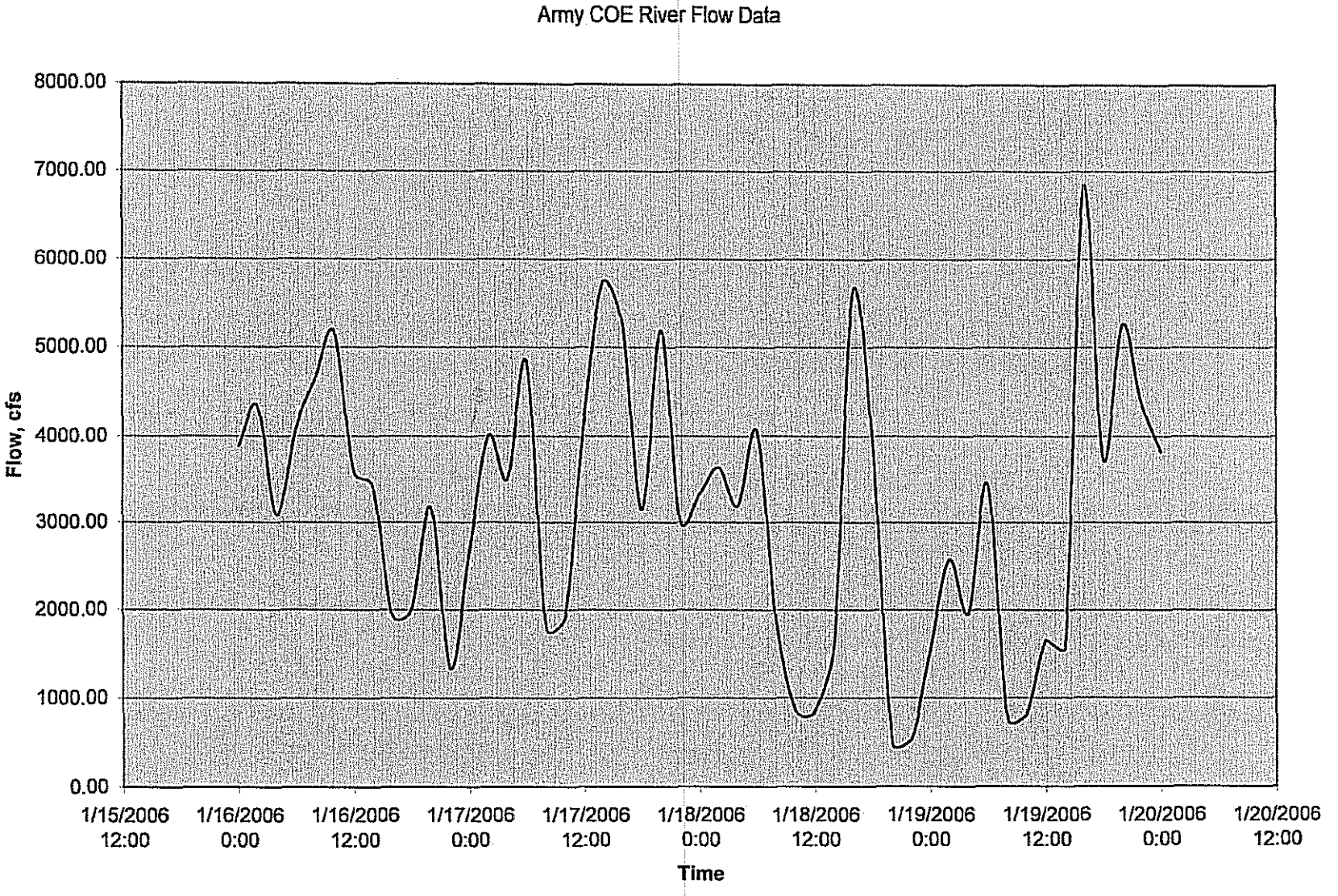
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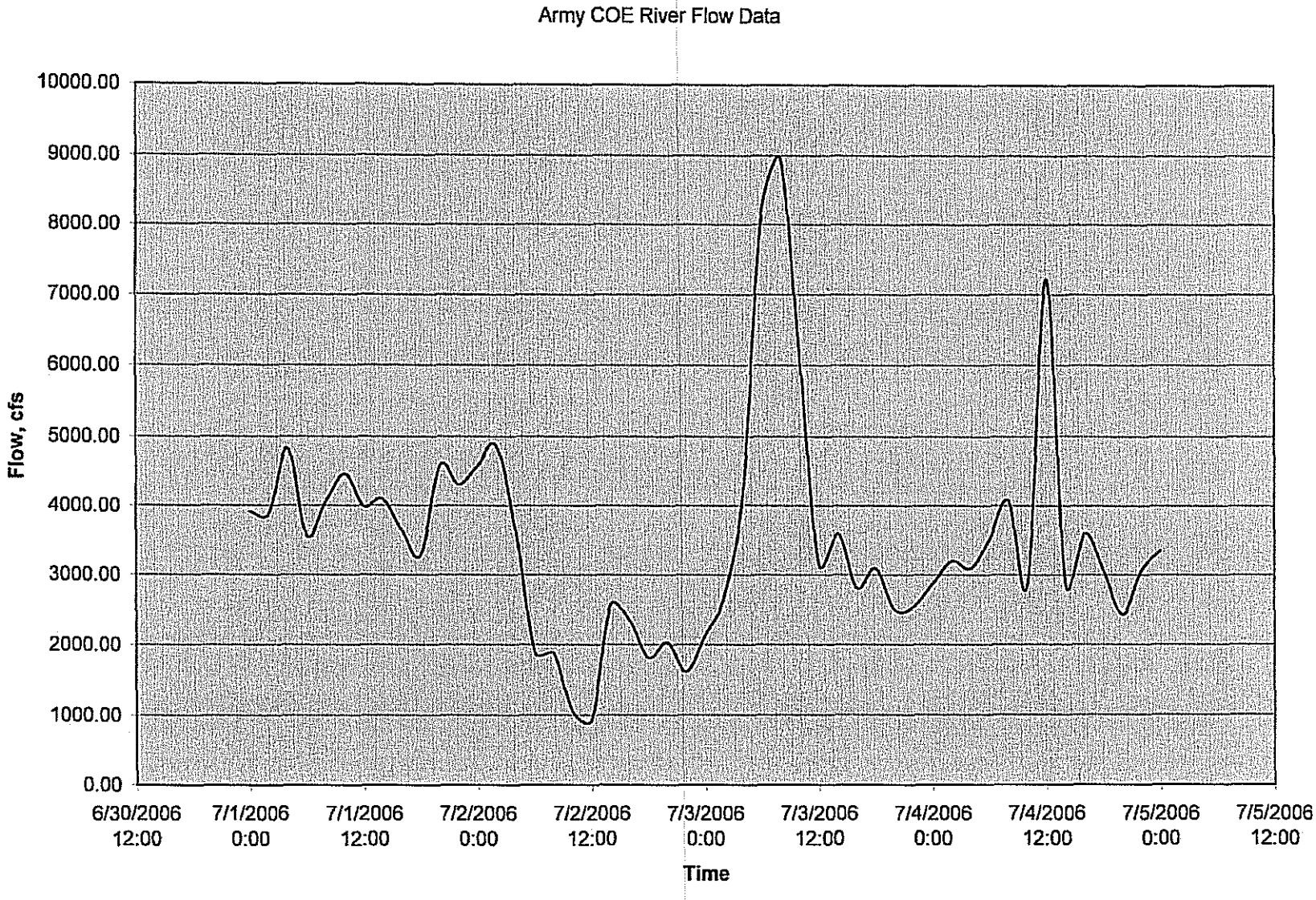
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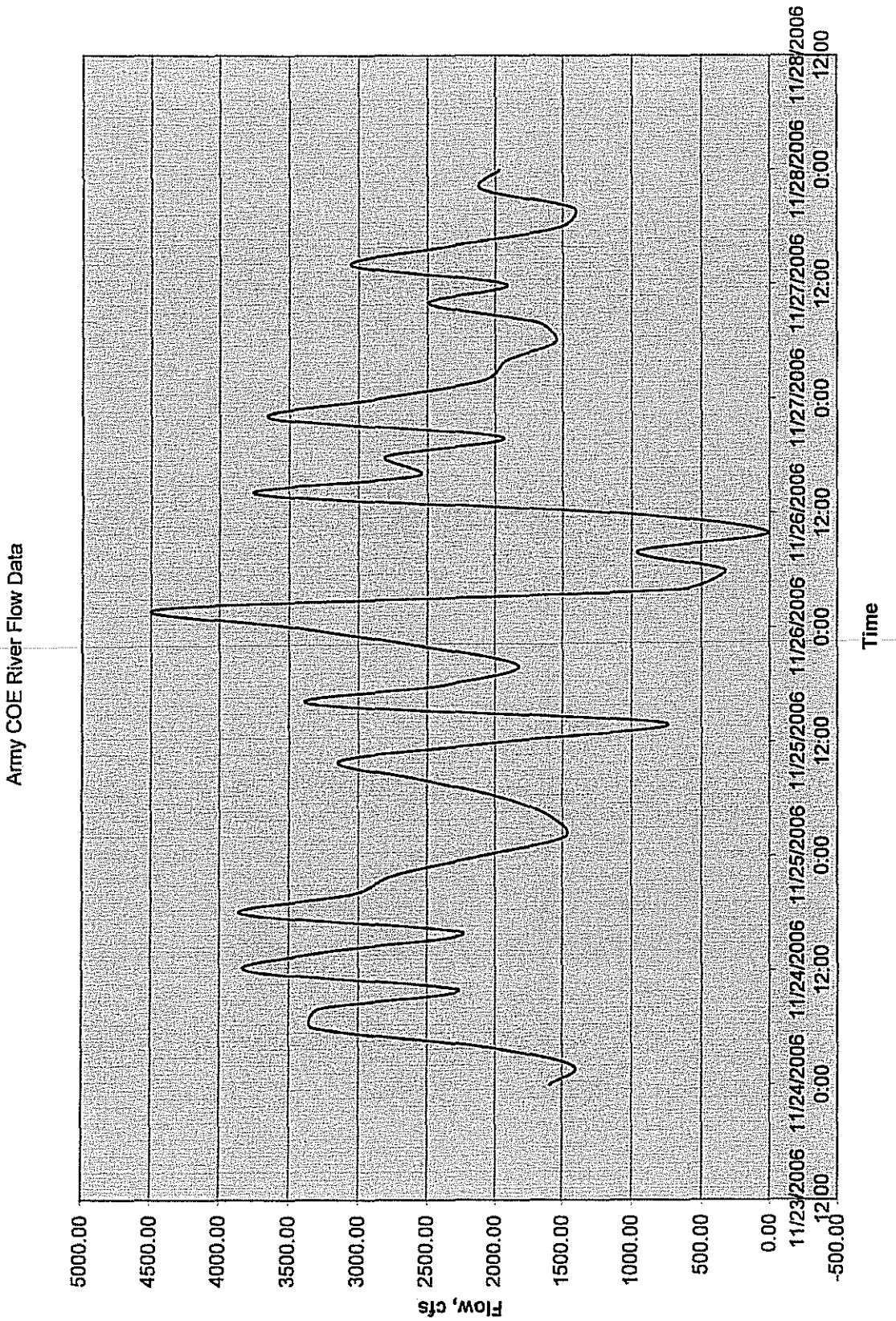
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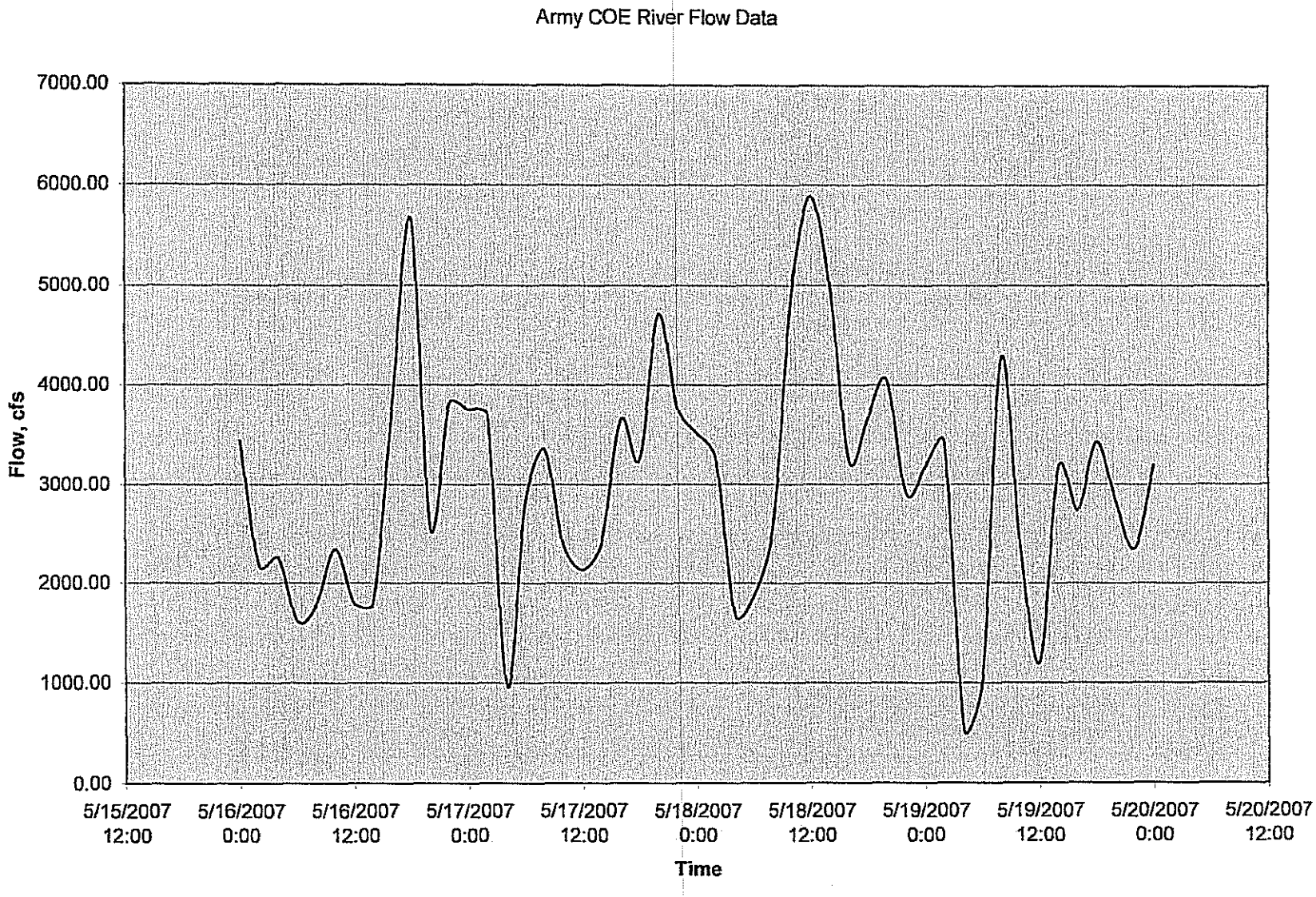
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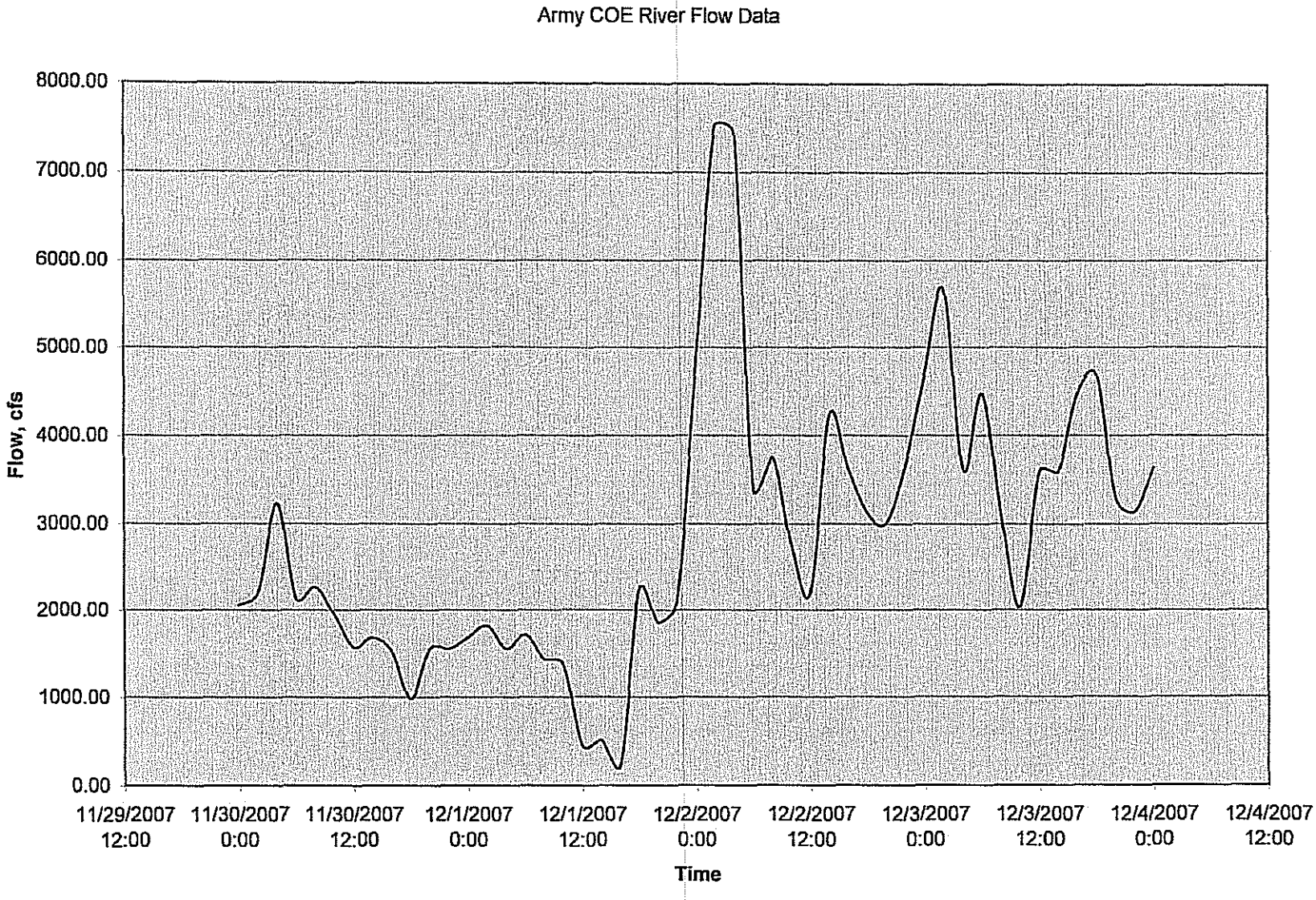
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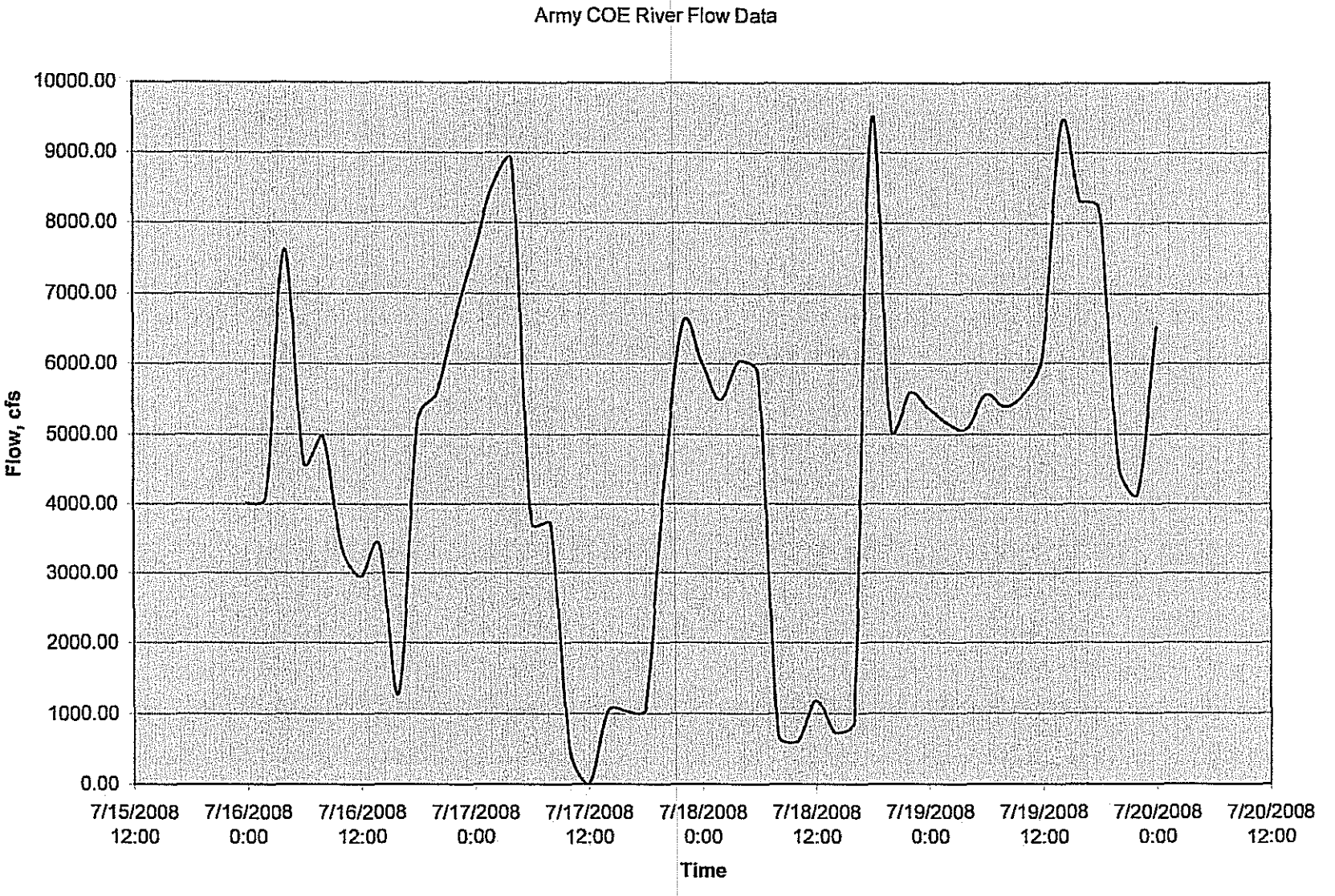
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7/20/2008 12:00
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ATTACHMENT 5

Chronology of Midwest Generation (MWGen) Correspondence to Illinois EPA Regarding the Chicago Area Waterway and Lower Des Plaines Use Attainability Analyses (UAAs)

No.	Correspondence Chronology	Description of Correspondence
1	March 26, 2002, MWGen letter to Toby Frevert, IEPA, regarding Lower Des Plaines UAA draft documents by IEPA consultants Novotny/Hey & Associates	Original MWGen letter to the IEPA in the LDP UAA stakeholder process identifying several concerns and issues relating to the contents of the draft documents prepared by IEPA's consultants Dr. Novotny and Hey & Associates, including their failure to consider and/or misrepresentation of LDP stream characteristics/habitat/aquatic/thermal data submitted by MWGen.
2	January 24, 2003, EA Engineering report entitled "Appropriate Thermal Water Quality Standards for the Lower Des Plaines River" submitted to IEPA (revised October 3003 version is **Attachment 6)**	MWGen's original 64-page report presenting proposed thermal water quality standards for the LDP, submitted to Toby Frevert, IEPA, and also to the LDP UAA Stakeholders Workgroup.
3	August 26, 2003, MWGen letter to Linda Holst, USEPA Region 5 **(Attachment 7)**	MWGen's response to USEPA Region 5's comments on MWGen's January 24, 2003 Appropriate Thermal Water Quality Standards Report (see Region 5 letter from Linda Holst to Toby Frevert, dated June 3, 2003). MWGen agrees to make certain revisions to its January 2003 thermal standards proposal/report to address USEPA comments and continues to identify serious inaccuracies, misrepresentations, and misuse of MWGen data in the draft UAA LDP Report.
4	September 12, 2003, MWGen letter to Toby Frevert, IEPA, regarding revision of Temperature Section of Draft LDP UAA Report	MWGen identifies numerous errors in the draft LDP UAA report concerning MWGen data and cautions that IEPA's UAA consultants appear to have pre-determined the outcome of the UAA, prior to consideration of all reasonably available data.
5	October 7, 2003, MWGen comments to IEPA regarding Revised Draft LDP UAA Report	MWGen comments on the most recently revised version of the thermal chapter of the Revised Draft LDP UAA Report and the supplemental material included in Chapter 8 thereof.

6	October 13, 2003, MWGen Revised "Appropriate Thermal Water Quality Standards for the Lower Des Plaines" to Toby Frevert, IEPA **(Attachment 6)**	MWGen provides a revised, proposed thermal water quality standards report for the LDP, submitted to Toby Frevert, IEPA, and also to the LDP UAA Stakeholders Workgroup, which incorporates/responds to comments received from IEPA, USEPA Region 5 and MWRDGC personnel.
7	October 14, 2003, Dr. G. Allen Burton Review of Draft LDP UAA Report to Toby Frevert, IEPA, submitted on behalf of MWGen	Dr. G. Allen Burton of Wright State University reviews and comments on the misinterpretations of his prior studies on the lower Des Plaines River by the LDP UAA IEPA consultants. Dr. Burton's comments corroborated many concerns voiced by MWGen regarding inaccurate, misleading data and findings in the draft IEPA UAA Report.
8	October 15, 2003, MWGen comments on Draft Thermal Section of the LDP UAA Report to IEPA **(Attachment 8)**	MWGen provides further comment to IEPA on the data interpretation and factual errors and misinterpretations contained in the draft LDP UAA report with respect to thermal issues. Serious problems with the report have still not been corrected.
9	October 22, 2003, MWGen revised comments on the Draft Lower Des Plaines UAA Report **(Attachment 9)**	MWGen provides further comment to IEPA on the errors and misinterpretations contained in the draft LDP UAA report. Serious problems with the report have still not been corrected.
10	November 18, 2003, E-mail to IEPA LDP consultant Dr. Vladimir Novotny (with cc to Toby Frevert) **(Attachment 10)**	MWGen continues to identify and explain data interpretation and factual errors in the draft LDP UAA Report and to provide corrections.
11	March 24, 2004, MWGen letter to Toby Frevert, IEPA, with comments on Final UAA Report for Lower Des Plaines River **(Attachment 11)**	MWGen provided comments on the final UAA LDP Report, including an attachment containing all prior MWGen LDP UAA written comments submitted to IEPA. MWGen expresses disappointment that many of the significant comments and corrections made by MWGen and other stakeholders were ignored in the final UAA LDP Report.
12	July 28, 2004, MWGen comments on Lower Des Plaines Temperature Criteria Derivation Report prepared by Yoder and Rankin (June 2004 draft version) **(See Attachment UU to IEPA Statement of Reasons)**	MWGen identifies errors in MWRDGC temperature data used by Mr. Chris Yoder to set the proposed "ambient conditions" relied upon in his thermal standards report to IEPA and also provides an extensive critique of the methodology utilized and assumptions made by Mr. Yoder.
13	March 29, 2005, MWGen Comments on Draft CAW	Extensive comments by MWGen regarding draft CAW UAA report.

	UAA Report to Scott Twait, IEPA. **(Attachment 12)**	
14	June 28, 2005, MWGen Supplemental Comments and Information Regarding the Draft CAW UAA Report which was prepared by CDM. **(See Attachment 13)**	MWGen comments including data to show that General Use temperatures are not being met in waterway, contrary to assertions in draft CDM report.
15	June 1, 2006, MWGen letter and comments on Yoder October 11, 2005 Report to Toby Frevert, IEPA. **(See Attachment UU to IEPA Statement of Reasons)**	MWGen letter including data to show that MWRDGC's discharges would not be able to meet proposed non-summer limits and includes a significant critique of MBI's methodology. MWGen expresses extreme disappointment with the MBI draft report dated October 11, 2005, and the fact that MWGen received no response to its prior comments and that its comments have been largely ignored.
16	February 27, 2007, MWGen letter to Marcia Willhite, IEPA.	MWGen responds to false allegations of alleged thermal noncompliance that arise from the continued errors and inaccuracies in the Final LDP UAA report. MWGen responds to an allegation by Prairie Rivers regarding "violations" of existing temperature limits by MWGen (letter dated December 11, 2006). MWGen continues to point out erroneous conclusions in the Final LDP UAA report.

ATTACHMENT 6

January 24, 2003/Revised October 13, 2003

EA Engineering Report Prepared for Midwest Generation

"Appropriate Thermal Water Quality Standards for the Lower Des Plaines River"

APPROPRIATE THERMAL WATER QUALITY STANDARDS FOR THE LOWER DES PLAINES RIVER

Summary Report
Prepared by Midwest Generation and EA Engineering, Science and Technology, Inc.

Original Issued: January 24, 2003
Revised: October 13, 2003

I. INTRODUCTION

Midwest Generation, with the assistance of EA Engineering, Science and Technology, Inc., has prepared this report for inclusion in the record of the current Use Attainability Analysis (UAA) for the Lower Des Plaines River. Under the federal Clean Water Act regulations, a UAA is required in order to determine if fishable and swimmable uses, reflecting the goals of the Clean Water Act, are not attainable for a particular water body or segment thereof. [See 40 C.F.R. § 131.10(j)].

This report evaluates and compares the present physical, chemical and biological characteristics of the Lower Des Plaines River to the current and proposed future thermal regime of the waterway. The results of this evaluation and comparison support the application of thermal water quality standards that are biologically appropriate and adequately protective of the existing and potential uses of this waterway, given the constraints on the system that are permanent or cannot be mitigated.

A. UAA Regulatory Overview

A use attainability analysis is defined as:

> ...a structured scientific assessment of the factors affecting the attainment of a use which may include physical, chemical, biological, and economic factors as described in Section 131.10(g). [40 CFR Section 131.3].

A "use attainability analysis" includes six factors that are to be considered in determining whether the fishable/swimmable goals of the Clean Water Act are attainable for a particular water body. [40 CFR § 131.10(g)]. These six UAA factors are discussed in this report and are summarized in Appendix 1. Under the UAA regulation, only one or more of these factors must be satisfied in order to determine that a water body is not capable of attaining the Clean Water Act's fishable/swimmable goals. Of particular relevance in this report are the following four UAA factors (the paragraph numbering is as found in 40 CFR 131.10(g)):

> 2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the

discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met;

3. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;

4. Dams, diversions, or other types of hydrologic modifications preclude the attainment of use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in attainment of the use;

5. Physical conditions related to the natural features of the water body, such as the lack of proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses.

B. Application of the UAA Factors to Assess Chemical, Biological and Physical Characteristics of the Lower Des Plaines River

U.S. EPA has long advocated the concept of independent application when using the assessment tools available to make use designation decisions:

> *"Independent application means that any one of the three types of assessment information (i.e. chemistry, toxicity testing results, and ecological assessment) provides conclusive evidence of nonattainment of water quality standards regardless of the results from other types of assessment information. Each type of assessment is sensitive to different types of water quality impact. Although rare, apparent conflicts in the results from different approaches can occur. These apparent conflicts occur when one assessment approach detects a problem to which the other approaches are not sensitive. This policy establishes that a demonstration of water quality standards nonattainment using one assessment method does not require confirmation with a second method and that the failure of a second method to confirm impact does not negate the results of the initial assessment."* (See U.S.EPA, June 19, 1991 Transmittal of Final Policy on Biological Assessments and Criteria).

Therefore, to reliably determine whether or not fishable and swimmable uses are attainable for the Lower Des Plaines River, the UAA must include consideration of **physical** and **biological integrity**, not simply chemical water quality. In EPA's Water Quality Standards Handbook, Second Edition (1994), the use of biological criteria to support designated aquatic life use classifications is strongly encouraged.

Approximately 20 years later, the U.S.EPA continues to endorse the use of biological assessments and criteria as a very reliable tool in the development of appropriate water quality standards:

> *"Ecological integrity is a combination of these three components: chemical integrity, physical integrity and biological integrity. When one or more of these components is*

> *degraded, the health of the waterbody will be affected, and in most cases, the aquatic life there will reflect that degradation. Aquatic life integrates the cumulative effects of different stressors such as excess nutrients, toxic chemicals, increased temperature, and excessive sediment loading. Therefore, bioassessments allow one to measure the aggregate impact of the stressors. Because biological communities respond to stresses over time, they provide information that more rapidly-changing water chemistry measurements or toxicity tests do not always produce. As such, bioassessment provides a more reliable assessment of long-term biological changes in the condition of a waterbody. The central purpose of assessing biological condition of aquatic communities is to determine how well a water body supports aquatic life".* (EPA 822-F-02-006, Summer, 2002)

The importance of basing use designations on biological integrity (as the overall integrator of waterbody conditions) was emphasized at the U.S.EPA sponsored "National Conference on Tools for Urban Water Resource Management and Protection" in 2000. In particular, the relationship between the Index of Biotic Integrity (IBI), an indicator of biological health, and a qualitative analysis of overlying stressors in six major metropolitan areas in Ohio were used by Yoder, Miltner and White, (2000) to suggest that there is a threshold of watershed urbanization (e.g.>60%) beyond which attainment of warmwater habitat (equivalent to Illinois' General Use) is unlikely. Similar reliance on biological assessment data and information were also recognized by an number of experts in the proceedings of the National Symposium on "Designating Attainable Uses for the Nation's Waters" held on June 3-4, 2002 in Washington, D.C. (GLEC, July 2002).

While Illinois does not have an established bioassessment program in place for large rivers, the draft bioassessment methodology that the Illinois EPA has developed, based on smaller order streams, can be successfully applied to the Lower Des Plaines River. Further, because of more than 20 years of biological and habitat monitoring data available on the UAA Reach, there is an extensive data base to which this draft bioassessment methodology can be applied to make decisions regarding the appropriate use designations for the Lower Des Plaines River.

Certainly, the chemical water quality of the Lower Des Plaines River has improved over the past 20 years. However, as the U.S. EPA and others have stated, chemical water quality alone does not dictate the potential of the waterway from an ecological perspective. Because the UAA analysis by Novotny/Hey & Associates focuses primarily on the chemical water quality of the Lower Des Plaines River, the information and supporting data presented in this report will address the other two key elements of a UAA--the physical and biological aspects of the Lower Des Plaines River and their overall potential for improvement, in the context of the 6 UAA factors. This extensive review of the physical and biological characteristics of the water body shows that focusing primarily on the chemical quality of the Lower Des Plaines River does not provide a reliable basis on which to determine its use potential. The UAA analysis presented in this report shows that the physical and biological constraints present in the Lower Des Plaines River make the full fishable/swimmable uses inherent to a General Use classification unattainable in this water body. Barring further refinements, such as the addition of subclassifications, to the existing Illinois Use Classification system, the Lower Des Plaines River is properly classified as a Secondary Contact Use water body.

II. BACKGROUND

Much of the background information and data contained in this report was drawn from the comprehensive ecosystem study of the entire Upper Illinois Waterway (UIW) performed by Commonwealth Edison ("ComEd") in the early to mid-1990's. Development and implementation of this study was done under the direction of an ad hoc task force consisting of representatives from Illinois EPA, U.S. EPA Region 5, Illinois Department of Natural Resources and the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), as well as other interested public, private and academic groups. (See UIW Summary at Appendix 2) Representatives of Illinois EPA, IDNR and U.S. EPA have recognized the UIW Study as the most comprehensive, multi-disciplinary effort ever performed on this waterway.

The overriding purpose of the comprehensive, multi-year UIW investigation was to better understand the effects that temperature increases caused by power plants have on aquatic biota and especially their potential to stimulate or hinder improvement of the waterway.

A majority of the information collected as part of the UIW Study is still valid today. The UIW Study data and findings need to be carefully considered in the UAA for the Lower Des Plaines River, including any assessment of appropriate thermal water quality criteria for the Lower Des Plaines River, to ensure that the most complete and reliable data available are used to determine what use(s) are attainable for this water body. Due to their comprehensive length, this report cannot extensively reference the studies performed as part of the UIW effort, but does provide a full executive summary in Appendix 2. All UIW documents are publicly available for review and can be provided upon request. (See listing of UIW Study individual reports and content summaries in Appendix 3).

III. HISTORY OF THE WATERWAY

The 53-mile section of the UIW originally studied by ComEd is a mix of artificial and greatly-modified natural waterways extending Southwest from Chicago to the Kankakee River. (Figure 1). Early in the history of Chicago, a plan was conceived to protect the area's primary water supply, Lake Michigan, by constructing three man-made waterways to permanently reverse the flows of the Chicago and Calumet River systems away from the lake, and divert the contaminated water downstream where it could be diluted in the Des Plaines and eventually the Illinois River. The man-made Chicago Sanitary and Ship Canal, completed in 1907, merges with the Des Plaines River about 40 miles downstream of Lake Michigan near Lockport, Illinois. Diversion water from Lake Michigan increased the navigation capabilities of the system and provided additional waste dilution. Construction of the Cal-Sag Channel was completed in 1922, connecting the Calumet and Little Calumet Rivers with the Chicago Sanitary and Ship Canal. Construction of these man-made waterways was a significant ecological event. It provided a direct link between the Great Lakes Drainage and the Mississippi Drainage.

Reconstruction of the UIW in its present form began in 1919. A new and larger channel was constructed in the Lower Des Plaines River and the upper Illinois River to form a continuous

navigational channel from Lake Michigan to the Mississippi River. This new channel was at least nine feet deep and 300 feet wide throughout and greatly increased the barge transport capabilities of the system. The project included construction of seven major locks and three dams, including a 40-foot dam just south of Lockport and a 34-foot dam just south of Joliet at Brandon Road. A third, 22-foot dam was constructed at Dresden Island, less than two miles downstream from the confluence of the Kankakee and Des Plaines Rivers.

In its UIW Study, ComEd covered the 53-mile reach between the diversion from Lake Michigan at Chicago and the Dresden Island Lock and Dam. The current UAA study reach area is a subset of the entire UIW. It extends from the Lockport Lock and Dam on the Chicago Sanitary and Ship Canal (RM 290) down to the I-55 Bridge on the Lower Des Plaines River (RM 278). This subset of the UIW is referred to herein as the "UAA Reach".

A. Power Plants in the UAA Reach

There are two open-cycle, coal-fired power plants that discharge either into or immediately above the UAA Reach. These plants, formerly owned and operated by ComEd, were sold to Midwest Generation in December, 1999. They include:

Will County Station is located in Romeoville, Illinois, near the intersection of the Chicago Sanitary and Ship Canal and 135th Street. (RM 295.5) The station has a total of 4 units, with a combined capability of 1154 gross megawatts of electricity. (For reference: 1 megawatt is enough power to service approximately 1000 homes). The first Will County unit began operations in 1955; the most recent unit came on-line in 1963.

Joliet Stations #9 (Unit 6) and #29 (Units 7&8) are capable of producing a total of approximately 1414 megawatts of electricity. The stations are located in Will County, approximately one mile southwest of the City of Joliet, Illinois. (RM 285) They are located on the Lower Des Plaines River just downstream of the Brandon Road Lock and Dam. The older Joliet unit began operating in 1959; the two newer units came on-line in 1966. Joliet Station #29 has 24 supplemental cooling towers to assist with heat dissipation. These towers were installed in 1999 and are used, as needed, to maintain near and far-field compliance with the existing thermal water quality standards.

Figure 1: Map of Upper Illinois Waterway, Including UAA Reach

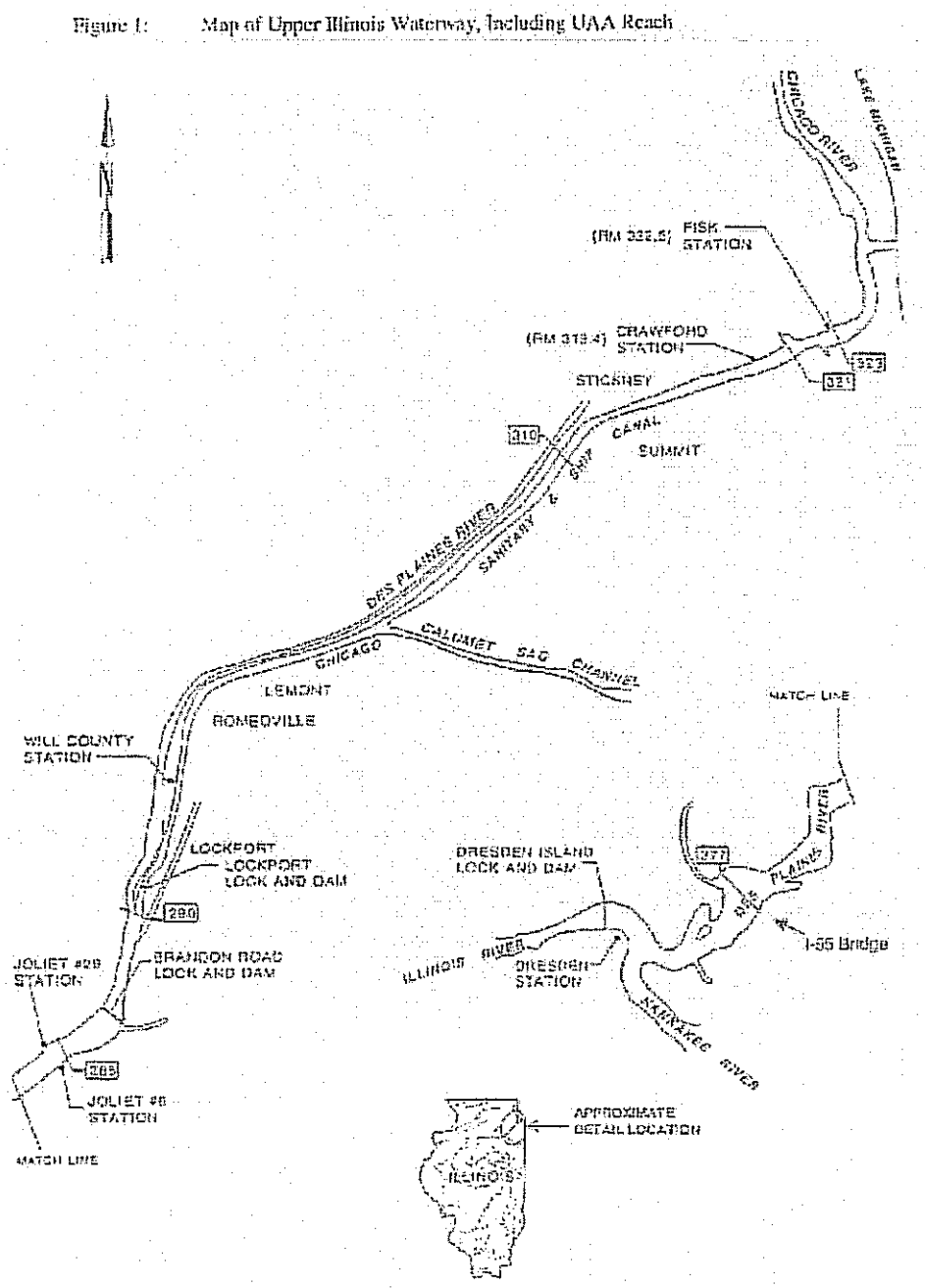


Table 1: Listing of Current Water Quality Limitations In Effect for the Lower Des Plaines River

PARAMETER	UNITS	GENERAL USE	SECONDARY CONTACT AND INDIGENOUS AQUATIC LIFE
pH	SU	6.5 minimum 9.0 maximum	6.0 minimum 9.5 maximum
Dissolved Oxygen	mg/L	5.0 minimum	4.0 minimum [5]
Arsenic	ug/L	(3)	1000
Barium	ug/L	5000	5000
Boron	ug/L	1000	(4)
Cadmium	ug/L	(3)	150
Chloride	mg/L	500	---
Chromium (Total)	ug/L	---	---
Chromium (Trivalent)	ug/L	(3)	1000
Chromium (Hexavalent)	ug/L	(3)	350
Copper	ug/L	(3)	1000
Cyanide	mg/L	(3)	0.1
Fluoride	mg/L	1.4	13.0
Iron (Total)	ug/L	---	2000
Iron (Dissolved)	ug/L	1000	500
Lead	ug/L	(3)	100
Manganese	ug/L	1000	1000
Mercury	ug/L	(3)	0.5
Nickel	ug/L	1000	1000
Phenols	ug/L	100	300
Selenium	ug/L	1000	1000
Silver	ug/L	3.0	100
Sulfate	mg/L	500	---
Total Dissolved Solids	mg/L	1,000	1500
Total Residual Chlorine	ug/L	(3)	---
Zinc	ug/L	1000	1000
Fecal Coliform Bacteria			
May-Oct.	#/100 ml	200 [5]	---
Nov.-April	#/100 ml	---	

Table 1: Listing of Current Water Quality Limitations In Effect for the Lower Des Plaines River

PARAMETER	UNITS	GENERAL USE	SECONDARY CONTACT AND INDIGENOUS AQUATIC LIFE
Ammonia Nitrogen (total)	mg/L	15 [2]	---
Un-Ionized Ammonia	mg/L	[2]	0.1
Nitrate Nitrogen	mg/L	---	---
Oil and Grease	mg/L	---	15.0
Total Phosphorus	mg/L	0.05 [3]	---
Aldrin	ug/L	---	---
Dieldrin	ug/L	---	---
Endrin	ug/L	---	---
Total DDT	ug/L	---	---
Total Chlordane	ug/L	---	---
Methoxychlor	ug/L	---	---
Toxaphene	ug/L	---	---
Heptachlor	ug/L	---	---
Heptachlor epoxide	ug/L	---	---
Lindane	ug/L	---	---
Parathion	ug/L	---	---
2,4-D	ug/L	---	---
Silver	ug/L	---	---

mg/L = milligrams per liter ug/L = microgram per liter

1. 35 Ill. Adm. Code Part 302 (1990).
2. Including the Calumet-Sag Channel, which shall not be less than 3.0 mg/L at any time
3. Acute and Chronic Standards (see Table 3-2).
4. (-) means no numeric standard specified; narrative standard applies
5. Waterbody reaches physically unsuited for primary contact use and not found in urban areas or parks may be designated as unprotected
6. The allowable concentration varies in accordance with water temperature and pH values. 15 mg/L is the maximum total ammonia nitrogen value allowed. In general, as both temperature and pH decrease, the allowable value of total ammonia nitrogen increases as calculated from the un-ionized ammonia nitrogen standards. Standard applies to certain lakes and reservoirs and at the point of entry of any stream to these lakes and reservoirs.

Table 1: Listing of Current Water Quality Limitations In Effect for the Lower Des Plaines River

Acute and Chronic Illinois General Use Water Quality Standards. [1]

Parameter	Unit	Acute standard [2]	Chronic Standard [3]
Un-ionized ammonia			
April-October	mg/L	0.33	0.057 [6]
November-March	mg/L	0.14	0.025 [6]
Arsenic (total)	µg/L	340	150
Cadmium (total)	µg/L	exp[A+B ln(H)] A = -3.918 B = 1.128 but not to exceed 50 ug/L	exp[A+B ln(H)] A = -3.490 B = 0.7852
Chlorine (total residual)	ug/L	19	11
Chromium (total Hexavalent)	µg/L	16	11
Chromium (total trivalent)	µg/L	exp[A+B ln(H)] A = 3.688 B = 0.819	exp[A+B ln(H)] A = 1.561 B = 0.819
Copper (total)	µg/L	exp[A+B ln(H)] A = -1.464 B = 0.9422	exp[A+B ln(H)] A = -1.465 B = 0.8545
Cyanide (weak acid dissociable) [4]	µg/L	22	5.2
Lead (total)	µg/L	exp[A+B ln(H)] A = -1.201 B = 1.273	exp[A+B ln(H)] A = -1.567 B = 1.273
Mercury (total) [5]	µg/L	2.0	1.1

Where: Exp(x) = base of natural logarithms raised to x power

ln(H) = natural logarithm of hardness of the receiving water in mg/l

1. 35 Ill. Adm. Code Part 302 (1999).
2. Not to be exceeded except when a zone of initial dilution is granted.
3. Not to be exceeded by the average of at least four consecutive samples collected over any period of at least four days.
4. American Public Health Association. 1998. Standard Methods for the Examination of Water and Wastewater. 20th edition. American Public Health Association, American Water Works Association, Water Environment Federation. 4500-CN I. STORET No. 718.
5. Human health standard is 0.012 mg/L.
6. Unless an effluent modified water is recognized in an NPDES permit.

IV. CURRENT UAA REACH USE DESIGNATION AND THERMAL WATER QUALITY STANDARDS

A "designated use" is the use specified in state water quality standards for each water body or segment. In setting use designations, a state is required to protect "existing uses." (40 CFR §131.10 and §131.12). "Existing uses" are defined as "those uses actually attained in the water body on or after November 18, 1975, whether or not they are included in the water quality standards." For the UIW, Illinois EPA is obligated to protect the uses actually attained as of November 18, 1975 or thereafter. In January, 1974, the Illinois Pollution Control Board (the "Board") designated the UIW as a "Secondary Contact and Indigenous Aquatic Life" use water body under the Illinois use classification system (hereinafter referred to as "Secondary Contact"). With little change since its adoption in 1974, the purpose of the Illinois Secondary Contact use classification is described in 35 Ill. Adm. Code §302.402 as follows:

> Secondary contact and indigenous aquatic life standards are intended for those waters not suited for general use activities but which will be appropriate for all secondary contact uses and which will be capable of supporting an indigenous aquatic life limited only by the physical configuration of the body of water, characteristics and origin of the water and the presence of contaminants in amounts that do not exceed the water quality standards listed in Subpart D.

The entire UIW from the South Branch of the Chicago River down to the I-55 Bridge has a designated use of Secondary Contact and Indigenous Aquatic Life. The narrative and chemical criteria associated with the Secondary Contact use designation are listed in Table 1. Other waters in the state (aside from Lake Michigan and Public and Food Processing Water Supply, which have their own specific limitations) are designated as General Use waters under the Illinois use classification system.

A. Thermal Water Quality Standards

With regard to thermal water quality limitations, there are significant differences between Secondary Use and General Use, as summarized below:

1. Secondary Contact

- Temperature shall not exceed 93 °F for more than 5% of the time, or 100 °F at any time (at the edge of the allowable mixing zone defined by Rule 302.102 of IAC, Title 35, Chapter 1, Subtitle C).
- Total of approx. 438 allowable excursion hours in any 12-month rolling period
- 100 °F maximum limitation, year-round

2. General Use (applicable downstream of the I-55 Bridge)

Narrative Criteria:

- There shall be no abnormal temperature changes that may adversely affect aquatic life unless caused by natural conditions.
- The normal daily and seasonal fluctuations which existed before the addition of heat due to other than natural causes shall be maintained.

Numeric Criteria:

- The water temperature at representative locations in the main river shall not exceed the maximum limits below during more than 1% of the hours in any 12-month period ending with any month. Moreover, at no time shall water temperature at such locations exceed the maximum limits by more than 3 °F:

  DECEMBER-MARCH: 60 °F

  APRIL-NOVEMBER: 90 °F

- Total of approx. 87 allowable excursion hours in any 12-month rolling period

- The maximum temperature rise above natural temperatures shall not exceed 5 °F.

The General Use thermal limitations are considerably more stringent than the Secondary Contact limits, both in numeric criteria and number of allowable excursion hours. Of equal concern here is that the General Use thermal standards by their express terms were intended to apply to "natural" waterways. The narrative General Use thermal standards assume that "natural" conditions existed in the waterway before the addition of point source discharges. Hence, the General Use thermal standards prohibit temperatures from rising more than 5 °F above "natural temperatures" and also require the maintenance of natural fluctuations in thermal levels in the waterway that existed before the addition of "other than natural" causes. The General Use thermal water quality standards were never intended to apply, and by their terms, cannot be applied to a waterway like the UAA Reach. The Lower Des Plaines River is not a "natural" waterway. It is a primarily man-made, artificial waterway with physical characteristics ill-suited to the application of General Use standards. It was constructed and/or altered for the purpose of protecting the water quality of Lake Michigan and maximizing commercial navigation, with the help of a lock and dam system that artificially creates and regulates water levels and flows. It does not have a "natural" temperature. It has temperatures that are dictated by the man-made uses for which it was constructed and/or altered.

3. Adjusted Thermal Standard for I-55

In addition to the two thermal limitations outlined above, there is an adjusted thermal limitation at the I-55 Bridge currently applicable only to Midwest Generation Power Plants. This adjusted limit was granted by the Illinois Pollution Control Board (IPCB) in Docket

Number AS96-10 , based on the results of the comprehensive UIW study performed by ComEd and overseen by the UIW Task Force. (See IPCB Order and Opinion, AS96-10, dated Oct. 3, 1996). The Adjusted I-55 Thermal Standard includes the following thermal limits and conditions:

Adjusted I-55 Thermal Standard

January:	60 °F
February:	60 °F
March:	65 °F
April 1-15:	73 °F
April 16-30:	80 °F
May 1-15:	85 °F
May 16-31:	90 °F
June 1-15:	90 °F
June 16-30:	91 °F
July:	91 °F
August:	91 °F
September:	90 ° F
October:	85 ° F
November:	75 ° F
December:	65 ° F

The Adjusted I-55 Thermal Standard may be exceeded by no more than 3 ° F during 2% of the hours in the 12-month period ending December 31, except that at no time shall Midwest Generation's plants cause the water temperature at the I-55 Bridge to exceed 93 ° F.

- A total of 175 excursion hours per calendar year are allowed.

The Adjusted I-55 Thermal Standard replaces the General Use Thermal Water Quality Standard for the Midwest Generation Plants. The Adjusted I-55 Thermal Standard recognizes the limitations and artificial influences on the thermal conditions of the UAA Reach while continuing to protect the existing uses of that waterbody.

V. THE RELATIONSHIP BETWEEN THE ADJUSTED THERMAL STANDARD AT I-55 AND THE UAA FOR THE LOWER DES PLAINES RIVER

In seeking the thermal adjusted standard from the IPCB in 1996, ComEd was required, in part, to show that the proposed adjusted standard would not adversely impact or prevent improvements to the aquatic community within the UAA Reach. In that proceeding before the IPCB, ComEd presented data for the entire UIW waterway, from Lake Michigan downstream to the Dresden Island Lock and Dam. The data presented demonstrated that thermal discharges from the power plants are not the main factor limiting further improvements in the aquatic community in the entire waterway, including the UAA Reach. There are other physical and biological constraints that prevent those improvements. These findings from the UIW Study, relied upon previously by

the IPCB in AS96-10 adjusted standard proceeding, are equally applicable here in the UAA of the Lower Des Plaines River.

According to Section 27(a) of the Illinois Environmental Protection Act (the "Act"), the IPCB was required to take into account the following factors in determining whether to grant the adjusted thermal standard requested by ComEd:

(a) the existing physical conditions;
(b) the character of the area involved, including surrounding land uses;
(c) zoning classifications;
(d) nature of the receiving water body, and
(e) the technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution.

The Illinois EPA also addressed each of these factors in its recommendation filed with the Board to grant the adjusted standard in AS96-10. (AS96-10 Agency Recommendation, filed August 9, 1996) The IPCB summarized the Agency's recommendation as follows:

> While stating that it was "technically feasible" to reduce the effluent temperature from the plants to meet the General Use Thermal WQS (at I-55) by the use of cooling towers... the Agency provided the opinion that the costs of installing additional cooling "may not be economically reasonable when compared to the **likelihood of no improvement in the aquatic community of the UIW**". (AS96-10, Opinion and Order at p.7)--(emphasis added).

After a thorough review of the information presented in the AS96-10 proceeding, in October, 1996, the Board granted ComEd the requested I-55 adjusted thermal limitations applicable at the I-55 Bridge in the Des Plaines River. (General Use thermal water quality standards continue to apply to the waterway below the I-55 Bridge). In granting ComEd the thermal adjusted standard, the Board accepted, with the Illinois EPA's support, the findings of the UIW Study. The UIW Study found that the operation of these power plants does not interfere with maintaining a reasonably balanced indigenous community of aquatic organisms in the UIW consistent with the limited physical habitat and history of chemical contamination that remains in the sediment and the predominant uses of the waterway, namely barge transport and conveyance of non-point and treated point source discharges.

In 2000, with Illinois EPA support, the Board again found that the conditions in the UIW, including the lack of impact that the adjusted thermal standards would have on the ecosystem of the receiving waterway, supported the transfer of the adjusted thermal limits from ComEd to Midwest Generation. (AS96-10 Opinion and Order, March 16, 2000)

The Board concluded that conditions in the Lower Des Plaines River in 2000 had not changed appreciably from when the original thermal adjusted standard was granted, based on the 1991-1995 data presented in the UIW Study. Today, just a few years later, these significant limiting factors in the UAA Reach are still present and prevent it from attaining full General Use status.

There have been no significant changes in Midwest Generation's operation of its power plants since the AS96-10 adjusted thermal standard was granted. No adverse impacts have been observed on the indigenous fish community during the course of the plants' operation since Midwest Generation assumed ownership in late 1999. Annual fisheries monitoring has demonstrated that the fish community present is consistent with what one would expect for an impaired waterway. Midwest Generation continues to monitor the fish community in the system, as well as temperature and dissolved oxygen at the I-55 Bridge, on a regular basis. Results of these studies are submitted to Illinois EPA and other regulatory/environmental groups on an annual basis. The more recent monitoring results continue to show no appreciable changes from the 1991-1995 data on which the IPCB granted the thermal adjusted standard.

VI. CURRENT THERMAL COMPLIANCE STATUS

All thermal discharges from Midwest Generation's power plants continue to meet the near-field Secondary Contact standards at the edge of the allowed mixing zone, as well as the far-field adjusted thermal standard at the I-55 bridge. Compliance is maintained through continuous real-time monitoring, as well as the use of customized thermo-hydrodynamic modeling to adjust station operations, when warranted, to meet both near and far-field thermal limitations.

VII. PHYSICAL/HYDRAULIC/CHEMICAL NATURE OF THE SYSTEM

The upper two-thirds of the UIW can best be characterized as a slow-moving, relatively uniform canal with little or no natural shoreline. The bottom one third is, in essence, a series of impoundments separated by locks and dams. The hydrology of the entire system is complex, owing to the diverse mixture of water sources and their inherent flow variabilities. The flow rate in the system is unstable, especially in close proximity to the Locks and Dams, and is largely controlled by flows regulated by the locks and dams, in response to navigational needs, as well as upstream run-off events. (MWRD, 1992)

The inputs from all water sources vary seasonally, although the system is dominated by wastewater treatment plant discharges year-round (Dick Lanyon, MWRD, personal communication). Currently, summer discretionary diversions from Lake Michigan account for less than 50% of the overall flow. Moreover, as the discretionary diversion from Lake Michigan into the Ship Canal incrementally decreases as more lake water is used for domestic purposes, the system will eventually be dominated solely by wastewater treatment plant (WWTP) flows and non-point source run-off year-round, without the benefit of any dilution water from Lake Michigan.

A. Brief Description of the Pools Comprising the Upper Illinois Waterway

Lockport Pool (Not part of the UAA Reach): 34 mile reach. Narrow, dredged waterway with borders comprised of vertical rock, pilings or rip-rap. Depths vary from 16 to 26 feet.

Brandon Pool: 5 mile reach. Extends for five miles from the Lockport Lock and Dam to the Brandon Road Lock and Dam. The Des Plaines River enters the Brandon Pool just downstream

of the Lockport Lock and Dam (RM 290) at which point the waterway changes from a narrow man-made channel to a wider canal with an average depth of 20 feet and variable width.

Dresden Pool: 15 mile reach. Extends from the Brandon Road Lock and Dam down to the Dresden Island Lock and Dam. Main channel depths vary from 15 to 20 feet. The Dresden Pool has less artificial shoreline than the other two navigational pools. In addition, it has limited off-channel backwater and slough areas which are largely absent in the upstream reaches. Dresden Pool also has several minor tributaries, including the DuPage River, Hickory Creek, Jackson Creek and Grant Creek.

Both the Brandon Pool and upper portion of the Dresden Pool are being evaluated to determine if it is appropriate to change their current use designation. Lockport, Brandon and Upper Dresden Pool waters are currently designated as Secondary Contact waterways. (See Table 1)

B. Effects of Artificial Flow Control and Barge Traffic

From the information presented to the UAA Task Force, Hey and Associates' cursory review of selected data and conclusions regarding the lack of impact by barge traffic on the system is notably incomplete. The review was largely confined to the potential effects on main channel chemical water column quality. It did not take into consideration the significant impacts that frequent barge traffic in the UAA Reach has on the aquatic biota or their preferred habitats within the waterway as a whole.

The transportation of commodities along the UAA Reach continually affects the physical and biological quality of the system. The waterways are typically ice-free in the winter, allowing barges to navigate the UAA Reach year-round. Pool water levels are variably controlled to aid barge navigation, as well as to reduce flooding, thereby eliminating environmentally beneficial seasonal flushing events found in natural systems. The frequent manipulation of pool levels and flows to balance navigational requirements, along with the need to release the magnitude of excess water resulting from rainfall and snowmelt runoff, results in continuous disruptions to the biota that are not found in natural systems. Due to the relatively narrow breadth of the waterway, surge effects from the barges continually disrupt the channel border areas and carry fine-grained sediments into protected backwater and off-channel habitats. (Burton, 1995b)

The constant barge traffic through the UAA Reach may adversely affect aquatic organisms, particularly fishes, by:

(1) physically injuring or stranding fishes,
(2) disrupting or disturbing spawning habitat,
(3) uprooting aquatic vegetation,
(4) increasing turbidity via resuspension of bottom materials, and
(5) enhancing toxicity by resuspending and dispersing the fine-grained sediments shown to be associated with toxic compounds.

The net effect of barge traffic on the UAA reach is to make the main channel and border areas a less hospitable environment for most aquatic life and for recreational users alike.

As acknowledged by U.S. EPA and well-established in the literature, the presence of dams reduces the abundance and diversity of riverine species. This is a result of interrupting or eliminating migration, the pooling effect upstream of each dam, the sediment that builds up behind dams, etc. Species most effected are so-called fluvial specialists (e.g., most darters, many suckers, etc.), whereas habitat generalists (e.g., common carp, gizzard shad, channel catfish), and pelagic species (e.g. emerald shiner, freshwater drum) do quite well under impounded conditions. Similarly, simple lithophiles (e.g., redhorse and most darters), which require clean, hard substrates, do poorly in impounded situations because of increased siltation while those that are nest builders (e.g., centrarchids), or have modified spawning strategies (e.g., bluntnose minnow) do quite well under the same set of circumstances.

The studies that U.S. EPA conducted and/or sponsored on the Fox River clearly demonstrate these impacts as shown by declines in IBI scores upstream of each dam. The adverse impacts on aquatic communities caused by dams are recognized by other Region 5 States. For example, Wisconsin and Michigan are actively promoting dam removal. Ohio has a separate use classification that recognizes effects from dams, as reflected by the subcategory of their Modified Warmwater Habitat (MWH) designation noted as "impounded". In addition, Ohio also retains a MWH subcategory for "Channel-Modified" conditions. (See Table 7-15 of Ohio Administrative Code, Chapter 3745-1, effective July 7, 2003).

A recent study by United States Geological Survey (USGS) and the Illinois Natural History Survey (INHS) has documented direct mortality to aquatic life caused by towboats. Gutreuter et al (2003) found that various medium to large fish were killed as a result of propeller strikes in Pool 26 of the Mississippi River, as well as the lower portion of the Illinois River. They estimated that 790,000 gizzard shad were killed in just this area as a result of propeller strikes. The number of fish killed was a function of the number of fish killed per kilometer times the amount of barge traffic (kilometers traveled). On a large river such as the Mississippi, at least some fish will move away in response to oncoming barge traffic. (Lowery 1987, Todd et al 1989). In a smaller, narrower river like the Des Plaines, propeller avoidance would likely be more difficult, so it is reasonable to assume that the mortality rate estimated for the Mississippi River will at least be as high and may be higher in the Des Plaines River. So, in addition to detrimental effects due to re-suspension of sediment (contaminated and otherwise) and localized changes in water levels due to barge traffic and storm water control, direct mortality to the aquatic community due to barge traffic also has now been documented.

The system's hydraulic modifications are solely under the control of MWRDGC and the U.S. Army Corps of Engineers, and are in place exclusively to accommodate flood control and commercial navigation. There is no indication that navigational/flow control and ensuing barge traffic will ever be removed as a existing use for this waterway, as "navigation" is a protected use under the Clean Water Act. (See Clean Water Act, § 303(c)(2)(A)). As such, it constitutes a "permanent" modification which significantly precludes the attainment of full General Use in the UAA waterway under Factor #4 of the UAA criteria. (Appendix 1).

A considerable body of research has been collected during the past 20 years showing that significant adverse impacts are associated with the type of hydraulic modifications found in the

UAA Reach. For similar conditions, other states, such as Ohio, have refined their use classification systems to address the specific limitations posed by such modifications Here, even the IEPA Consultant's Draft UAA report acknowledged (See Draft UAA Report, p. 8-16) that expectations for the Upper Dresden Pool were lower because of hydraulic impacts and thus suggested the creation of a proposed use category called "General Use Impounded". Clearly, the reasonable biological expectations for areas like the UAA Reach are lower than those required for a General Use Classification System. The hydraulic modifications in the UAA Reach support either retention of the existing Secondary Contact use or creating a new use that could include modified water quality standards and associated criteria to reflect the aquatic community and recreational use limitations imposed by such adverse, persistent constraints.

C. Pollutant Loadings to the UAA Reach

A major component of the flow to the UAA Reach, 70% or more of the flow upstream of Brandon Road Lock and Dam is derived from treated wastewater discharges (Final Report, UIW Study, 1995. p. 10.4-2). These discharges,, by their nature and volume alone, remain a significant influence on conditions for aquatic life in the UAA Reach, and the UIW as a whole. A wide variety of industrial facilities line the shores of the UIW, particularly in the Lockport and Brandon Pools. (There are no power plants that discharge directly into the Brandon Pool). Discharges from these facilities are currently controlled by the NPDES permitting program, in accordance with the existing Secondary Contact Water Quality Standards.

Current monitoring data presented in the preliminary UAA reports indicate that water column quality may have improved over the years to the extent that most General Use chemical criteria are now being met within the waterway below Brandon Lock and Dam, and possibly upstream as well. (This subject is addressed in detail in the Hey and Associates' Draft Final UAA Report and will not be described here). However, there are still many non-point sources, as well as combined sewer overflows (CSO), that contribute to the overall pollutant loading to the system, including its sediment contamination, and are not readily controllable through current regulatory mechanisms. According to the U.S. EPA's review of the states' 2002 section 303(d) Lists, pathogens are the second most frequent cause of water quality impairments under the Clean Water Act. Excessive nutrients are also among the top four leading causes of water quality impairments. (U.S. EPA, August 2003). Hey and Associates found that the General Use fecal coliform standard cannot be met in the UAA Reach and that nutrient standards not yet developed but under consideration for Illinois General Use streams also may not be attainable in this waterway (Draft UAA Report, Chapter 7)

D. Extent and Physical Characteristics of Sediments in the UIW

From an aquatic ecological perspective, a significant stressor in the UAA Reach is the accumulation of fine-grained sediments and the presence of legacy contaminants from historic discharges. Next to structural habitat availability (discussed in the following section), the physical nature of the sediment in the UIW continues to be one of the most significant factors adversely influencing the present and future expected assemblage of aquatic biota present in the Lower Des Plaines River.

In the July 2002 U.S. EPA draft guidance on non-point source pollution, U. S. EPA identified many detrimental effects on aquatic life caused by excessive sedimentation from urban run-off. (U.S. EPA, July, 2002. p. 26-31) Sediment, whether contaminated or not, was found to be the leading cause of impairment accounting for 38% of the impaired waters in the nation. More recently, the U.S. EPA reported that "[s]edimentation and siltation problems account for more identified water quality impairments of U.S. waters than any other pollutant." (U.S. EPA, August, 2003). Excessive erosion, transport and deposition of sediment in surface waters is a significant form of pollution. Sediment imbalances impair many waters' designated uses. Excessive sediment can impair aquatic life by filling interstitial spaces of spawning gravels, impairing fish food sources, filling rearing pools, and reducing beneficial habitat structure in stream channels.

While the UIW Study did not quantify the amount of sediment present within the waterway, it did examine the types of sediment present, as well as its depositional pattern, particularly as it relates to the presence of contaminated sediment in the waterway.

The extensive studies performed by ComEd in the mid 90's (Burton, 1995a and 1995b, and 1998, 1999) found that contaminated sediments occur in all three navigational pools and are present primarily in side-channels and backwater areas. Sediment inputs from local drainages appear to have covered the historically contaminated sediments in some areas, especially along the lower reaches of the Dresden Pool. However, substantial deposits of fine-grained and potentially contaminated materials remain throughout the UIW, including in the limited habitat areas in the UAA Reach, posing a permanent impediment to significant improvement of overall ecological integrity of the system. In a recently completed (EA. May, 2003) habitat evaluation on the Dresden Pool, it was found that sedimentation was moderate to severe in many (23 out of 34, or 70%) of the areas where QHEI scores were calculated. Sedimentation appears to have gotten worse over the past 5-10 years (e.g., DuPage Delta). (Maps of QHEI locations are available upon request--large bmp files: 9.8MB).

A key limiting factor to improved biological conditions in the UAA Reach is the physical characteristics of the sediment itself (i.e., fine, silty, organic). The fine, silty and organic nature of the sediments are not suitable for many higher quality fish species which need a hard, clean substrate for spawning. Even if the stream could be remediated and the existing sediment (contaminated or not) removed, the nature of the waterway itself (e.g. impounded) would ensure that additional fine, silty sediment (whether clean or contaminated) would continue to be deposited, thereby preventing an improved habitat for better quality aquatic life. The unpreventable and irreversible accumulation and physical quality of the sediments that will always be present in the system is limiting further biological improvements in the UAA Reach, with existing, depositional area sediment contamination exacerbating the fundamental siltation problem.

As part of ComEd's UIW Study, conducted from 1991-1995, a thorough literature review (EA, 1992), followed by a detailed risk screening (LMS, 1995), defined historic patterns of sediment contamination in the Lower Des Plaines River and identified the following list of contaminants of special concern: **ammonia, arsenic, cadmium, chlordane, chromium, copper, DDT, dieldrin, lead, mercury, nickel, PCBs, PAHs and zinc.**

Intensive sediment and immediately overlying water column samples were subsequently taken and analyzed as part of the UIW study. (Burton, 1995a) Toxicity varied among pools and habitat types. Differences were correlated with sedimentation patterns. Fine-grained sediments from depositional areas were found to be the most toxic. Overlying waters also were found to be toxic. These fine-grained, contaminated sediments tend to occur at the tributary mouths and in backwater and protected areas of main channel border habitat---especially in the Lockport and Brandon Pools. These contaminated sediment depositional areas provide the primary source of potential habitat for the fish community. As such, the fish are likely exposed to whatever contamination currently exists within these specific areas. In contrast, sediments collected from main channel habitat and power plant intakes and discharges throughout the UIW generally had no or very little sediment toxicity. However, these areas do not provide suitable aquatic habitat for most aquatic organisms.

Monitoring by the Illinois Department of Natural Resources (IDNR) has shown significant body burdens of contaminants in adult, bottom-feeding fishes within the UAA Reach, as well as elsewhere in the UIW. These results are used by the Illinois Department of Public Health (IDPH) to establish annual human health risk advisories. (IDNR, 2002-2003 and IDPH, 2002-2003) There is an on-going consumption advisory for bottom-feeding fish species in effect for the Dresden Pool, as well as the upstream reaches and further downstream. This fish consumption advisory is clear and continuing evidence of the prevalence and persistence of sediment contamination in the UAA Reach.

The highest levels of toxicity were found in sediments collected between the junction of the Cal-Sag Channel and the Chicago Sanitary and Ship Canal and the Brandon Road Lock and Dam tailwaters. The Brandon tailwater area has been previously identified as the best quality aquatic habitat in the UAA Reach, based on its physical characteristics. (These are the same depositional areas AquaNova and Hey and Assoc. identify as potential "recreational use" waters (littoral zones)). Sediment toxicity in the Dresden Pool was more variable than in the two upper pools, with effects observed predominantly on growth. Toxicity was not restricted to the surface sediments, as much of the historic deposition has since been covered over by cleaner material.

More recent sediment sampling in the UAA Reach was performed by U.S. EPA Region 5 during the summer of 2001. Results of this investigation only have been released as part of the draft UAA Report, and have not undergone prior review by the UAA Biological Subcommittee or the UAA Workgroup. A thorough review of this data should be conducted as part of the overall evaluation of the future use potential of the waterway; however, these results must also be viewed with caution. Sediment is so heterogeneous and selectively dispersed in the system that unless a large quantity of samples are taken and analyzed, as was done in the previous UIW Study, the sampling may not be fully representative of the UAA Reach. Areas of significant contamination may be missed by a random sampling program. The draft UAA Report presents only average sediment sampling values from the U.S. EPA sediment sampling database. This partial disclosure of the U.S. EPA 2001 sediment sampling results does not allow for a meaningful, scientific assessment of the data. The average values do not reveal whether they reflect either a broad or narrow range of individual sediment sampling location results.

Grouping sediment data together to present only an "average" concentration of chemicals/metals/ toxics does not provide a true picture of where the specific areas of contamination are or the associated contamination levels. Averaging dampens out the heterogeneity of sediment quality and distribution, which is an extremely important factor in determining the adverse exposure levels sediment present to biological organisms. The data presented in the draft UAA Report does not disclose or differentiate between sediment sample type(s) or specific sampling site(s) at any given River Mile location. Thus, there is no way to determine if it reflects the results of main channel or side-channel/backwater areas. As explained above, sediment distribution (and any associated contamination) is extremely heterogeneous in nature within the UAA Reach. Depositional areas that would otherwise provide available fish habitat, such as those found just above or below lock and dams or backwaters/side channels, have large accumulations of sediment, while locations near the main channel may have sparse or no sediment accumulation, due to the scouring effects of barges and sporadic high river flows. Accordingly, sediment sampling results that average the values across various types of sediment areas will likely understate the levels of sediment toxicity present in the aquatic habitat areas in the UAA Reach.

In contrast, the sediment data obtained during the course of the UIW studies has been fully disclosed and peer reviewed. It represents the most comprehensive record available of current sediment quality and composition in the system, as well as how its presence in various locations relates to habitat quality and toxicity, within the UAA Reach and beyond. Since sediment characteristics do not change appreciably over a few year's time, the results of the UIW sediment characterization/toxicity work remain valid and applicable to this UAA process. A thorough and reliable assessment of sediment quality is critical to the overall use designation assessment of the Lower Des Plaines River. It affects the assessment of both biological habitat quality and the long-term potential for future recreational activity in the waterway. As noted earlier, the areas that are the most important biologically are also the areas that have been found to be the most contaminated.

The IEPA consultants assume that any contaminated sediments can be removed permanently and are not a limiting factor to the overall improvement of the waterway. However, this contamination is the result of historic deposition. It is not solely due to current point source discharges which could, theoretically, be controlled through tighter NPDES permit limits. No proposal, plan or funding has yet been identified by anyone that would remove the biological limitations these sediments (contaminated and otherwise) place on the UAA Reach and prevent them from reoccurring.

Even if remediation of any historically contaminated sediments was feasible, the impounded nature of the waterway will result in the continual deposition of fine, silty sediments, especially in the main-channel border, side-channels and backwaters where the majority of aquatic organisms reside. This type of sediment, as well as the continual barge traffic that affects its ultimate location in the waterway, is not conducive to the development of an improved biological community. The physical quality of the sediments in the system will continue to limit further biological improvements, with existing, depositional area sediment contamination exacerbating the siltation problem. The presence and persistence of fine-grained sediments in the UAA Reach constitutes a "lack of proper substrate..., unrelated to water quality," within the

meaning of the UAA regulations (UAA Factor #5), that preclude the attainment of aquatic life protection uses.

E. Effect of Temperature on Contaminated Sediments

Generalizing on the effects that elevated water temperatures may have on contaminants in the UIW is a difficult task. Elevated water temperatures may increase the rate of chemical or biological degradation of complex organics, strengthen or weaken the physical or electrostatic bonding of toxicants to inert substrates or to other chemical molecules, increase or decrease the rates at which organisms take up materials, increase physiological capabilities of the organism to eliminate or metabolize toxicants, thereby altering the level of concentration of the chemical at which toxic effects are expressed, and so on. Since it has been shown that the thermal discharges to the system are buoyant and do not generally affect the lower portion of the river, the sediments are not likely exposed to high water temperatures and should not be impacted by them, either positively or negatively. (Burton, 1995a) In any event, the overriding negative effects caused by the levels of contamination that remain present in the system, as well as the presence of fine-grained sediments themselves, regardless of whether they are contaminated or not, pose a continuing concern for the future potential of the waterway to meet a higher use.

F. Physical Habitats

1. Types and Availability of Physical Habitats

An obvious requirement for a diverse aquatic biota is a suitable variety of living spaces. As part of the original UIW study performed by ComEd, the entire UIW was surveyed to determine the types, distribution and relative amounts of physical habitats available in the three navigational pools. (Habitat definitions conventional for large rivers and reservoir systems were used in the survey). These habitat classifications are still valid today, as they are based on physical characteristics of the waterway, that have not changed appreciably since the UIW study. (EA, 1993)

Main Channel:	51.6%
Main Channel Border:	22.4%
Backwaters, Sloughs and Artificial Embayments:	10.4%
Tributary Deltas:	7.0%
Tailwaters:	4.6%
Tributary Mouths:	3.0%
Intake/Discharge Embayments:	1.0%

The preponderance of habitat available in the system is main channel (MC) and main channel border (MCB), areas where the effects of barge transport and industrial and municipal discharges are especially dominant. Main channel habitat, which accounts for more than 50% of the available area, is poor habitat for most fishes owing to excessive depths, scour and lack of food resources. Protected backwater areas and tributary mouths are almost non-existent in the Lockport Pool and uncommon in the Brandon Pool. These two upper pools are primarily artificial or dredged waterways with a uniform bottom and shear rock, piling or rip-rap borders.

A greater diversity of habitats is available downstream in the Dresden Pool, although these are still adversely affected by barge traffic and historical sediment deposition.

2. Physical Habitat Quality

Quantitative techniques for evaluating physical habitat in large river systems are generally lacking. Although it has shortcomings and limitations, the best quantitative system available for the UIW is the Qualitative Habitat Evaluation Index (QHEI) (Rankin, 1989). This numeric index ranks aquatic habitats as to selected attributes, availability and desirable quality characteristics. The outcome is a numeric score (ranging from 0-100) that allows comparison of habitats from other aquatic systems. The higher the numeric score, the better the quality of aquatic habitat in the waterway. The points allotted for the QHEI scores are divided as follows: Substrate (20 pts), Cover (20 pts), Channel Morphology (20 pts), Riparian Zone (10 pts), Pool/Riffle Quality (20 pts) and Gradient (20 pts).

The UIW studies found that average QHEI scores for the different habitat types ranged from 42 to 69, with the higher values attributed only to tributary mouths, a small riffle-run area in the Upper Des Plaines River, and the Brandon Road tailwater. The predominantly low scores reflect the artificial nature of the system and the limited variety of habitat. Channelization, inadequate in stream cover, lack of riffle-run habitat, excessive siltation, lack of clean, hard substrates, and poor quality riparian and floodplain areas all contribute to the low QHEI scores.

The UIW study also found that habitat conditions were poorest in the Lockport Pool (mean QHEI = 45.3), marginally better in the Brandon Pool (mean QHEI = 48.6) and better still in the Dresden Pool (mean QHEI = 54.8). However, even the best of these three QHEI scores is well below values typical of unaltered systems of comparable size. For example, Ohio EPA identifies a target minimum value of 60 as necessary to assume a potential for warmwater habitat use. All of the QHEI scores for the UAA Reach, except for the Brandon Road tailwater, were well below the target score of 60 that would be the Ohio equivalent to consider a General Use designation.

A more recent and more extensive habitat evaluation study was performed by EA Engineering, Science and Technology ("EA") in May 2003 on the entire Dresden Pool. QHEI scores were calculated along both banks of the river at 0.5 mile intervals throughout the pool. Field biologists from Illinois EPA accompanied EA during this investigation. Results are presented in Tables 1A and 1B. The results of this 2003 study show that habitat conditions today in the UAA Reach remain relatively unchanged from when first reviewed as part of the comprehensive UIW studies conducted in the early to mid-1990s. In fact, average scores now are even lower than they were in the mid-90's. The recent QHEI scores for the UAA waterway are all clearly well below what would be expected for a General Use stream under the Illinois use classification system. EA personnel reviewed the QHEI scores collected at all 34 locations and determined that poor habitat is pervasive throughout the Pool. IEPA biologists, present throughout the evaluation process, concurred that the entire area "looked the same" (Joe Vondruska, EA, personal communication).

Modifications to the QHEI factors which could improve overall habitat should be considered by Illinois EPA and its consultants as part of the UAA analysis. On the whole, however, the

individual QHEI metrics which are the major contributors to degraded habitat quality are those that cannot be feasibly or economically reasonably mitigated, including insufficient current speed, sediment quality (physical characteristics of the sediments), excessive siltation, lack of riffle areas, little or no sinuosity and poor riparian development (Table 1C).

Table 1A. Des Plaines River QHEI Scores, 21 May 2003.

Upstream I55			Downstream I55		
	QHEI Score			QHEI Score	
RM	Right Bank	Left Bank	RM	Right Bank	Left Bank
285.5	65.5 (TW)*	48 (MCB)	277.5 (408)	28 (MCB)	45.5 (MCB)
284.5	47.5 (MCB)	36.5 (MCB)	276.5	39 (MCB)	42 (MCB)
283.8 (403A)	43.5 (MCB)	39 (MCB)	275.5	49.5 (MCB)	57 (MCB)
282.5	35.5 (MCB)	36.5 (MCB)	274.4 (419A)	60 (MCB)	40 (MCB)
281.5	36 (MCB)	36 (MCB)	273.5 (501)	54.5 (MCB)	28 (MCB)
280.5	38 (MCB)	41 (MCB)	272.5	56 (MCB)	37 (MCB)
279.5	59 (MCB)	49 (MCB)	272.0 (510/507)	51 (MCB)	32.5 (MCB)
278.5	56 (MCB)	48 (MCB)			
	Overall Mean = 44.7 (Range = 35.5-65.5)			Overall Mean = 44.3 (Range = 28-60)	

* Habitat Type: TW = Tailwater MCB = Main Channel Border

Table 1B. QHEI Scores at Off-Channel Locations.

Location	Score
405--Treats Island (RM 279.7)	53
408--Mouth of Jackson Creek (RM 278.3)	54.7
414--Bear Island Slough (RM 275.9)	40.5
418--Mouth of Grant Creek (RM 274.8)	57.5

Provided below are the 10 major components of the QHEI that contributed to the low scores:

Table 1C--Dresden Pool Individual QHEI Factors--May 2003

Factor	No. of Locations Affected (out of 34)
Poor Development (of riffles)	ALL
No Riffles	32
Current Speed None or Slow	32
Recent Channelization or Lack or Recovery	30
No Sinuosity	23
Moderate to Heavy Silt	23
Extensive or Moderate/Extensive Embeddness	19
Only Substrate Silt or Detritus	10
Poor (≤ 6) Instream cover	8
Urban or Industrial Riparian Zone	6

Practically speaking, these factors either cannot be remediated (e.g. lack of sinuosity, substrate only silt) or the effort to remediate them, (e.g., the amount of instream cover) would be unprecedented for a stream of this size.

In addition, EA reviewed the habitat characteristics of the Brandon and Upper Dresden Pools and compared them to Ohio's use designations for Warm Water Habitat (WWH) and Modified Warm Water Habitat (MWH) to provide additional analysis, as requested by U.S. EPA. The results of this effort are presented in the following table (Table 1D), which was compiled based on the same criteria used by Ohio EPA to determine whether an area should be classified as WWH or MWH. As these data show, both the Brandon and Upstream Dresden Pool areas share many of the characteristics of modified warm water habitat streams, and except for depth, possess **none** of the characteristics associated with warm water habitat streams.

Table 1D. Comparison of warm water habitat (WWH) and modified warm water habitat (MWH) characteristics of the Des Plaines River.

	Brandon Pool	Upper Dresden Pool
WWH Characteristics		
No Channelization or Recovered		
Boulder, Cobble, Gravel Substrates		
Silt Free		
Good-Excellent Development		
Moderate-High Sinuosity		
Cover Moderate to Extensive		
Fast currents & Eddies		
Low/Normal Substrate Embeddness		
Max Depth > 40cm	X	X
Low/No Riffle embeddness		
Total WWH Characteristics	1	1
MWH Characteristics with High Influence		
Recent Channelization		
Silt/Muck Substrates	X	X
No Sinuosity	X	X
Sparse/No Cover	X	X
Total MWH (High)	3	3
MMH Characteristics With Moderate Influence		
Recovering Channelization	X	X
High or Moderate Silt Over Other Substrates		
Sand Substance (Boat)		
Fair/Poor Development	X	X
Low Sinuosity		
Only 1-2 Cover Types		
Intermittent or Interstitial		
Max Depth < 40cm		
High Embeddness of Riffle Substrates	X	X
Lack of Fast Current	X	X
Total MWH (Moderate	4	4
Total MWH (All)	7	7

With regard to the approach summarized in Table 1D, Yoder and Rankin (1996) stated that "as the predominance of modified habitat attributes increase to a modified warmwater ratio of greater than 1.0-1.5, the likelihood of having IBI scores consistent with the WWH use declines." In both Brandon Pool and Dresden Pool, the ratio is 7:1, far greater than 1.5:1 trigger point suggested by Yoder and Rankin. Thus, it is clear, based on this well established methodology, that neither of these areas is capable of attaining a Warmwater (i.e.General) Use, so some lower classification is clearly warranted.

These unalterable limitations in the physical conditions/habitat features of the waterbody, even without the presence of contamination, preclude the attainment of aquatic life protection uses consistent with General Use requirements. Therefore, these limitations meet the requirements of factor #5 of the UAA criteria for determining that General Use is not an attainable use designation for the UAA Reach. (Appendix 1).

Also, in the May 2003 EA study, no significant differences were found between habitat type or availability upstream or downstream of I-55. Similarly, the fish community downstream of I-55, where General use thermal water quality standards are in force, is not appreciably better than the fish community upstream of I-55, where Secondary Contact thermal limits are effective. This demonstrates that the maintenance of General Use thermal standards in the area downstream of I-55 does not allow attainment of a fish community commensurate with a General Use designation. The fish community is comparable upstream of I-55 where the less restrictive thermal Secondary Contact standards apply. If thermal levels made any appreciable difference, this would not be the case. Clearly, there are factors like the absence of adequate habitat in the Lower Des Plaines River, not thermal levels, that are limiting the assemblage of aquatic organisms present in the waterway.

The absence of adequate habitat limits the fish species that can inhabit the UAA Reach. Fish species whose natural history minimizes contact with the sediments or that are highly tolerant of degraded conditions, that preferentially attach to "clean or non-silty" substrates such as rocks or rip-rap around power plant intakes, are pelagic in nature or that prefer to live along rocky submerged cliffs, can be expected to inhabit the system. However, most aquatic species, especially fishes, require a sequence of varying habitat types as they proceed through the different life stages. The overall lack of habitat diversity in the UIW represents a serious impediment to the development of a more diverse resident aquatic biota consistent with a General Use designation. (Final Report, UIW Study, 1995. p. 2.6-1)

G. Limitations of the Illinois Use Classification System

Section 303(c) of the Clean Water Act provides that in setting water quality standards, States should consider the following factors: the use and value of State waters for public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation. (See also 40 CFR §131.10(a)). Thus, the Act allows the States to consider the use and value of the particular water body in determining its appropriate use designation. Within these directives, a state has the flexibility to develop and adopt whatever use classification system, including subcategories of uses, it deems appropriate. For example, Section 303(c)(2)(A) of the Clean

Water Act includes "industry", "navigation", "marinas" and "agriculture", among the many suggested use designations for a water body.

However, Illinois has only two generic use designations for inland waterways: Secondary Contact and Indigenous Aquatic Life and General Use. The General Use classification is a broad aquatic life use that assumes a water body will support all aquatic life and all types of recreational uses. It does not differentiate among aquatic communities or the physical characteristics of a water body. Illinois also has not developed any use subcategories under its existing use classification system. As the U.S. EPA has noted, making a determination of non-attainment in waters with broad use categories may be difficult and open to alternative interpretations. (See *Water Quality Standards Handbook: Second Edition*, U.S. EPA, August 1994, Section 2.4, p. 2-5). Due to the lack of any refined delineation of use classifications in Illinois, there is a regulatory bias in favor of designating or "defaulting" waterways to the General Use classification.

In U.S.EPA's Water Quality Standards Handbook (Second edition. 1994--p.2.5), the Agency discusses the need for sub-categories of use in certain cases:

> *"Designated uses are described as being intentionally general. However, States may develop subcategories within use designations to refine and clarify the use class. Clarification of the use class is particularly helpful when a variety of surface waters within distinct characteristics fit within the same use class, or* ***do not fit well into any category.***" (emphasis added).

In the newly published "Strategy for Water Quality Standards and Criteria" document (U.S. EPA, August, 2003), it was stated that "assigning tiered designated uses is an essential step in setting water quality standards." EPA's Office of Science and Technology (OST) agrees that refined uses including biologically "tiered" uses can improve the effectiveness and credibility of state and tribal standards in many situations. "Many states are learning that refined uses offer advantages for waterways where information is available to develop them. For example, they can provide better operational definitions of desired outcomes, and can provide flexibility to describe locally-important variations that broad uses cannot." (EPA Strategy for Water Quality Standards and Criteria--August, 2003. EPA-823-R-03-010, p. 24).

Other Region 5 states either already have or are in the process of refining and expanding their use classifications. Ohio has four warmwater aquatic life use classifications. Their very best streams are classified as Exceptional Use. The majority of Ohio streams are classified as Warmwater Use; this use would be equivalent to Illinois' General Use. The next lower Ohio classification is Modified Use, which they further subdivide depending on the type of modification, e.g., Impounded (dams), Channelized, or Acid Mine Drainage. Thus, Ohio clearly recognizes that dams, due to their impounding effect, can necessitate a lower use classification. Lastly, Ohio has a category called Limited Resource Water, which is their lowest classification. In some cases, water quality criteria are adjusted to provide the level of protection necessary to protect each of Ohio's uses.

In comparison to Illinois' existing use designations, the state of Ohio's use classification system has a range of acceptable use designations based on measured physical, chemical and biological criteria. In Ohio's use designation guidance documents, the Ohio EPA has noted that sites with QHEI scores of less than 60 often do not support balanced, indigenous aquatic communities. (Ohio EPA, 1989a) Ohio EPA also notes that streams with gradients <5 ft/mile (as is the case in the UAA Reach) are very slow to recover or may not recover at all, resulting in an "irretrievable anthropogenic modification".

Wisconsin is in the process of developing new and more refined uses and has prepared (November 2002) a Draft document entitled "Guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters". For warmwater, Wisconsin is proposing the following categories: Diverse Fish and Aquatic Life (which they propose to further subdivide), Tolerant Fish and Aquatic Life, and Very Tolerant Aquatic Life. These categories would be quite similar to Ohio's Warmwater, Modified Warmwater, and Limited Resource Water uses, respectively. The draft Wisconsin guidance lists the factors which would allow one of their streams to be put into one of the two lower use categories. Three of the reasons they cite are particularly relevant to the UAA Reach:

1) "Dams, diversions or other types of hydrologic modifications preclude the attainment of a Diverse Fish and Aquatic Life community, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of a Diverse Fish and Aquatic Life community."

   Thus, Wisconsin, like Ohio, recognizes the negative effect that dams can have on aquatic life.

2) "Human caused conditions or sources of pollution prevent the attainment of a Diverse Fish and Aquatic Life community and cannot be remedied or would cause more environmental damage to correct than to leave in place."

   They go on to note that "This condition can occur where years of poor land management have resulted in sediment and nutrient deposits in streams and other water bodies. These deposits can result in habitat destruction and degraded water quality. These conditions may not be attributable to one source and cannot be remediated through enforcement or reasonable management actions. Degraded habitat or water quality will likely continue to persist even with better land management in the watershed."

   The problem of legacy sediment contamination in the UAA Reach clearly would fall under this definition.

3) "Physical conditions related to the natural features of the water body, such as the lack of proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of a Diverse Fish and Aquatic Life community."
   Wisconsin proposes to apply this to situations where the lack of these features is a result of the natural condition of the waterway. Nonetheless, it is a clear acknowledgement that

> these factors, whether a result of natural conditions, or from the damming of a river, as in the UAA Reach, has severe consequences to the biota.

Given the precedents established by these other Region 5 states, Illinois should give strong consideration to developing one or more new and more appropriate use categories.

In its *Water Quality Standards Handbook*, the U.S. EPA offers some guidance in establishing subcategories of use designations. The U.S. EPA notes that subcategories of aquatic life uses may be based on: attainable habitat (*e.g.*, coldwater versus warmwater habitat); innate differences in community structure and function (*e.g.*, high versus low species richness or productivity); or fundamental differences in important community components (*e.g.*, warmwater fish communities dominated by bass versus catfish). (*Water Quality Standards Handbook: Second Edition*, U.S. EPA, August 1994, Section 2.4). The U.S. EPA also suggests using biological data as a basis for creating subcategories, such as using measurable biological attributes to create a use subcategory. *Id.*

In general, the U.S. EPA supports the use of greater specificity by states in defining use classification systems. It is considering revisions to the water quality regulations that would require more precise use designation systems by the states. In its 1998 Advanced Notice of Proposed Rulemaking on the Part 131 water quality regulations, the U.S. EPA said:

> [T]he Agency's current thinking is that there is a growing need to more precisely tailor use descriptions and criteria to match site-specific conditions, ensuring that uses and criteria provide an appropriate level of protection which, to the extent possible, is neither over nor under protective. 63 Fed.Reg. 36750 (July 7, 1998).

The discussions held during the recent U.S. EPA-sponsored national symposium entitled "Designating Attainable Uses for the Nation's Waters" (GLEC, July, 2002) also highlighted the current need for more refined designated uses with more differentiated criteria applicable to site-specific waterbodies.

For Illinois, the development of additional use classification designations to address those waters which fall between Secondary Contact and General Use may be an appropriate course of action to further evaluate the proper use classification of the UAA Reach[1].

The Lower Des Plaines River data reveals that in some ways it can attain uses that are higher than those included in the Secondary Contact Use designation. However, the application of the UAA regulatory factors shows that it cannot attain a General Use designation. The alternative of creating a new use designation or a subcategory that incorporates an appropriate hybrid of General and Secondary Use water quality standards is an option that would be consistent with U.S. EPA guidance and current thinking on use classification systems.

[1] The Clean Water Act regulations require an opportunity for public hearing before a State may establish a use subcategory. See 40 C.F.R. § 131.10(e).

An additional use category would allow the State to recognize and maintain the improvements that have been made in the Lower Des Plaines River chemical water quality over time, while also accurately concluding that certain fishable/swimmable uses are not attainable. Under such an additional use category, less stringent limitations are justified and warranted for those parameters which are not responsible for limiting the existing and potential indigenous aquatic community or preventing full recreational uses in a physically compromised system.

VIII. POWER PLANT EFFECTS ON THE WATERWAY

A. Effects of Power Plants on Physical Habitat

Power plants add to the availability of physical habitats in a localized but generally positive way. Intake and discharge embayments provide protected off-channel refuges. High velocities in the discharge areas tend to scour fine, contaminated sediments. Discharge water temperatures during mid-summer reach levels sufficient to exclude many of the more heat-sensitive fish species from the hottest portions of the plumes, but the areas affected are quite small. These same areas attract fish during the colder months of the year. Thermal plume observations conducted in connection with the UIW study in 1993-1994 revealed that in each instance at least 75% of the cross-section of the stream was in compliance with applicable thermal standards, providing a zone of passage for potentially affected organisms. (Final Report, UIW Study, 1995. Chapter 3). The data collected during the 2002 Joliet thermal plume studies conducted by EA for Midwest Generation, during typical summer operating conditions, showed that the two thermal plumes from the Joliet Stations are continuing to meet both the mixing zone and zone of passage requirements of 302.102 in the context of the existing Secondary Contact thermal water quality standards (EA, 2003, p 13-15). Being surficial in nature, the thermal plumes from Midwest Generation's plants have no negative impacts on the existing physical habitats for aquatic life in the Lower Des Plaines River.

B. Water Temperature Regime

Generally, main channel water temperatures in the entire UIW tend to be warmer year round than would be expected for a river of comparable size in this geographic region. As an effluent-dominated waterway, the primary causes of the elevated thermal regime in the UIW are discharges from power plants and wastewater treatment plants (WWTP). WWTPs contribute a large component of the flow (100 % during low flow periods) and their discharges tend to have a relatively constant, moderate temperature which has the effect of dampening seasonal and diurnal changes. While power plants do not change the volume of flow, they add heat and raise the water temperatures not only near the plant, but progressively downstream. The increases in incremental temperature gradually diminish as heat is lost to the atmosphere, but overall water temperatures do increase from the Chicago Metropolitan area to the Joliet area, due to a combination of ambient solar heating, WWTP discharges, power plant contributions and non-point source sheet runoff from urbanized areas. (Final Report, UIW Study, 1995. Chapter 3).

The UIW study confirmed the cyclic nature of both temperatures and organism life stages in the waterway. Because nearly all temperate zone organisms normally live in temperatures that cycle annually, it is assumed that maintenance of a seasonal cycle is important. Thermal modeling

shows that water temperatures in the system are higher than they would be without the power plants in operation, but that the seasonal cycle is nonetheless preserved. The UIW studies observed actual conditions associated with power plant operations. It also confirmed that biological cycles are maintained in the waterway. The timing of biological cycles did not appear to be altered significantly, although some shifts probably do occur because the temperature cycle in the waterway cannot be considered "natural".

C. Longitudinal Temperature Distributions

The variability in temperatures inherent in the water source inputs to the UIW, atmospheric conditions (largely unpredictable), and operations of the power stations make concise, quantitative portrayal of longitudinal temperatures throughout the system extremely difficult. Midwest Generation uses predictive mathematical models to extrapolate hypothetical temperature distributions assuming fixed representative inputs and atmospheric conditions. The reliability of these models to depict realistic conditions has been confirmed for a wide range of seasonal and operational circumstances. (Holly, et. al, 1994-1995)

All of Midwest Generation's power plants in the UIW utilize once-through, open cycle cooling systems. Each plant takes relatively large volumes of water through its condensers and discharges it directly back into the waterway at an elevated temperature. Stations must meet the current Secondary Contact thermal limitations at the edge of the allowable mixing zone. Compliance is monitored by reporting end-of-pipe temperatures, per NPDES permit requirements. Compliance is verified internally by performing mass-balance calculations to determine the fully mixed waterway temperature. Field verification studies have been performed, including the field studies performed by ENSR as part of the UIW Study (ENSR, 1995) , as well as more recent studies (EA, 2003) that demonstrate compliance with the Secondary Contact thermal limits at the edge of the allowed mixing zone.

The UIW thermal modeling analysis shows that the overall thermal regime of the waterway downstream of the MWRDGC's Stickney Water Reclamation Plant (WRP) is influenced more by the temperature of the Stickney WRP treated effluent discharge than by any upstream temperatures: warmer in the winter, cooler in the summer. Therefore, any impacts on temperature from the operation of Midwest Generation's Fisk and Crawford Plants (located upstream of the Stickney WRP and approx. 33 River Miles upstream of the UAA Reach) on the Lower Des Plaines are negligible.

D. Non-Summer Water Temperatures in the Lower Des Plaines River:

While summer temperatures have been the primary focus in the draft UAA report, non-summer temperature limits also need to be adequately addressed in the course of the this UAA evaluation. There are periods during the Winter and Spring when ambient river temperatures currently exceed the corresponding General Use thermal water quality limit, largely due to the influences of the MWRDGC's Stickney Water Reclamation Plant (the "Stickney WRP"). The Stickney WRP provides up to 100 % of the flow to the waterway during the winter months. Its discharge elevates UIW temperatures above what would be found in a natural waterway during this time

of year. The result is an altered thermal regime, regardless of the input of heat from MWGen's plants.

This phenomenon is substantiated by MWGen's temperature monitoring data upstream of the UAA study reach that indicates ambient water temperatures often exceed the General Use thermal water quality criteria limit of 60 °F / 63 °F during the winter months. This is largely due, as indicated above, to the significant influence of MWRD's treated wastewater discharge on the waterway. Unless the temperature of this dominant discharge is controlled to ensure that downstream ambient temperatures meet the General Use criteria, the "natural" (in so far as anything can be considered natural in this waterway) background temperature of this waterway will remain elevated during the Winter and Spring months.

The Cal-Sag Channel enters the Chicago Sanitary and Ship Canal between the Stickney WRP discharge and Will County Station. Inflow temperatures from the Cal-Sag tend to be very similar to those at the Roosevelt Road Bridge (the most upstream influent point in the UIW system). Proceeding downstream, the next significant thermal input in the Lockport Pool (aside from the MWRD discharge during the winter months) is the discharge from Midwest Generation's Will County Station. Some of the heat from the Will County Station's discharge is gradually dissipated to the atmosphere along the approximately five mile reach from the Station to the Lockport Dam. This cooling continues for another mile and a half below the Lockport Dam, at which point it is further diluted by the discharge from the upper Des Plaines River. Inflows from the upper Des Plaines tend to have a cooling effect on the Lower Des Plaines River year-round, although the volume of total flow contributed is minimal.

Joliet Stations #9 and #29 are located in the Dresden Pool approximately a mile downstream of Brandon Road Lock and Dam. The waterway in this lower pool has a moderately large cross-sectional area (and surface area) and water movement downstream is relatively slow. A substantial portion of the heat input from the Joliet Stations is lost to the atmosphere before the flow reaches the I-55 Bridge located approximately seven miles downstream--the point at which General Use water quality standards begin.

Five miles downstream of I-55, the mixing of the Lower Des Plaines River with the cooler waters of the Kankakee River further reduces the water temperature. However, the inflow of the Kankakee tends to be compressed along the south bank of the channel such that full mixing (and reduction of the temperature by dilution) does not occur until downstream of the Dresden Island Lock and Dam. (Holly, et. al. 1995)

E. Lack of Thermal Effects on Phytoplankton and Zooplankton

The warmest areas in the UAA Reach occur in the near-field plumes immediately downstream of the points of discharge from Midwest Generation's power plants. Important questions associated with possible near-field impacts include whether these temperatures are sufficiently high to kill or injure planktonic organisms passing through the plants' cooling systems, whether mobile organisms will be excluded from areas in the immediate discharge vicinity, and whether the movements of mobile organisms up and down the waterway will be blocked by elevated temperatures that might completely occupy the cross-section near any particular station. The

UIW Study components were designed to respond to these questions. More recent information (EA, 2003) also confirms the limited extent of influence of the thermal plumes from MWGen's Joliet plants on the lower Des Plaines River under typical summertime operations.

The UIW Study showed that truly planktonic forms of algae (and presumably zooplankton) make up a very minor component of the flora and fauna in the UAA Reach. (Final Report, UIW Study, 1995. Chapter 5). For the most part, planktonic organisms are represented by species that attach to or are closely associated with the substrate--periphytic algae and grazing zooplankters. The UIW Study results indicate that phytoplankton densities generally increase with distance downstream. These increases are related to an expansion of available habitats in the lower pools, the input of plankton from tributaries in these pools, and to some extent, from increased growth rates due to elevated water temperatures.

Previously done studies documented in the UIW report, as well as the monitoring work done for the UIW study, confirm that algae in the UIW system have little susceptibility to entrainment and that similar community structure and abundances are found throughout the UIW. The community below Dresden Lock and Dam (RM 271.4) on the Illinois River was similar to that in the upper Des Plaines River and the Kankakee River. These results indicate that members of the phytoplankton communities in the system receiving warm-water effluents were similar to those removed from this influence. Although identified as a potential concern in the draft UAA report, the UIW studies of phytoplankton and periphyton clearly show that the system is not dominated by blue-green algae. It is, in fact, populated by the same species assemblage as other similar river-reservoir navigation channels. Phytoplankton density at Joliet was comparable to the density observed in Pool 19 of the Mississippi River, which is not thermally impacted. This shows that members of the phytoplankton and zooplankton communities are not impacted on a long-term basis by power generation.

F. No Adverse Thermal Effects on Macrophytes

Surveys showed that aquatic macrophytes occur throughout the UIW wherever suitable substrate occurs (Final Report, UIW Study, 1995. Chapter 6). Elevated water temperatures seem to be having no adverse effect on macrophyte stands, either in the general, system-wide context or in the immediate vicinity of power plant discharges. As the result of respiration, oxygen levels within the confines of the macrophyte beds may fall to low levels during the night, especially in the two upper pools. This may limit the value of such areas as habitat for sensitive fish species and life stages.

G. No Adverse Thermal Effects on Benthic Macroinvertebrates

The elevated water temperatures below power plant discharges or the generally warmer conditions that prevail in the UIW relative to nearby waterways are not adversely affecting macroinvertebrate composition or distributions. Habitat condition, as well as sediment quality, rather than temperature, appear to be the primary controllers of benthic invertebrate community composition within the UIW system. (Final Report, UIW Study, 1995. Chapter 7). The assemblages of near-field areas at each of the generating stations studied generally demonstrated an overall improvement in community quality relative to areas either upstream or further

downstream of the discharge, a result likely arising from improvements in flow regime within the discharge canals themselves. The UIW Study findings directly contradict the draft UAA report contention that the number and distribution of bottom organisms decreases as temperature increases. This might hold true where identical, suitable habitat conditions are present and not variable, as in the case of the Lower Des Plaines River, where macroinvertebrate habitat conditions are generally better within the discharge canals of the power plants than elsewhere in the waterway, despite the sometimes elevated temperature conditions. It is also important to understand that the warmest temperatures occur in the upper to middle portions of the water column, thus not affecting bottom-dwelling benthic macroinvertebrates. In the UIW study, any taxa that were found to be reduced or eliminated within the near-field areas typically demonstrated a rapid recovery to the composition and condition of those upstream of the discharges. This suggests that there was no observable cumulative impact of thermal effluents on the macroinvertebrate community.

H. Effect on Fisheries

The "Selection of the Temperature Standard" and "Critique of the Current Secondary Contact and Indigenous Aquatic Life Standard" sections of the draft UAA report have many inaccurate statements regarding temperature effects on riverine species and ecosystem processes. High and low temperatures may or may not be detrimental to aquatic life that resides in the UIW. There is not a simple relationship, as noted from many past studies (e.g., Cairns et al. 1973; Cairns et al. 1978; review by the Institute for Environmental Quality 1995). Both low and high temperatures can increase AND decrease toxicity due to exposures from other chemical stressors, such as found in the UIW, and is both species, toxicant type, toxicant concentration and species dependent. The overly simplistic statement that high temperatures increase toxicity is simply incorrect. Nitrification is also inhibited by cold temperatures and ammonia is not always consumed in the upper sediment layers. Nitrification is very sensitive to toxicants, which abound in the depositional sediments. The UAA consultants AquaNova and Hey and Associates incorrectly imply that high temperatures are always detrimental by focusing only on negative thermal impacts and over-generalizing. Both ammonia and ammonium can be toxic but this is both species and concentration dependent. For example, the amphipod *Hyalella azteca* is more sensitive to total ammonia than the un-ionized form. Blue green algae are not a concern in the UIW due to its high flow. Toxic cyanobacterial blooms have only been noted in pond, lake and reservoir ecosystems. So, many of the "negative" examples used in the draft UAA Report do not apply to the UIW, yet their presentation implies that they do.

The UIW study data, as well as the results of MWGen's on-going monitoring, show that the magnitude, duration and extent of excess temperature in the Lower Des Plaines River is within the tolerance range for most of the species expected to reside in this waterway, given the existing physical constraints. Contrary to the implication in the draft UAA Report (October, 2003 revised temperature section, p. 2-93), "[d]irect deaths from excessive temperature beyond the thermal lethal point" have never been documented in the Lower Des Plaines River. MWGen's monitoring work (EA, 1997-2002) continues to show that dissolved oxygen levels in the Lower Des Plaines remain at or above that needed to support the indigenous aquatic community. MWGen's long-term fisheries monitoring program (EA, 2002) assessments of fish condition show that there are no obvious food availability problems in the system. Synergisms between

heat and toxic substances have been shown by Burton's studies (1995, 1998, 1999), however, these studies were conducted under controlled laboratory or in-situ conditions which represented worst-case exposure conditions. In reality, the heat from MWGen's power plants does not reach the areas where most of the sediment-bound contaminants are found.

Exclusion areas--small areas of elevated temperature avoided by sensitive mobile organisms--will occur in the immediate discharge vicinities for all of the Midwest Generation stations during the warmer months. The three-dimensional mapping of the thermal plumes (ENSR, 1994, EA, 2003), shows that buoyancy of warm water limits these exclusion areas to upper water column layers and that a zone of passage at cooler temperatures (of at least 75% of the cross-section of the waterway) remains beneath the surface thermal plume at any time. As part of the UIW Study, fly-over, infra-red imagery was taken of the waterway. (Brady, 1993-1994) These data also confirm the surficial nature of the thermal plumes in both the summer and winter periods.

These findings, together with the fact that no fish kills have been reported in or around any of Midwest Generation's stations, support the premise that resident fish species can and do move temporarily out of thermally enhanced areas and into portions of the river that are more suited to their preferred temperature range. Thermal refuges (e.g. tributary mouths) exist throughout the expanse of the Lower Des Plaines River downstream of Brandon Road Lock and Dam, and are also found upstream, although are more limited there due to the physical structure of the canal in this area.

The fishery of the UIW is basically a "warm-water" assemblage consistent with the physical circumstances of the system. Common carp dominate the biomass throughout the system. Improvements in the diversity of species occur as one moves downstream through the three navigational pools. The assemblage inhabiting the Dresden Pool, though improved over those of the Lockport and Brandon Pools, is still well below expectations. Brandon Road Lock and Dam is clearly a transition point for the fishery, based primarily on improvements in habitat availability relative to the upstream reaches. While it may not be possible to separate the various stressors to the system to determine which ones are most responsible for the limitations on the biological potential of the waterway, thermal discharges are not sufficient to account for the lack of a balanced indigenous fish community in the Lower Des Plaines River. Given the lack of balance in the Lower Dresden Pool, even if thermal discharges were to required to comply with General Use Thermal Standards, there still would not be a balanced indigenous fish community in the UAA Reach.

The warmer overall conditions of the waterway may also play a beneficial role in protecting the aquatic ecosystem as a whole, especially in light of the recent efforts of state and federal natural resources agencies to deter the threat of invasive species to our waterways. The water temperatures currently encountered in the UAA reach may actually serve to preclude the migration of non-native invasive alien species of fish, such as the Asian carp, to more sensitive waterbodies, such as the Great Lakes, which, if unchecked, could have a devastating effect on Lake Michigan's indigenous aquatic community/sport fishing industry. Midwest Generation has been working cooperatively with state and federal natural resources agencies to assist in the development of plans to control the migration of invasive species in the UAA waterway, using whatever means are technically and legally available.

I. Temperature Effects on Dissolved Oxygen Levels

For purposes of analyzing dissolved oxygen (D.O.) levels, the waterway can be divided into two segments: the area above and the area below the Brandon Lock and Dam. Dissolved oxygen levels vary seasonally in both areas in accordance with the prevailing water temperature regime, the changing solubilities of oxygen and with oxygen levels in tributaries and other source waters. Oxygen concentrations in the Lockport and Brandon Pools are typically below saturation, periodically dropping below the Illinois Secondary Contact standard of 4.0 ppm. Generally, higher oxygen levels are observed downstream of the Brandon tailwaters and in the Dresden Pool. In part, this is the result of the reaeration that occurs at the Brandon Road Dam and transport through the tailwater area. Dissolved oxygen levels in the Dresden Pool main channel are generally improved over those in the two upper pools, and are generally in compliance with applicable limits. (EA, 1997-2002 Temp/D.O. Study Reports).

It has also been speculated that power plant discharges, by adding an increment of heat to the overall waterway, are accelerating the bacterial and chemical decomposition of organic matter and the respiration of aquatic plants, thereby reducing dissolved oxygen levels. While this may be conceptually correct, the actual reduction is very small, and more importantly, accelerating decomposition has the overall positive effect of reducing levels of organic materials in the system. It is likely that occasional decreases in dissolved oxygen levels in the system are primarily caused by heavy rainfall events, nutrient introduction and primary productivity cycling and/or increased boat traffic, rather than the input of heat from power plants. (EA 2001 Temp./D.O. Study Report, p. 8-11). Illinois EPA's UAA consultant also has suggested that the cause of sporadically low D.O. cycles in the system may be more the result of nutrient enrichment and photosynthesis, rather than strictly thermal inputs. (Vladimir Novotny --personal communication. December 13, 2001).

At times power plants can also contribute to increasing the level of dissolved oxygen in a waterway. In the UAA Reach, the intermittent use of Joliet Station #29's supplemental cooling towers during warm weather periods contributes additional dissolved oxygen to the waterway. The total contribution has not been quantified but may more than offset any incremental decreases in dissolved oxygen perceived to be the result of power plant operations under high temperature conditions.

Significantly, the water temperature/dissolved oxygen studies at the I-55 Bridge performed annually by ComEd/Midwest Generation since 1997 have not shown consistent correlations between high water temperatures and prolonged adverse levels of dissolved oxygen. Supplemental physicochemical monitoring done as part of Midwest Generation's long-term fisheries monitoring system also show that dissolved oxygen levels are variable throughout the waterway during the course of the monitoring period. Typically, D.O. levels are at or above minimum limits in the various habitats sampled over the course of the summer period. (EA Upper Illinois Waterway Fisheries Investigation Reports, 2000, 2001, 2002) The observation that lower D.O. levels in the system are generally limited to a few locations for short periods of time indicates that low D.O. is not a widespread problem in the waterway.

Short-term, localized "low" D.O. levels, whatever the cause, should not have any measurable adverse impacts on the aquatic community. The U.S. EPA Green Book (FWPCA, 1968) recommends a warm water fisheries one-day acceptable minimum dissolved oxygen concentration of 3.0 mg/l, with a 7-day minimum of 4.0 mg/l. Dissolved oxygen levels in the Lower Des Plaines River are generally well above these minimums. The data analysis presented as part of the current UAA Study, as well as the UIW Study results and current monitoring data, all indicate that dissolved oxygen levels in the Lower Des Plaines River are more than sufficient to support the indigenous aquatic community.

Overall, the average D.O. in the waterway is well above that needed to sustain the indigenous biological community, as evidenced by both continuous I-55 monitoring, as well as measurements taken as part of MWGen's long-term fisheries monitoring program. These data continue to show more than adequate levels of D.O. at all of the sampling locations in the Lower Des Plaines River, including the immediate generating station discharge canals, where water temperatures are the highest.

IX. UNIQUENESS OF THE WATERWAY

The Lower Des Plaines River, along with the Chicago Sanitary and Ship Canal, Cal-Sag Canal and portions of the Chicago River are the only major waterbodies in the State currently designated as Secondary Contact and Indigenous Aquatic Life waters. They have held this designation since its inception in 1974. This is due to the unusual and unique character of this waterway. Its uniqueness creates additional challenges in trying to determine what its overall potential as a valued State aquatic resource could be in the future.

The unique character of the UAA Reach makes it difficult to identify a biological reference site for this portion of the UIW. The UAA Biological Subcommittee had several discussions regarding the availability, or lack of availability, of a biological reference site for the Lower Des Plaines River UAA Reach. A reference site is needed in order to be able to compare biological measurements from the Lower Des Plaines River with other physically similar streams in the State to determine the overall potential of the system. Several rivers in the same ecoregion have been proposed for consideration as a reference site by various Subcommittee members and the IEPA consultants, but none has received the consensus support of the UAA Biological Subcommittee upon further review. This is because there are no other waterways in the State that have the same artificially-controlled flow/level regime, the man-made "shorelines" or the significant commercial navigational/storm water control uses of the UAA Reach. All of these characteristics must be considered for a proper assessment and comparison of biological potential, because they are <u>permanent</u> features of the UAA Reach.

Without an appropriate representative reference stream, a prediction that the UAA Reach can attain the General Use classification is highly speculative. In other words, there is no actual real-life stream that mirrors the UAA Reach to show with a reasonable degree of certainty that General Use can be attained. We lack this reasonable basis on which to determine what the UAA Reach is capable of regarding the type of aquatic life it can support with more stringent water quality limitations in place. For this reason, the suggestion that a separate use designation

for this particular portion of the waterway should be developed based on what it actually has attained, or what it might reasonably attain in the future, warrants further review.

X. CURRENT MONITORING STUDIES OF THE UAA REACH

Midwest Generation continues to perform physical monitoring in the UAA Reach, including temperature monitoring (done year round at each generating station and at the I-55 Bridge), as well as seasonal temperature/dissolved oxygen monitoring at I-55. Midwest Generation, working with the Iowa Institute of Hydraulic Research, also continues to perform thermo-hydrodynamic modeling of the waterway as part of its on-going compliance commitment. These models are, by necessity, very customized in nature, due to the unique circumstances present in the river system.

The studies conducted on the UIW show the waterway to be populated with aquatic biota capable of carrying out their life functions under the constraints of available physical habitat. The studies also show that some species (e.g. walleye) and organism groups (e.g. redhorses) that might be expected in a slow-moving river-reservoir system in the Midwest at this latitude, though present, are found in reduced numbers.

The important questions here are:

(1) Is the heat contribution of Midwest Generation's plants sufficient to raise temperatures to a range that would exclude expected species, or are the reduced numbers of such species a result of other factors, such as poor habitat?; and

(2) What temperature limits are reasonable for the protection of organisms one would reasonably expect to inhabit the waterway?

Although temperature is but one factor among many that the study has shown affects aquatic life, it is useful to examine the temperature requirements of the biota in relation to existing and expected future waterway temperatures. The best information on temperatures requirements for biota is available for fish. The fish community of the Lower Des Plaines River has been monitored on an ongoing basis for the past twenty-plus years, sponsored by ComEd/Midwest Generation. The monitoring results continue to show general improvements and/or status quo in the biological community over time under the existing Secondary Contact thermal water quality limits. These results indicate that the existing thermal levels in the UAA Reach are not a significantly limiting factor to the present or future expected biological community.

XI. ESTABLISHING PROTECTIVE THERMAL LIMITS FOR THE BRANDON POOL AND THE UPPER DRESDEN POOL

A. Temperature is a Unique Constituent

Temperature has several unique characteristics that need to be considered when determining appropriate and protective thermal limits. Temperature is non-conservative; excess temperature dissipates very rapidly to the atmosphere. It does not bioaccumulate and under most conditions it stratifies vertically in the water column, thus allowing for a zone of passage even when surface temperatures might be excessive. Because temperature "behaves" in a very predictable manner, thermal models can accurately predict the general spatial distribution of thermal plumes based on a few fairly simple input parameters. However, the sudden and unpredictable flow fluctuations that occur in the Des Plaines River as a result of artificially controlled flow management make predictions much more difficult than in natural systems.

In addition to unique physical properties, fish have a well established ability to avoid excessively warm or cool temperatures (EPRI 1981). Assuming thermal refugia are available, fish will simply avoid areas that are too hot and return quickly when temperatures are more favorable. Thus, many species avoid thermal discharges during the middle of the summer, but seek out these areas during cooler periods. This is why many discharge areas are favored "fishing holes" over much of the year. Avoidance of excessive temperatures is why fish kills are rare during the summer...the more sensitive species simply leave the area. Thus, from a behavioral perspective, thermal avoidance is protective. It allows fishes to move away from conditions that otherwise may become lethal.

A distinction needs to be made between short term and long term avoidance (Ohio EPA 1978). Short-term avoidance is "the temporary avoidance by a species population caused by the onset of limiting or unfavorable environmental conditions" (Ohio EPA 1978). Short-term avoidance, though not rigorously defined, is typically considered to be on the order of hours or days, whereas long-term avoidance has been defined as the permanent or prolonged avoidance of an area (Ohio EPA 1978). Thus, long-term avoidance would be on the order of weeks or months. Long-term avoidance is an indicator of appreciable harm (assuming the area avoided is not trivial in size), whereas, short-term avoidance is not (Ohio EPA 1978). Fisheries studies performed by EA for over the past 20 years demonstrate that there is short term avoidance of the power plant discharge canals during the hotter periods of the summer, but that fish move back into the discharge areas once more preferable temperatures resume. There is no evidence that fish permanently move from the area and do not return.(EA Fisheries Monitoring Studies, various years).

The AquaNova/Hey Report states (p. 2-99) that "only adult fish are known to escape the impacts of high temperatures" and that the effect on juvenile fish is "uncertain". This is simply untrue. U.S. EPA has long acknowledged that juvenile fish can avoid high temperatures. For example, in their "Gold Book" (U.S. EPA 1986), the Agency states that "(J)uvenile and adult fish usually thremoregulate behaviorally by moving to water having the temperature closest to their thermal preference" (emphasis added). The EPA report goes on to note that "this response (avoidance) precludes problems of heat stress by juvenile and adult fish during the summer." (U.S. EPA

1986). Another interesting aspect of temperature is that the temperatures fish prefer during the summer are quite close (often within 2-4 °C) to those that are lethal (EPRI 1981).

B. Brandon Pool Current Conditions

As evidenced by the final meeting minutes of the UAA Biological Subcommittee (April 3, 2002), there was a general consensus reached by the biological experts assembled that a General Use classification is not appropriate for Brandon Pool. This determination was based on existing limitations (principally poor habitat quality, urbanization, sediment quality and barge traffic) which either cannot be changed (i.e., the habitat limitations and urbanization) or will not be changed in the foreseeable future, if at all (i.e., sediment quality and barge traffic). Because of these present and continuing limitations, the aquatic biota in the Brandon Pool will continue to be dominated by tolerant fishes and macroinvertebrates.

Given the existing and potential biotic community in the Brandon Pool, the present Secondary Contact thermal water quality standards (WQS) will be protective, whether the area remains Secondary Contact or is upgraded to a new "modified" use that also accounts for the limitations inherent in this segment of the UAA Reach.

C. Dresden Pool

If the use classification for the Upper Dresden Pool (i.e., the area upstream of I-55) remains as Secondary Contact, then the Secondary Contact thermal standards are and would remain appropriate to protect that use designation. However, as part of the UAA, a potential upgrade of the use designation to General Use or some other intermediate "modified" use is under review. Although Midwest Generation submits that a complete analysis of the UAA factors shows that General Use is not attainable for the UAA Reach, we have included in our review of the thermal standards whether more restrictive thermal standards would be needed to support any proposed upgrade in the use designation of the Upper Dresden Pool. As explained further below, this review concludes that more restrictive thermal standards would not result in any significant improvement to the aquatic communities in the Upper Dresden Pool.

To evaluate Upper Dresden Pool thermal alternatives, we applied some of the protocols typically used as part of a 316(a) demonstration under the Clean Water Act[1]. As with a UAA, a 316(a) analysis evaluates the physical, chemical and biological conditions of the waterway and characterizes potential stressors and their impacts. In a 316(a) demonstration, the main focus is on thermal discharges. The 316(a) process considers what thermal limits are necessary to support balanced, indigenous aquatic communities.

U.S. EPA has long recognized that it is not practical or necessary to evaluate the thermal tolerance of every aquatic species. It recommends that a group of Representative Important Species (RIS) be assessed.

[1]. A 316(a) demonstration is prepared to support the position that applicable thermal limits are more stringent than necessary to assure the protection and propagation of a balanced indigenous community of shellfish, fish, and wildlife in or on the water to which the discharge is made. The applicant attempts to demonstrate that alternative, less stringent thermal limits, will allow the protection of existing balanced indigenous communities, or alternatively, will allow the development of such a community if one is not present currently. This is the showing that ComEd successfully made before the Board in the AS96-10 proceeding.

According to U.S. EPA's Technical Guidance Document (U.S. EPA 1977), RIS are those that are:

1. Commercially or recreationally valuable;
2. Threatened or endangered;
3. Critical to the structure and function of the ecological system[1];
4. Potentially capable of becoming localized nuisance species;
5. Necessary in the food chain for the well-being of species determined in 1-4; or
6. Representative of the thermal requirements of important species but which themselves may not be important.

Recognizing that it is not possible or even necessary to study every species at a site in great detail due to time and resource limitations, U.S. EPA (1977) suggests that 5 to 15 species be designated as RIS because this range of RIS species allows for a representative assessment of the biotic community. Except for threatened and endangered (T&E) species, investigators generally pick species that are (or are expected to be) fairly common because it is difficult to assess the status of, or impacts to, species that occur in low abundance. Also, all other things being equal, species chosen as RIS should be ones for which thermal tolerance data are available.
Based on existing site-specific information, we compiled thermal tolerance data on the following Representative Important Species (RIS) consistent with the U.S. EPA suggestion:

Gamefish	Panfish	Forage Species	Benthic Species	Miscellaneous Species
Smallmouth bass	Green sunfish	Gizzard shad	Smallmouth buffalo	Freshwater drum
Largemouth bass	Bluegill	Emerald shiner	Channel catfish	Common carp
		Bluntnose minnow	Redhorse	

D. Justification for the Selection of RIS:

The selection of Representative Important Species (RIS) for the Lower Des Plaines River is consistent with accepted methods and guidance. MWGen also considered the inclusion of a number of cool water species, such as walleye, other percids and esocids, as suggested by U.S. EPA.

However, such cool water species are not appropriate representatives of the potential fish community in the Lower Des Plaines River. Not only is the Upper Dresden Pool near the edge of their natural ranges, but there is little or no habitat in the Brandon and Upper Dresden Pools to support them. For cool water species such as northern pike and yellow perch, which are examples of the percid species found in some Illinois waters, clear, well-vegetated lakes, pools, or backwaters are required for them to thrive and particularly to reproduce. Such areas are rare to nonexistent in these UIW pools. Therefore, these species will be limited naturally by the lack of suitable habitat.

[1]. To evaluate this factor, most investigators include at least one species at each trophic level (e.g. a herbivore, an insectivore, an omnivore and a top predator).

Even assuming the General Use Thermal Standards applied to the Upper Dresden Pool, neither good northern pike nor yellow perch populations would become established. Since, as shown during EA's recent habitat survey of the entire Dresden Pool (EA. May, 2003), habitats upstream and downstream of I-55 are similar, it follows that these species should have been able to establish viable populations in the lower Dresden Pool, which is already subject to the General Use thermal standard. However, data collected over the past nine years (See Table 1E), show that only one yellow perch and one northern pike have been collected from the General Use portion of the pool. Since populations of these two species in lower Dresden Pool are already protected by the General Use thermal standard, the only logical reason for their extreme rarity in lower Dresden Pool is lack of proper habitat or other non-thermal causes. Both species are also rare in the Upper Marseilles Pool , which is subject to the General Use thermal water quality standard, for the same reason (i.e. lack of habitat). (See Table 1F).

These cool water species are habitat limited in the UAA Reach and should not be designated as RIS. U.S. EPA (1977) guidance supports this approach for species at the edge of their range. The U.S. EPA report stated (p. 36) that "[w]ide-ranging species at the extremes of their ranges would generally not be considered acceptable as 'particularly vulnerable' or 'sensitive' representative species" though they still could be considered important." Here, based not only on their peripheral nature but also the obvious habitat limitations, the U.S. EPA guidance does not support their inclusion in the RIS designation.

Walleye are more thermally tolerant than yellow perch or northern pike and, as a result, are more widely distributed in Illinois (Smith 1979). Thus, they were not excluded from the MWGen RIS list based on being peripheral. However, like the two species just discussed, they clearly are habitat limited. Most walleye populations spawn over clear cobble or rubble areas, but some populations can spawn in flooded, well-vegetated backwaters. However, except for a small portion of the Brandon tailwaters, both habitat types are rare in Dresden Pool. Examination of data from Lower Dresden Pool and Upper Marseilles Pool supports our contention that walleye are habitat limited. Nine years of collecting fish has yielded only one walleye from the Lower Dresden Pool and only one from the Upper Marseilles Pool (See Tables 1E and 1F) despite the fact that General Use thermal standards prevail in both areas. Thus, there is no reason to believe that walleye would be any more successful in the Upper Dresden Pool than the Lower Dresden Pool.

If we compare catches of walleye with those of smallmouth bass, a species considered to have similar thermal tolerance, or to redhorse, which are likely more thermally sensitive (Reash et al 2000), it is equally clear that walleye numbers in these areas are constrained by something other than temperature. For example, Lower Dresden Pool, which yielded only one walleye, produced 477 smallmouth bass and 571 redhorse (all redhorse species combined) during the same period (See Tables 1E and 1F), and upper Marseilles Pool, which also yielded only one walleye, yielded 172 smallmouth bass and 348 redhorse. The only possible interpretation of this data is that walleye are habitat limited while the other two species, which have roughly similar thermal requirements, are not. Given that it is habitat limited, walleye is clearly not an appropriate RIS for the UAA Reach.

E. Temperature Tolerance of RIS

In considering the temperature tolerance of fish, it is important to recognize that their upper lethal temperature varies directly with acclimation temperature until that species can no longer be acclimated to any higher temperature (usually referred to as the ultimate upper incipient lethal temperature). Thus, fish exposed to summertime ambient conditions should be able to withstand water temperature at or near the upper end of the tolerance range reported for that species. All the Des Plaines River RIS except for redhorse, have upper temperature tolerances in the mid to high 30s °C (95 – 100 °F) (Table 2). This indicates that occasional exposure to temperatures in the mid to high 90s °F should have little effect on these species. The fact that populations of several RIS are good in the Upper Dresden Pool (EA 2001, 2002) supports this interpretation.

If Secondary Contact thermal standards are adversely affecting RIS, then one would expect that RIS catch rates would be lower in the Dresden Pool upstream of I-55, where the Secondary Contact thermal limits apply. Conversely, similar catch rates upstream and downstream of I-55 would suggest that the Secondary Contact thermal standards in the Upper Dresden Pool have little or no influence on the abundance of RIS. In Table 3, catch rates for all native RIS in the Dresden Pool (divided into the upstream and downstream of I-55 segments) are compared for the period 1999-2001. Thirty-three upstream vs. downstream comparisons can be made (11 taxa x 3 years). In 14 of the 33 comparisons, there is no appreciable difference between upstream and downstream of I-55 CPE's. In ten of 33 comparisons, CPE's are noticeably higher downstream of I-55. In nine of 33 comparisons, CPE's are noticeably higher upstream of I-55, where the Secondary Contact thermal limits apply. Thus, overall there is no clear pattern favoring the Dresden Pool segment upstream or downstream of I-55. On a species-specific basis, there are some differences. Emerald shiner, green sunfish, channel catfish, and freshwater drum are generally higher upstream of the I-55 Bridge. Catches of smallmouth bass, gizzard shad, bluntnose minnow, and smallmouth buffalo show no clear-cut upstream/downstream pattern. Redhorse, largemouth bass and especially bluegill CPE's are higher downstream of I-55. In sum, eight of the 11 RIS taxa show either no upstream/downstream preference or have slightly higher catch rates in the warmer upstream portion of the study area.

Largemouth bass, redhorse, and especially bluegill CPE's were generally higher in the cooler waters downstream of I-55. However, of these three species, only bluegill showed a large difference in catch rates. Both bluegill and largemouth bass are very thermally tolerant so their higher catches downstream of I-55 are likely not a result of avoiding the area upstream of I-55. Given that the abundance of most RIS is not lower upstream of I-55 and, even when catch rates are higher downstream of I-55, the difference is slight (bluegill being the only exception), it appears that changing the thermal standard upstream of I-55 from Secondary Contact to General Use may result in only a marginal improvement to the fish community.

The only species (group) that would likely be limited by the Secondary Contact thermal water quality standards are the redhorses. Little quantitative thermal data are available for redhorse but the limited data available indicate that its upper lethal limit is about 92 °F and they likely avoid temperatures in the mid to high 80s °F (Reash et al 2000). Although the thermal limits associated with the Secondary Contact use designation would likely be limiting to redhorse, it

appears that other, more important factors, already limit redhorse abundance in the Lower Des Plaines River.

The Des Plaines River downstream of I-55 is already designated as General Use. If water temperature was the principal factor affecting redhorse abundance in the Des Plaines River, then one would expect that redhorse abundance would be much higher downstream of I-55, which is already subject to the General Use thermal standards, than upstream of I-55, where the Secondary Contact thermal limits apply. Furthermore, in the absence of other limiting factors, redhorse abundance in the Des Plaines River downstream of I-55 would be comparable to that seen in other similar sized rivers. Redhorse catch rates are higher in the Des Plaines River downstream of I-55 as compared to upstream of I-55 (Table 4). However, the difference is slight (about 2 fish/km downstream of I-55 compared to about 0.5 fish/ km upstream of I-55) and probably not biologically significant. Further, redhorse catches per unit of effort (CPEs) downstream of I-55 are much lower than they are in the Kankakee River (Table 4). This indicates that other factors (likely either poor habitat or sediment quality) limit redhorse abundance in the Dresden Pool. This being the case, imposing more restrictive thermal limitations on the river upstream of I-55 would likely result in only marginal improvement in redhorse abundance and little or no improvement in the other RIS.

F. Is a Balanced, Indigenous Aquatic Community Present?

Another way to determine whether existing or proposed thermal limits are protective is to determine whether a balanced, indigenous community (BIC) is present; or, if such a community is not present, are current thermal WQS precluding development of a BIC. Based on low Index of Biotic Integrity (IBI) scores (calculated using scoring procedures developed in Ohio, (Ohio EPA 1987), we conclude that a BIC is not present in the Des Plaines River below the Brandon Road Lock and Dam (i.e., Upper Dresden Pool). In both 2000 and 2001, mean IBI scores gradually improved from the mid-teens in Lockport and Brandon Pools to the low 20s in the Dresden Pool (Figures 2 & 3). A BIC should have IBI scores in the low 40s (Ohio EPA 1987). Thus, even in the "best" areas (i.e., those downstream of I-55), the Des Plaines River fish community is poor, with IBI scores not even approaching those that would be expected from a BIC.

G. Are the Secondary Thermal Limits the Cause of the Lack of Balance?

Given that a BIC is not present, it is appropriate to consider whether the lack of a BIC is due to thermal effects or other causes. Several lines of evidence suggest that the lack of a BIC is due primarily to factors other than thermal impacts.

First, IBI scores upstream of I-55, where the Secondary Contact thermal WQS apply, are only marginally lower than in the area downstream of I-55 where the more restrictive General Use thermal WQS apply (Figures 4-6). This indicates that even if the observed IBI differences are due to differences in thermal standards, the net environmental benefit associated with the more restrictive General Use standards is minor.

Second, the mean IBI score in the Joliet Station discharge was comparable to or higher than the mean score at the location just upstream of the station in two of the past three years (Figures 4-6). If the thermal discharge was causing a significant impact, then one would expect that the impact would be most severe in the discharge canal (where water temperatures are highest), but such is not the case.

Third, when slightly better IBI scores do occur in the Dresden Pool, they occur in off-channel areas (e.g., tributary mouth and slough locations) suggesting that, in general, habitat is more important than temperature in determining the quality of the aquatic biota. This assertion is supported by the fact that IBI scores in the Joliet discharge canal (DIS) are comparable to those at main channel border (MCB) locations both upstream and downstream of I-55. Also, temperature measurements in these off-channel areas can be as high or higher than those in the main channel, further indicating that temperature is not the driver in this system (EA 2002).

Fourth, within the upstream I-55 Segment, IBI scores in the Joliet Station discharge are comparable to (i.e., within 4 IBI units, Ohio EPA 1987) to those in other habitats, including Main Channel Border (MCB), Tributary Mouth (TM), and even Dam Tailwater, a habitat with a considerably higher QHEI score.

Fifth, if temperature was the driving factor with regard to the quality of the aquatic biota, then one would expect that IBI scores downstream of the discharge to be noticeably lower than those upstream of it. IBI scores at the first MCB location downstream of the discharge were slightly lower than at the MCB location upstream of the discharge in two of three years, however, the decline is minor (on average about 3 to 4 IBI units, Figures 4 & 6). Even if this small decline is real, the spatial extent of the decline is small. In 2001, IBI scores immediately upstream and downstream of the discharge were comparable (Figure 5). Further, the fact that IBI scores in the discharge itself, where water temperatures are highest, were higher than in areas downstream of it suggests that the slightly lower scores at the next location downstream (where temperatures would be lower) may not even be related to the thermal discharge.

In any case, it is reasonable to conclude that whatever thermal impacts there might be are minor, limited to a small area, and of minor consequence compared to other, more limiting factors.

If thermal is not the principal factor accounting for the lack of a BIC and causing a poor biota throughout the Dresden Pool, then it is reasonable to ask what factor(s) are limiting the biota. As discussed in greater detail elsewhere in this report, there are several factors that clearly limit the quality of the biota. The two most severe limiting factors are poor habitat quality and sediment quality/contamination. Constant barge traffic and urbanization are two likely additional factors, and, based on QHEI metric scores, siltation is also a likely contributing factor (Note: this refers to the general negative effects of siltation in general [e.g., burying of habitats], not the toxic component of sediment). It is also important to note that of possible contributing factors, only water temperature can be addressed in part by point source controls. Thus, even if General Use thermal standards were adopted for the Des Plaines River upstream of I-55, the relevant data shows that the aquatic biota would not significantly improve because the factors that do significantly limit the quality of the biota cannot and will not be controlled.

H. Would the Upper Dresden Pool Aquatic Biota Improve Significantly if General Use WQS Were Applied and Would a BIC be Achieved?

Theoretically, the numbers of only a few species would increase in the Upper Dresden Pool, with redhorse being the group most likely to improve. In reality, however, any improvement is likely to be negligible because other, more influential, factors limit the quality of the biota. With regard specifically to redhorse, this is clearly the case as the abundance of redhorse in Dresden Pool downstream of I-55, where General Use thermal WQS already exist, is only marginally higher than that in the Dresden Pool upstream of I-55. (Table 3). Some of the other reasons why meaningful improvement in the Upper Dresden Pool aquatic community is unlikely include the following:

(1) No thermally sensitive cold- or cool-water species are present
(2) Other factors, some of which are irreversible, limit the community
(3) The community in the Des Plaines River downstream of the I-55 Bridge is not balanced despite General Use WQS (and thermal limits) being in place
(4) The amount of clean spawning substrate is limited for certain fish species due to excessive siltation.

Therefore, except for a possible small increase in redhorse abundance, the fish and benthic communities of Dresden Pool upstream of I-55 are not likely to improve significantly even if General Use thermal standards are imposed. For these same reasons, it is highly unlikely that a BIC would develop in this area.

The biological community data collected on the Lower Des Plaines River for the past 20+ years is more reliable and ecologically meaningful. It warrants a higher level of credence than laboratory-derived endpoints that attempt to predict how the biological community would respond. Good populations will be maintained only if there is adequate early life history survival, successful spawning, etc. An examination of the long term data sets shows that those species tolerant of the extensive limiting conditions that exist in the study area (*e.g.*, gizzard shad, most centrarchids, various minnows, etc.) are doing quite well, whereas those that are more sensitive to these limitations (e.g., redhorse and darters) are not. Thus, it is factors other than temperature (*e.g.*, sedimentation, poor habitat, silty and/or contaminated sediments, etc.) that determine and limit the Upper Dresden and Brandon fish communities. Temperature plays an insignificant role. In other words, there would be no significant change in these fish populations even if General Use thermal standards were applied to the Upper Dresden and Brandon Pools.

Indeed, the results of the recent pool-wide habitat assessment (EA. May, 2003), coupled with the poor IBI scores throughout Dresden Pool suggest that, if anything, it is Lower Dresden pool that is misclassified. Because of poor habit conditions due to impounding and the other factors discussed previously, the biological data supports a lowering of the use classification of Lower Dresden Pool and does not support upgrading the use designation of the upper Dresden Pool.

TABLE 1E. NUMBER, CPE (No./km), AND RELATIVE ABUNDANCE OF ALL FISH TAXA COLLECTED ELECTROFISHING FROM LOWER DRESDEN POOL (between the I-55 bridge and Dresden Lock and Dam) FOR THE PERIOD OF 1994-2002.

SPECIES	LOWER DRESDEN POOL		
	#	CPE	%
LONGNOSE GAR	32	0.16	0.079
SHORTNOSE GAR	1	0.01	0.002
UNID GAR	3	0.02	0.007
SKIPJACK HERRING	35	0.18	0.087
GIZZARD SHAD	12,070	62.00	29.881
THREADFIN SHAD	391	2.01	0.968
GRASS PICKEREL	4	0.02	0.010
NORTHERN PIKE	1	0.01	0.002
CENTRAL STONEROLLER	5	0.03	0.012
GOLDFISH	9	0.05	0.022
GRASS CARP	1	0.01	0.002
COMMON CARP	1,022	5.25	2.530
CARP X GOLDFISH HYBRID	134	0.69	0.332
BIGHEAD CARP	2	0.01	0.005
GOLDEN SHINER	21	0.11	0.052
PALLID SHINER	3	0.02	0.007
EMERALD SHINER	3,781	19.42	9.360
GHOST SHINER	12	0.06	0.030
STRIPED SHINER	20	0.10	0.050
SPOTTAIL SHINER	347	1.78	0.859
RED SHINER	2	0.01	0.005
SPOTFIN SHINER	400	2.05	0.990
SAND SHINER	3	0.02	0.007
REDFIN SHINER	1	0.01	0.002
MIMIC SHINER	3	0.02	0.007
CHANNEL SHINER	1	0.01	0.002
BLUNTNOSE MINNOW	2,602	13.37	6.442
FATHEAD MINNOW	1	0.01	0.002
BULLHEAD MINNOW	1,141	5.86	2.825
RIVER CARPSUCKER	141	0.72	0.349
QUILLBACK	90	0.46	0.223
UNID CARPIODES	1	0.01	0.002
WHITE SUCKER	11	0.06	0.027
SMALLMOUTH BUFFALO	363	1.86	0.899
BIGMOUTH BUFFALO	21	0.11	0.052
BLACK BUFFALO	9	0.05	0.022
SPOTTED SUCKER	4	0.02	0.010
SILVER REDHORSE	28	0.14	0.069
RIVER REDHORSE	6	0.03	0.015
BLACK REDHORSE	1	0.01	0.002
GOLDEN REDHORSE	358	1.84	0.886
SHORTHEAD REDHORSE	177	0.91	0.438
UNID MOXOSTOMA	1	0.01	0.002
BLACK BULLHEAD	3	0.02	0.007
YELLOW BULLHEAD	47	0.24	0.116
CHANNEL CATFISH	376	1.93	0.931
UNID AMEIURUS	1	0.01	0.002
TADPOLE MADTOM	4	0.02	0.010
FLATHEAD CATFISH	17	0.09	0.042
TROUT-PERCH	1	0.01	0.002
BLACKSTRIPE TOPMINNOW	16	0.08	0.040
BROOK SILVERSIDE	98	0.50	0.243
WHITE PERCH	4	0.02	0.010
WHITE BASS	9	0.05	0.022
YELLOW BASS	8	0.04	0.020
HYBRID MORONE	2	0.01	0.005
UNID MORONE	5	0.03	0.012
ROCK BASS	11	0.06	0.027

TABLE 1E (cont.)

SPECIES (cont.)	LOWER DRESDEN POOL		
	#	CPE	%
GREEN SUNFISH	3,146	16.16	7.788
PUMPKINSEED	26	0.13	0.064
WARMOUTH	5	0.03	0.012
ORANGESPOTTED SUNFISH	3,040	15.62	7.526
BLUEGILL	7,271	37.35	18.000
LONGEAR SUNFISH	67	0.34	0.166
REDEAR SUNFISH	1	0.01	0.002
HYBRID SUNFISH	108	0.55	0.267
UNID LEPOMIS	110	0.57	0.272
SMALLMOUTH BASS	477	2.45	1.181
LARGEMOUTH BASS	1,659	8.52	4.107
UNID MICROPTERUS	1	0.01	0.002
WHITE CRAPPIE	15	0.08	0.037
BLACK CRAPPIE	35	0.18	0.087
BANDED DARTER	1	0.01	0.002
YELLOW PERCH	1	0.01	0.002
LOGPERCH	126	0.65	0.312
BLACKSIDE DARTER	1	0.01	0.002
SLENDERHEAD DARTER	3	0.02	0.007
WALLEYE	1	0.01	0.002
FRESHWATER DRUM	439	2.26	1.087
TOTAL FISH	40,394	207.50	100.000

TABLE 1F. NUMBER, CPE (No./km), AND RELATIVE ABUNDANCE OF ALL FISH TAXA COLLECTED ELECTROFISHING DOWNSTREAM OF DRESDEN LOCK AND DAM FOR THE PERIOD OF 1994, 1995, AND 1999-2002.

SPECIES	D/S DRESDEN L&D		
	#	CPE	%
LONGNOSE GAR	18	0.41	0.239
SHORTNOSE GAR	1	0.02	0.013
UNID GAR	2	0.05	0.027
SKIPJACK HERRING	23	0.52	0.305
GIZZARD SHAD	1,003	22.80	13.301
THREADFIN SHAD	55	1.25	0.729
GOLDEYE	1	0.02	0.013
GRASS PICKEREL	1	0.02	0.013
NORTHERN PIKE	3	0.07	0.040
GRASS CARP	1	0.02	0.013
COMMON CARP	178	4.05	2.360
CARP X GOLDFISH HYBRID	2	0.05	0.027
GOLDEN SHINER	2	0.05	0.027
EMERALD SHINER	2,565	58.30	34.014
GHOST SHINER	7	0.16	0.093
STRIPED SHINER	7	0.16	0.093
SPOTTAIL SHINER	50	1.14	0.663
RED SHINER	5	0.11	0.066
SPOTFIN SHINER	422	9.59	5.596
SAND SHINER	36	0.82	0.477
MIMIC SHINER	9	0.20	0.119
SUCKERMOUTH MINNOW	8	0.18	0.106
BLUNTNOSE MINNOW	265	6.02	3.514
BULLHEAD MINNOW	257	5.84	3.408
RIVER CARPSUCKER	91	2.07	1.207
QUILLBACK	69	1.57	0.915
HIGHFIN CARPSUCKER	1	0.02	0.013
UNID CARPIODES	2	0.05	0.027
NORTHERN HOG SUCKER	7	0.16	0.093
SMALLMOUTH BUFFALO	180	4.09	2.387
BIGMOUTH BUFFALO	1	0.02	0.013
BLACK BUFFALO	1	0.02	0.013
SILVER REDHORSE	50	1.14	0.663
RIVER REDHORSE	3	0.07	0.040
BLACK REDHORSE	2	0.05	0.027
GOLDEN REDHORSE	236	5.36	3.130
SHORTHEAD REDHORSE	56	1.27	0.743
GREATER REDHORSE	1	0.02	0.013
BLACK BULLHEAD	1	0.02	0.013
CHANNEL CATFISH	126	2.86	1.671
FLATHEAD CATFISH	4	0.09	0.053
TROUT-PERCH	1	0.02	0.013
MOSQUITOFISH	2	0.05	0.027
BROOK SILVERSIDE	24	0.55	0.318
WHITE PERCH	3	0.07	0.040
WHITE BASS	50	1.14	0.663
YELLOW BASS	7	0.16	0.093
HYBRID MORONE	3	0.07	0.040
UNID MORONE	50	1.14	0.663
ROCK BASS	2	0.05	0.027
GREEN SUNFISH	466	10.59	6.180
PUMPKINSEED	1	0.02	0.013
ORANGESPOTTED SUNFISH	11	0.25	0.146
BLUEGILL	559	12.70	7.413
LONGEAR SUNFISH	7	0.16	0.093
HYBRID SUNFISH	2	0.05	0.027
SMALLMOUTH BASS	172	3.91	2.281
LARGEMOUTH BASS	174	3.95	2.307

TABLE 1F (cont.)

SPECIES	D/S DRESDEN L&D		
	#	CPE	%
WHITE CRAPPIE	2	0.05	0.027
BLACK CRAPPIE	8	0.18	0.106
LOGPERCH	36	0.82	0.477
SLENDERHEAD DARTER	1	0.02	0.013
WALLEYE	1	0.02	0.013
FRESHWATER DRUM	207	4.70	2.745
TOTAL FISH	7,541	171.39	100.000

Table 2. Upper Thermal Temperatures of Various Des Plaines River RIS

Species	Location	Lifestage (size)	Upper Lethal Temp. (°C)	Reference
C. carp*	Poland	Juvi	40.6	Horoszewicz 1973
	Lake Erie	YOY	39.0	Reutter and Herdendorf 1975, Reutter and Herdendorf 1976
	Canada	YOY& Juvi	35.7	Black, E.C. 1953
Channel CF	Lake Erie	165	38.0	Reutter and Herdendorf 1975 Reutter and Herdendorf 1976
	AK hatchery	44-57	37.8	Allen and Strawn 1967
	Lower Susquehanna R, PA	158	36.5	Peterson, Sutterlin, and Metcalf 1979
	SC hatchery	50	36	Cheetham, et al. 1976
Bluegill	SC cooling ponds	Juvi (27-58 mm)	41.9-42.8	Holland, W.E., et al. 1974
	SC cooling ponds	40-82 mm	38.5-41.4	Holland, W.E., et al. 1974
	Wabash R, IN	49 mm	39.0	WAPORA, Inc. 1976
	TN	73, 140	37.4-39.2	Cox, D.K. 1974
	Lake Erie	168	38.3	Reutter and Herdendorf 1975, Reutter and Herdendorf 1976
	Mississippi River	Juvi	37.3	Banner and Van Arman 1973
	VA hatchery	50-100	36.0	Cherry, D.S., et al. 1977
	Lower Susquehanna R, PA	52-159	36.0	Peterson, Sutterlin, and Metcalf 1979; Peterson and Schutsky 1979
	Lower Susquehanna R, PA	52-159	35.8	Peterson, Sutterlin, and Metcalf 1979; Peterson and Schutsky 1979
	Lake Erie		35.5	Hickman and Dewey 1973
	Mississippi River	YOY	35.0	Cvancara, V.A. 1975
	Galveston Bay, TX		35.0	Chung, K. 1977
	Mississippi River	Juvi, adults	34, 33	Hart 1947
	Mississippi River	Eggs	33.8	Banner and Van Arman 1973
	Mississippi River	YOY	28.5	Cvancara, V.A. 1975, Cvancara, et al. 1977

* All data (except redhorse data) from Talmage, S. and D. Opresko. 1981. Literature Review: Response of Fish to Thermal Discharges. EPRI Publication EA-1840. Redhorse data from Reash, R., G. Seegert, and W. Goodfellow. 2000. Experimentally-derived upper thermal tolerances for redhorse suckers: revised 316(a) variance conditions at two generating facilities in Ohio. Env. Sci. & Policy Vol 3:S191-S196.

Table 2. Upper Thermal Temperatures of Various Des Plaines River RIS

Species	Location	Lifestage (size)	Upper Lethal Temp. (°C)	Reference
LM bass	Parpond, SC	Immature	40.0	Smith, M.H. and Scott 1975
	Galveston Bay, TX		37.2	Courtenay, et al. 1973
	Mississippi River	YOY	36.2	Cvancara, V.A. 1975
	Galveston Bay, TX		36	Chung, K. 1977
	Mississippi River	YOY	35.6	Cvancara, V.A. 1975 Cvancara, V.A. et al. 1977
	Canada Lake	52 g	28.9	Black, E.C. 1953
SM bass	Alabama	YOY	37.0	Wrenn 1980
	Lake Erie	151	36.3	Reutter and Herdendorf 1975, Reutter and Herdendorf 1976
	New & East R., VA	50-100	35.0	Cherry, D.S. et al. 1977
	Alabama	Adults	35.0	Wrenn 1980
Green SF			35	Whitford 1970
FW Drum	Mississippi River	YOY	36.0	Cvancara 1975
	Lake Erie	180-212	34.0	Reutter and Herdendorf 1975, Reutter and Herdendorf 1976
	Mississippi River	YOY	32.8	Cvancara, V.A. 1975 Cvancara, V.A. et al. 1977
E. shiner	S. Canadian R, OK	Adults	37.7	Matthews and Maness 1979
	Lake Superior	Juvi	35.2	McCormick and Kleiner 1976
	Canada	Juvi	30.7	Hart 1947
Gizzard shad	Lake Erie	?	36.5	Hart 1952
	Lake Erie	152-167	31.7	Reutter and Herdendorf 1975, Reutter and Herdendorf 1976
	Mississippi	YOY	31.0	Cvancara, V.A. 1975
	Mississippi	YOY	28.5	Cvancara, V.A. 1975, Cvancara, et al. 1977
BN minnow	Wabash R, IN		38	WAPORA, Inc. 1971
	New & East Rivers, VA	50-100	32	Cherry, et al. 1977
	New York streams		31.9	Kowalski, et al. 1978
Shorthead RH	Muskingum R, OH	Juvi	33.3	Reash et al 2000
SM buffalo	Wabash R, IN		31-34 (preferred)	Gammon 1973
	Ohio River		22-23 (preferred)	Yoder & Gammon 1976

Table 3. Comparison of RIS Catch Rates (No/km) Upstream and Downstream of I55.

Species	1999		2000		2001	
	US I55	DS I55	US I55	DS I55	US I55	DS I55
Smallmouth bass	1.2	0.6	0.4	1.1	1.0	0.9
Largemouth bass	7.9	14.0	7.2	13.7	5.4	6.4
Green sunfish	29.7	12.6	24.5	28.9	16.9	7.0
Bluegill	10.6	50.9	19.0	86.4	18.2	33.9
Gizzard shad	32.1	51.0	27.0	62.3	65.1	84.9
Emerald shiner	10.1	3.2	7.7	1.8	11.4	9.2
Bluntnose minnow	8.3	12.1	6.2	26.7	20.9	19.1
Smallmouth buffalo	3.4	3.7	2.4	2.4	2.5	3.2
Channel catfish	3.2	1.9	3.6	2.0	3.5	1.9
Freshwater drum	3.0	2.6	4.6	1.6	3.0	2.4
Redhorse spp.	0.6	1.1	0.9	0.8	0.2	0.7

Table 4. Kankakee, Illinois and Des Plaines River Redhorse (all species combined)
Catch Rates

Kankakee River near Braidwood (11 locations)

YEAR	CPE (No./km)
1999	27.3
1998	17.5
1996	18.1
1993	25.2
1992	11.4
1991	15.6
1990	20.8
1989	21.5

Kankakee River (IDNR data, timed effort converted to effort per 1 km)

Wilmington Dam		I-55		Confluence	
YEAR	CPE	YEAR	CPE	YEAR	CPE
2000	88.0	2000	104.0	2000	4.0

Illinois River Downstream of Dresden Lock and Dam (upper Marseilles pool)

YEAR	CPE
1999	8.7
1995	15.3
1994	4.3

Illinois River Lower Dresden Pool (several locations)

YEAR	CPE
1999	0.9
1998	8.6
1997	5.6
1995	13.1
1994	3.3

Des Plaines River: Lower Dresden Pool Downstream I-55

YEAR	CPE
1999	1.1
1998	2.4
1997	2.5
1995	2.3
1994	2.5

Des Plaines River: Upper Dresden Pool Upstream I-55

YEAR	CPE
1999	0.6
1998	0.7
1997	0.8
1995	0.0
1994	0.3

Figure 2. Upper Illinois Waterway Mean IBI Scores, 2001.

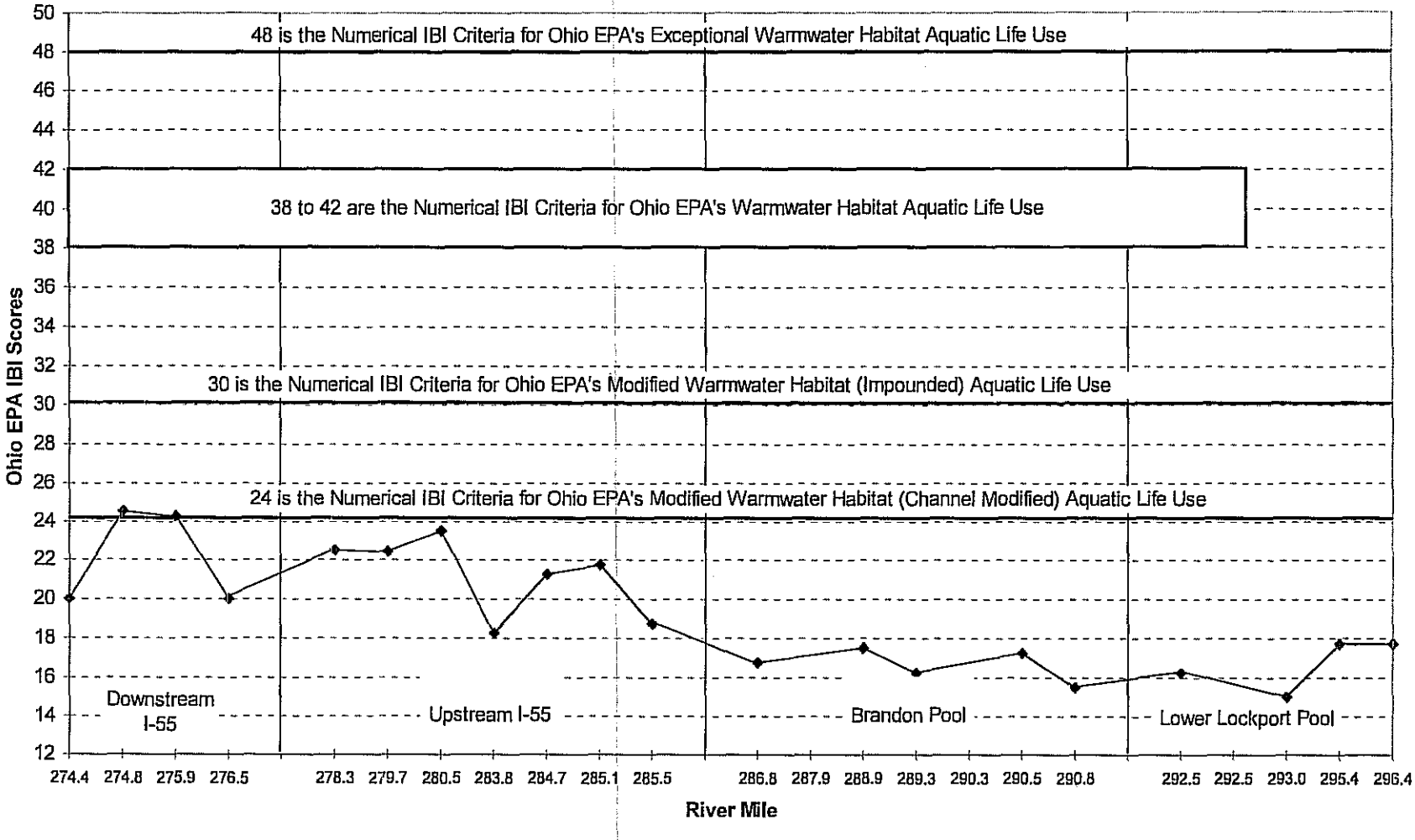


Figure 3. Upper Illinois Waterway Mean IBI Scores, 2000.

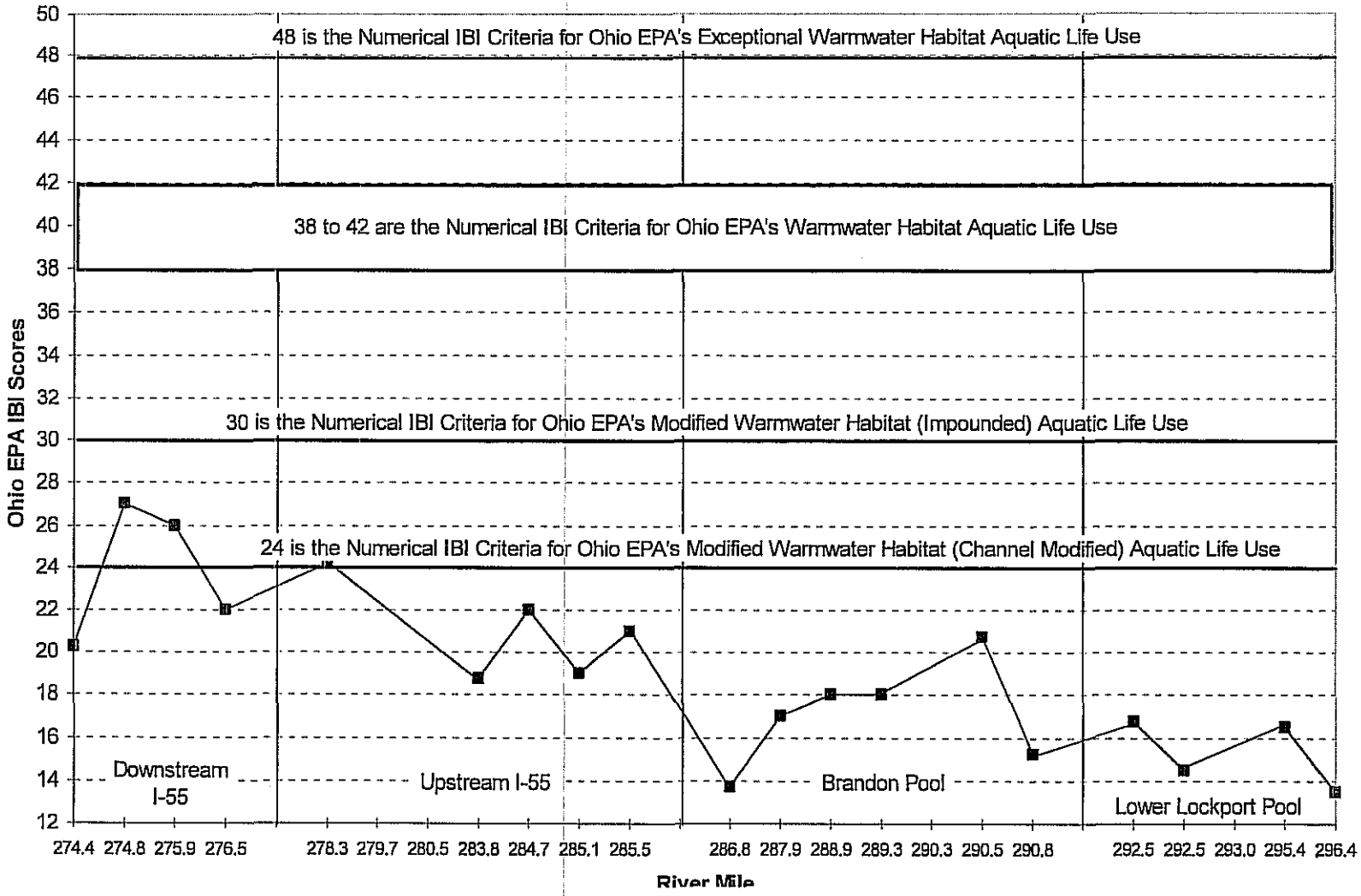


Figure 4. Mean IBI Scores Within the Upstream and Downstream I-55 Segments, 1999.

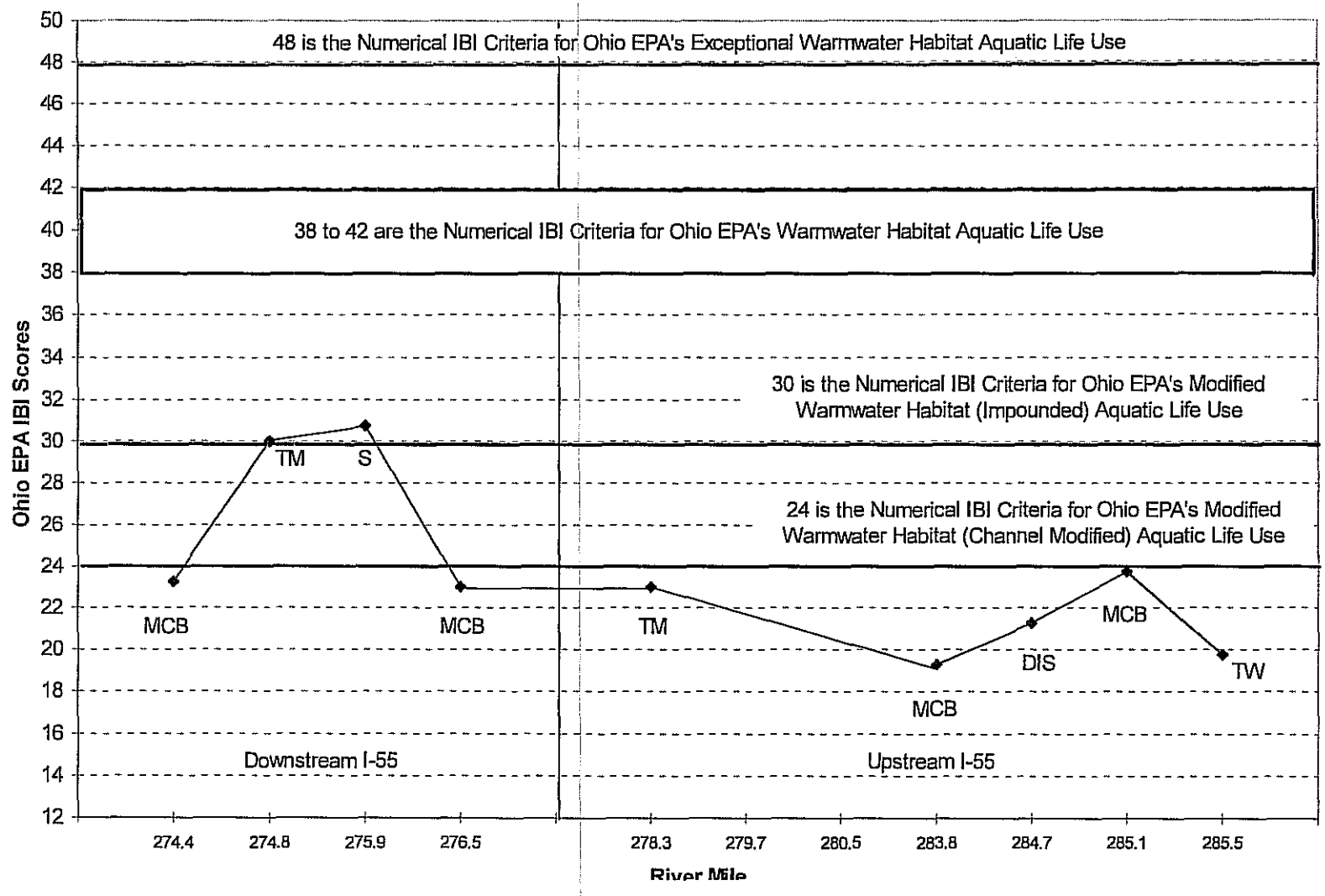


Figure 5. Mean IBI Scores Within the Upstream and Downstream I-55 Segments, 2000.

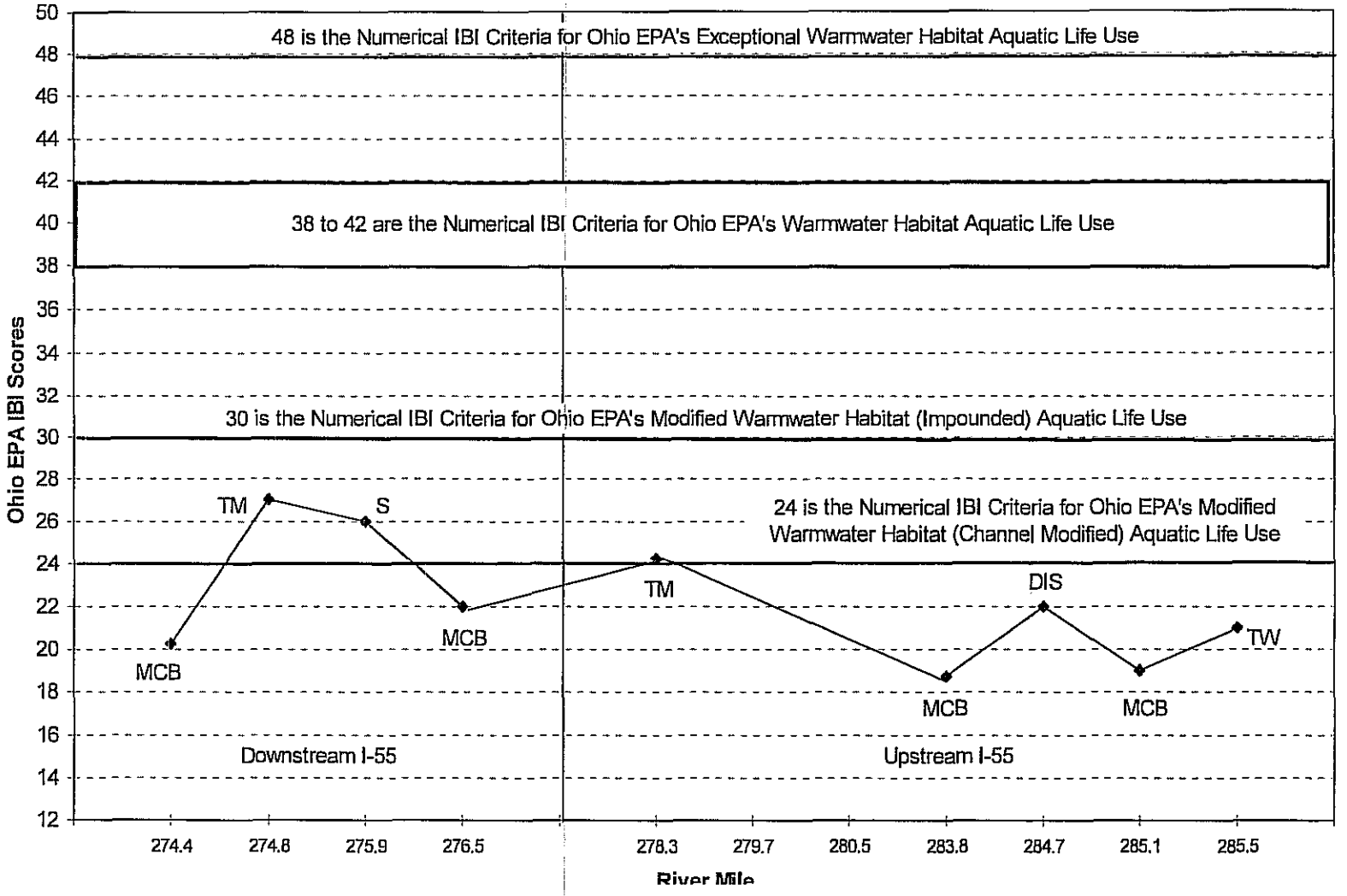
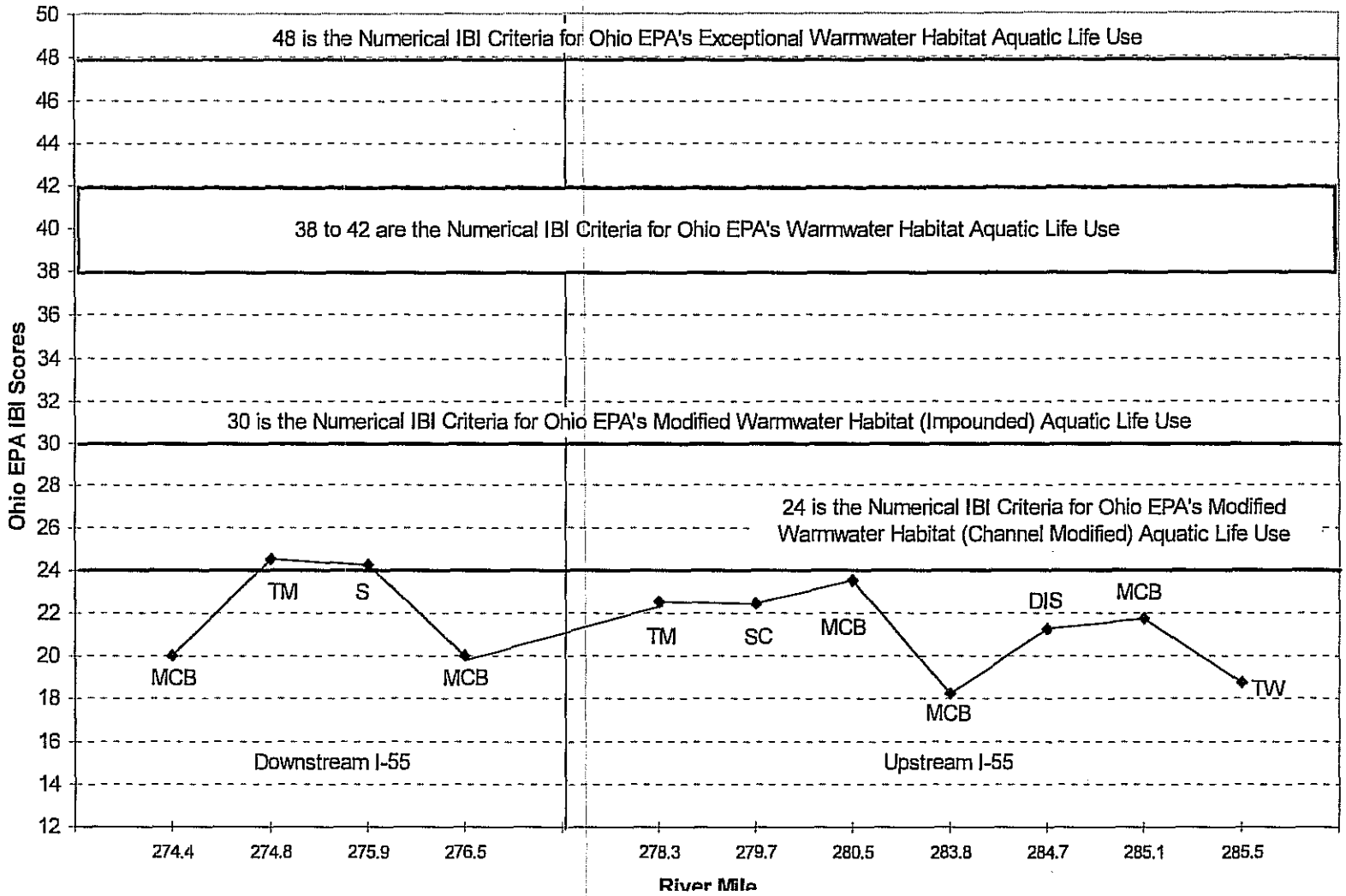


Figure 6. Mean IBI Scores Within the Upstream and Downstream I-55 Segments, 2001.



XII. COST/BENEFIT ISSUES

A significant question to be answered in the context of the current UAA process is: What is the cost/benefit of applying tighter limits and/or technological controls to further limit the amount of heat introduced to the system? The previous section has documented that the environmental benefit of lower temperatures in the Lower Des Plaines River would be negligible in the context of the existing and/or permanent physical limitations of this waterway. This section serves to provide general information for the Agency's consideration in determining appropriate thermal water quality limits for the UAA Reach which adequately serve both biological and industrial uses while not causing unjustified, adverse economic impacts. We have not attempted here to assess all of the other economic impacts that would be caused generally if the UAA Reach were upgraded to General Use. That inquiry is beyond the scope of this report.

A. Compliance with General Use Thermal Water Quality Limits

Based on modeling studies done as part of the UIW Study, it is unlikely the Lower Des Plaines River could meet the General Use thermal criteria even in the absence of power plant thermal discharges. (Final Report, UIW Study, 1995. Chapter 3). Applicability of these limitations to a system which is so heavily influenced by artificially controlled conditions and the effects of heavily urbanized surrounding areas is not likely to improve the biological community and is also not economically reasonable to achieve.

B. Costs Associated with Technological Controls and/or Operating Restrictions to Meet More Stringent Thermal Water Quality Standards

Review of the other UAA factors included in this report demonstrates that General Use is not attainable in the UAA waterway based on one or more of them Having shown that tone of more of the UAA factors is satisfied here, the proper legal conclusion is that the UAA Reach should not be designated as a General Use waterway. Therefore, MWGen believes that a full socio-economic impact study under the remaining sixth UAA regulatory factor is not warranted. However, at the Agency's request, a preliminary engineering cost estimate on the operational/technological considerations of meeting a stricter near-field water quality temperature limit will be provided by MWGen as part of this UAA effort. If the opportunity is provided, details regarding this cost estimate can be presented at a future UAA Workgroup meeting.

XIII. CURRENT AND FUTURE OPERATIONAL CONSIDERATIONS

A. SEASONALITY OF PEAK POWER PRODUCTION

The highest demand for Midwest Generation's product ("electricity") comes concurrently with the highest ambient air and water temperatures and lowest river flows. The critical summer period is when the need for electricity is the greatest. Air conditioning all of the commercial businesses and residential buildings in northern Illinois requires a tremendous amount of power. This is in addition to the normal demands on the system: lighting, computer systems, health care equipment, routine conveniences, etc. During the hottest times of the year, the ambient river temperatures are also increased, due to higher air temperatures and solar inputs. The discharges from our power plants also contribute to this temperature rise. This creates a situation in which thermal stress is exerted on the waterway from both natural and man-made sources, in response to ambient weather conditions.

Despite this reality, and yet in fact, because of it, Midwest Generation plants must remain available to provide needed power to the citizens and businesses of Northern Illinois (and beyond) during these periods. Production levels cannot be adjusted/moved to a less sensitive time of year, as an industrial manufacturing facility may be able to do. (i.e. Midwest Generation cannot "store" electricity made during off-peak seasons to provide for customer demand during critical summer periods).

Midwest Generation is very sensitive to potential impacts on the environment. We have a continuing commitment to remain in compliance with our permit limitations. We have continued to take significant steps to reduce effluent temperature levels during critical periods, including the use of cooling towers and unit deratings, in order to maintain compliance with all applicable thermal water quality standards while optimizing the ability of our stations to continue to produce needed power. Midwest Generation's goal is to strike an equitable and protective balance between the energy needs of the citizens of Illinois and the environmental concerns associated with our operations.

B. USE OF EXISTING COOLING TOWERS

The 24 mechanical draft, once-through cooling towers at Joliet Station #29 were installed on a completely voluntary basis by ComEd in 1999. (This installation took place after the current alternate thermal limits for I-55 were granted, not as a means to obtain them). Use of the towers serves to mitigate any potential adverse thermal impacts that station operations could have on either a near-or far-field basis. The towers are designed to operate on an intermittent basis only, and do not receive any type of treatment for biofouling control, other than drying. Operation of the towers results in an effective discharge temperature considerably less than the end-of-pipe value. Based on design criteria, the use of the towers is projected to result in a temperature decrease of at least 14 °F in the volume of discharge passed through them (approx. 33% of the total design flow of the station, or over 50% of the typical condenser flow rate). Based on actual temperature monitoring data, a comparison of the pre-cooling tower effluent and the post-cooling tower effluent shows a more typical temperature decrease is approximately 20 °F, and can be higher under elevated tower influent temperature conditions. This results in an overall effective

discharge temperature at least 5 °F cooler, and more typically 10 °F cooler, than the corresponding condenser discharge temperature.

Station management remains committed to using the cooling towers on an as-needed basis, to ensure that all applicable thermal limitations continue to be met. In 2001, the towers were used for approximately 40 days during the year to maintain thermal compliance. In 2002, the towers were used for approximately 55 days. In 2003 (to-date), the towers were used for a total of approximately 37 days, primarily to control near-field compliance with the Secondary Contact thermal limits. While increased use of the cooling towers could possibly reduce the magnitude of potential temperature limit exceedances that occur within the allowable excursion hours provided in the Secondary Contact thermal standard, the cooling towers are not capable of providing the cooling needed to prevent the frequency of such elevated temperatures and hence, the requirement for significant unit deratings remains the same, raising the possibility of complete unit shutdowns, to meet more stringent thermal limits under General Use water quality standards.

C. CURRENT PLANT DERATINGS

Use of the existing Joliet Station cooling towers alone is often not sufficient to control the thermal discharge from the plant to meet the current Secondary Contact thermal limits under adverse weather/river flow conditions. Under these situations, units have been and will continue to be derated (i.e. megawatt load restricted) when compliance conditions warrant. Unfortunately, this forced loss of power occurs when it is most needed by the citizens and businesses of Northern Illinois. The cost of unplanned, emergency unit deratings to Midwest Generation is extremely high, in terms of lost revenue, and can adversely impact system reliability.

Derating is also not necessarily confined to the summer period. There have been several occasions in the recent past when the Joliet units have needed to reduce load to meet the applicable thermal limits during December and March/April, when upstream river temperatures were elevated and/or when abnormally warm weather conditions persisted over several days.

D. FUTURE COMPLIANCE ALTERNATIVES

Compliance costs are one of the factors to be considered under the UAA to evaluate the economic impact of any proposed use upgrade. Among the potential economic impacts caused by upgrading the UAA Reach to General Use are the costs for additional controls/deratings that would be required to meet these more stringent General Use thermal standards on a near-field basis for the Joliet and Will County Stations.

In the AS96-10 adjusted standard proceeding, ComEd presented evidence showing that the cost estimate to derate generating units to comply with the General Use thermal limits at I-55 (seven miles downstream of the Joliet Station discharge) was in the range of $3.5M to $16M annually (in 1995 dollars). As further shown below, complying with General Use thermal limits near-field, even with an allowed mixing zone, would be significantly more costly, and likely is not possible given the physical and technological constraints to doing so.

Based on a review of historical river temperature and station operating schedules, and confirmed by thermal modeling results, neither Will County nor Joliet Station can consistently meet the General Use thermal water quality standards under their current operational mode. This would be true for Joliet Station #29 even with all available supplemental cooling towers in operation.

Further, significant unit deratings would be required during non-summer periods should warmer weather conditions prevail during the period from December through March, when the General Use limit is 60/63 °F. Ambient, upstream temperatures of this magnitude have been observed during a number of years at both our Will County and Joliet Stations.

Installation of additional cooling towers would appear to be the solution of first choice. However, there are several, serious obstacles that surface upon further analysis.

The installation of additional supplemental cooling towers for either Joliet or Will County presents significant technological obstacles. Aside from the significant costs associated with the equipment, installation and operation/maintenance of additional cooling towers, there is not enough physical space at either station to accommodate the number of towers that would be needed to ensure uninterrupted unit operations during critical demand periods. It simply is not feasible to do. The number of towers that were installed at Joliet #29 in 1999 was chosen based not simply on historical derating information, but on the physical space available to accommodate them on-site. The 24 towers installed filled all of the available physical space along the Joliet Station discharge canal. These towers enable the Joliet Station to maintain compliance with the applicable thermal limits. They are not sufficient to achieve compliance with General Use thermal standards without drastically limiting the operating capability of the Joliet generating units.

To achieve compliance with more stringent thermal standards, significant unit deratings, and most probably total unit shut-downs, would be required under the critical load demand conditions typically encountered during hot, dry summers. The potential loss of electrical power totals approximately 2500 megawatts of normally available generation to the citizens of Northern Illinois, or the amount required to service approximately 2.5 million homes. These users would need to find an alternate source of power. Since Midwest Generation's sole business is to generate power for sale to the open market, the loss of this capability, due to a station's inability to consistently meet tighter thermal limits at normal operating loads, would likely result in the decision to shut down units unable to supply required power during peak demand times. While there are other sources of power in the area, these may not be available during critical demand conditions, due to prior sale commitments or operational problems. The potential result of the loss of this amount of power from the grid could, under extreme circumstances, lead to instability and ultimately rolling brown or black-outs under adverse weather conditions.

XIV. TEMPERATURE LIMIT PROPOSAL FOR THE BRANDON POOL

Based on the biological information and supporting data presented and/or referenced in this report, as well as the determination of the UAA Biological Subcommittee (See meeting notes dated April 3, 2002), the Brandon Pool cannot support a General Use designation. Dissolved oxygen, bacteria, copper and temperature limits are not currently meeting General Use standards in this segment of the waterway, largely due to unregulated and/or non-point source contributions. Moreover, the physical characteristics of the Brandon Pool will continue to limit its future potential to support a higher quality aquatic community, as well as any form of full body contact recreation. **For the above reasons, Midwest Generation submits that the existing Secondary Contact thermal water quality standards upstream of the Brandon Road Lock and Dam should be retained.** These standards remain adequately protective of the current and expected assemblage of aquatic organisms that inhabit the Brandon Pool, given the existing physical and chemical constraints of the system and the existing navigational uses.

XV. TEMPERATURE LIMIT PROPOSAL FOR THE UPPER DRESDEN POOL (From Brandon Road Lock and Dam to the I-55 Bridge)

Midwest Generation's operations are governed by the variable weather conditions and the artificially controlled UIW river flow, neither of which is reliably predictable in either the short or long-term. Midwest Generation has taken actions to ensure that its stations can continue to operate during high electrical demand periods, while still meeting all currently applicable thermal limitations. This compliance strategy involves using actual monitoring data to track actual UIW flow and thermal conditions and also employs thermal modeling to try to anticipate when river conditions will change and require more stringent control of thermal discharges. Midwest Generation remains on diligent and constant watch of the UIW in-stream conditions to adjust as necessary its unit loads so that compliance with existing thermal standards is maintained.

The biological and physical monitoring data from the ongoing collection efforts of Midwest Generation persuasively demonstrate that generally, existing thermal conditions in the UAA Reach have no significant adverse effects to the types of indigenous aquatic organisms existing in or expected to inhabit this waterway, given the existence of other permanent limitations and human-induced disturbances. In fact, under the prevailing ambient temperatures, there have been gradual improvements in the fish community over time, as predicted by this same type of evidence that was presented to support the IPCB's decision to grant the alternate thermal standards in the AS96-10 proceeding. All of this has been achieved because the continual input of heat to the system at Secondary Contact and AS96-10 levels does not cause significant adverse effects to the UAA Reach.

As such, **Midwest Generation submits that continuing compliance with the existing Secondary Contact limits near-field, and the alternate I-55 thermal limits far-field, as set forth in the AS 96-10 Board Opinion and Order, has and will continue to adequately protect the indigenous aquatic community in the entire UAA Reach. Actual river monitoring data for a period of over twenty years and reliable scientific evaluations of that**

data, supports the conclusion that additional or more stringent thermal restrictions are not likely to result in any substantial improvement in the biological community of the system.

Modified Thermal Limits for Upper Dresden Pool:

Under either the existing Secondary Contact or a new use designation, thermal water quality standards may be modified in order to provide further protection the current and expected assemblage of aquatic life that would reside in the Upper Dresden Pool, given appropriate consideration of the permanent constraints on the system under the UAA Factors 3, 4 and/or 5.

In an effort to make the thermal water quality standards more reflective of the existing seasonal variability in the Upper Dresden Pool, Midwest Generation proposes that a maximum thermal standard of 93 °F should apply during the summer months of June through September, with step-wise monthly or semi-monthly limits applied during the remainder of the year. Temperature in the main body of the river, as determined by the Midwest Generation's Near-Field Thermal Compliance Model, shall not exceed the maximum limits by more than 5 °F for more than 5% of the hours in the 12-month period ending December 31st. This proposal is also conditioned upon the allowance of a mixing zone consistent with Illinois regulations. This seasonal approach is consistent with the standards set in several other Region 5 states, including Ohio, and is also reflective of how the adjusted I-55 thermal standards were developed.

Table 5 shows the proposed maximum thermal limits for the Upper Dresden Pool. The numeric limits are based on the general seasonal temperature cycle of the waterway and incorporate an increased margin of safety, beyond that already currently afforded by the Secondary Contact thermal limits. Compliance with these proposed main river temperature standards can be documented through the use of the proposed Midwest Generation Near-Field Compliance Model, previously submitted to Illinois EPA and U.S. EPA Region 5 for review in 2001. (A copy this submittal is attached as Appendix 4.)

Midwest Generation has proposed this alternate temperature limitation for the Upper Dresden Pool in an effort to assist the Agency in the development of appropriate water quality limitations for this transitional waterway that are reflective of both the improvements and limitations inherent to the Lower Des Plaines River.

Under this proposal, water temperature limits would be gradually lowered over the Fall and Winter periods, and increased in the Spring period, in correspondence with the current modified thermal regime of the waterway. The seasonal cycle to be approximated by the step-wise progression of monthly or semi-monthly temperature limitations would be more reflective of the ambient conditions encountered and would also be complementary to the existing adjusted thermal standards at the I-55 Bridge. This approach is appropriate because the Upper Dresden Pool is basically a "transition zone" from Secondary Contact to General Use designated waters.

These proposed modifications to the Upper Dresden Pool thermal limits could be implemented as part of an overall sub-classification of the use designation for the Upper Dresden Pool. Alternatively, it may be accomplished by a site-specific classification for the Upper Dresden Pool with water quality standards that reflect the existing conditions in that segment of the UAA

Reach. More stringent thermal water quality limitations than those proposed above will only create significantly more burdensome and costly compliance requirements for Midwest Generation stations that are not economically sound or environmentally beneficial for this particular waterway. Such unnecessary restrictions also threaten to impose additional hardships on the general public due to the potential loss of existing levels of electrical power at competitive prices when it is most needed.

Table 5: Proposed Modified Thermal Limits for the Upper Dresden Pool
(Brandon Road Lock and Dam down to the I-55 Bridge):

Jan 1-31	Feb 1-29	Mar 1-15	Mar 16-31	Apr 1-15	Apr 16-30	May 1-15	May 16-31	Jun 1-30	Jul 1-31	Aug 1-31	Sept 1-30	Oct 1-31	Nov 1-30	Dec 1-31
72	77	82	82	90	90	92	93	93	93	93	93	92	90	82

Maximum temperature in the main body of the river, as determined by the Midwest Generation's Near-Field Thermal Compliance Model, shall not exceed the maximum limits listed above by more than 5 ^{o}F for more than 5% of the hours in the 12 month period ending December 31st. This temperature limits proposal is also conditioned upon the allowance of a mixing zone consistent with Illinois regulations.

XVI. SUMMARY AND CONCLUSIONS

There is an abundance of data demonstrating that conditions in the UAA Reach are, and will remain, strongly limiting for aquatic life. The UIW Study results show that the lack of diversity and quality of physical habitats in the UAA Reach are the primary reasons why a full aquatic life use is not attainable. The existence of fine, silty sediments in the limited habitat areas that do exist in the UAA Reach, along with chemical contamination present in certain sediments, are also important, contributing factors that prevent the attainment of the "fishable/swimmable" uses represented by the General Use classification. Even if the physical habitat conditions could be improved significantly, the predominant uses of the waterway, namely barge transport and conveyance of treated effluents and storm water away from the Metropolitan Chicago area, would still have significant adverse effects on the biological community. Artificially controlled, variable flows and pool levels to accommodate navigational needs present a condition which is considerably altered from what would be found in a natural waterway. As such, these constraints are irreversible and cannot practically be mitigated. Similarly, there is no cost-effective or practical solution to the residual chemical sediment contamination that exists throughout the system, or the fact that the system will continue to be dominated by fine-grained sediment in the future, limiting its ability to support a more diverse biological community. In addition to continuing siltation, the impounding effect caused by the Brandon and Dresden Lock and Dams has permanently degraded the riverine habitat by the elimination of riffles and fast water areas. And finally, there is no legal authority to require the reduction of the non-point source run-off that enters the UAA Reach in significant amounts and aggravates further the chemical sediment contamination.

Ambient water temperatures (main channel temperatures without power plant contributions) approximate the regional norm for warm-water streams in spring, summer, and fall. Winter ambient water temperatures tend to be elevated slightly above regional expectations due to the large inputs of water from POTWs. The maximum summer temperature rise above background when the five Midwest Generation stations (Fisk, Crawford, Will County, Joliet #9, and Joliet #29) are operating at normal load schedules (all sources considered) is about 8 °F at I-55, while compared to the General Use standard's prohibition of no more than a 5 °F rise above "natural" conditions. However, under winter conditions, the maximum temperature rise through the system is about 12 °F above background (assuming all plants are operating at normal load schedules, which is often not the case during the winter period when unit maintenance outages occur). Small areas around the discharges from the individual power stations may be warmer.

There is substantial temperature variability outside the main channel in the UAA Reach that is unrelated to power plant operations. Side channel, slough, and backwater habitats are often warmer than mid-channel areas in mid-summer (due to solar heating) and colder in winter. Complex physical and chemical interactions occur between the elevated temperatures and the dissolved oxygen cycle and the system dynamics of organic and inorganic toxicants. However, in no case is temperature the primary factory that constrains the establishment of more favorable physical and/or chemical conditions for aquatic life. In other words, even if the thermal standards were upgraded to General Use, the "fishable, swimmable" standards of the Clean Water Act would not be attained.

The extensive biological studies done to date continue to support the conclusion that, due to both physical and chemical limitations, the UIW as a whole, and the UAA Reach specifically, remains incapable of sustaining a high quality aquatic biota representative of the region and of true General Use waterbodies. At the same time, the studies provide no indication that water temperature is, in any way, significantly constraining the establishment of a unique biota suited to the physical and chemical limitations of the system. Species that find physical circumstances that suit their natural history appear to flourish within the limits set by sediment chemical contamination and physical constraints and navigational use of the UAA Reach. Species tolerant of the physical and chemical limitations that define the system are typically tolerant of the elevated temperature regime as well. The discharge temperatures allowed by the applicable Secondary Contact standards, including the AS96-10 limits, clearly do not further limit the representative fish species and other aquatic life present in the UAA Reach.

Moreover, conditions for aquatic life in the UAA reach are not expected to substantially improve in the foreseeable future, even if point source dischargers are required to reduce current loadings to the water body. The "recovery" of a degraded system generally depends on a sequence of improvements. Of primary importance is a substantive improvement in the physical, as well as the chemical condition of the waters. Suitable water clarity, dissolved oxygen content, and nutrient loadings associated with an absence or low levels of chemical contaminants such as trace metals, ammonia, herbicides, pesticides, petroleum products and other materials associated with agriculture, industrial processes, or urbanization are paramount. A diversity of uncontaminated physical habitats suitable to the native regional assemblage of aquatic life is also a necessary component of overall ecological integrity. Given a physical and chemical environment that meets minimal requirements for life, there must be a diversity of seed organisms available to recolonize a formerly degraded area. Finally, the physical/chemical environment must be sufficiently favorable to permit the recolonization process to proceed.

In the UAA Reach, the water quality has greatly improved since the adoption and application of the Secondary Contact water quality standards. These improvements stem from additional treatment and control implemented by public and private waste treatment facilities that discharge to the UAA Reach. Moreover, similar improvements have realized in the tributary drainages. There also is a suitably diverse assemblage of seed organisms available to colonize the UAA Reach. Nonetheless, irreversible obstacles still remain to the establishment of a higher quality biota. These obstacles include: (i) the general lack of habitat diversity and lack of balance among habitat types in the UAA Reach (*e.g.* except for the Brandon tailwaters, riffles are absent in the UAA study area); (ii), physical characteristics of the sediments; and (iii) contaminated sediments and physical habitat disturbances associated with barge traffic and water level fluctuations.

The resurgence of macrophyte beds, proliferation of more tolerant forms and continuous input of immigrants of more sensitive species from the tributaries to the UAA Reach serve to mask the prevailing level of physical and sediment-based chemical degradation that still exits. Colonization by more highly tolerant species and the ability of more sensitive immigrant organisms to survive in the system may provide some optimism which would lead to the misassumption that these species would be capable of carrying out their full life histories in the

UAA reach. However, there is little prospect of establishing a true resident biota of more sensitive native species similar to those inhabiting the higher quality tributaries that feed the system, such as the Kankakee River. Sufficient physical habitat to make this possible is simply not present in the UAA Reach. Moreover, the limited habitat that does exist is further constrained by the navigational traffic and the constant flow manipulations and alterations required to maintain this protected use in the UAA Reach.

The limiting factors in the UAA Reach are clearly and consistently the physical habitat and sediment quality limitations that characterize this system. These factors will remain unchanged for the foreseeable future. Each of these factors alone satisfy the requirements of the UAA analysis under the Clean Water Act regulations for maintaining the current use designation of the UAA Reach, or developing an alternate use designation that reflects the constraints present in the waterway. Clearly, the weight of the biological and physical evidence here supports the conclusion that General Use is not attainable for the UAA Reach, within the meaning of 40 CFR 131.10(g).

This report also has provided actual monitoring data and pertinent reference information to demonstrate that the thermal levels in the UAA Reach have not and cannot improve to those required under the General Use standards without a significant technical and financial burden to MWGen. To propose such a use upgrade, and the corresponding thermal water quality standards required by General Use, would likely result in a serious loss of electrical capacity to service the needs of Illinois industrial and residential users while not reaping any significant environmental benefits to the UAA Reach. Twenty-plus years of actual river monitoring data show that the present thermal regime of the Lower Des Plaines River has not negatively impacted the biological community that resides in the system. Other more important factors, such as habitat limitations, sediment quality and flow alterations/commercial navigation have far more influence on the overall assemblage of species capable of residing in the waterway both now and in the future. In addition, there is still a consumption advisory in effect for certain species of fish present in the UAA Reach--this alone should preclude the area from being designated as full General Use.

All of the above unalterable conditions and conditions that cannot be modified sufficiently satisfy one or more of the UAA six regulatory factors to allow for an alternate use designation for this industrialized urban waterway which would be commensurate with its permanently altered character. Accordingly, the Illinois EPA may elect to preserve the improvements in chemical water quality that have been realized in the UAA Reach by creating a new use classification or sub-classification that incorporates the chemical levels that are being attained by the UAA Reach. Ohio's more specific and refined use classification system is one approach that can serve as guidance to the Illinois EPA in crafting an alternative use designation. Better and more refined use designations, with correspondingly differentiated water quality standards, may help recognize the water quality improvements in the UAA Reach. As it currently stands, the Illinois use classification system is not differentiated sufficiently to acknowledge any use levels that fall between Secondary Contact and General Use. . The UAA study reach, as a whole, will not meet the criteria for a full General Use waterway. Further, as U.S. EPA's UAA guidance states, primary contact recreation, one of the requirements of a General Use classification, is also a significant concern for the UAA Reach. Navigational traffic, as well as widespread

bacteriological concerns, threaten the safety of public recreation in the waters of the Lower Des Plaines River. Several deaths and near-misses have occurred in recent years, even with the current Secondary Contact designation in place. Further mishaps and/or potential tragedies are more likely to occur if the State deems the UAA Reach suitable for full body contact recreation. Absent some further refinement of the Illinois use classification system, the current Secondary Contact designated use is the only use designation attainable, as shown by the physical, sediment chemistry/character and biological data relating to the UAA Reach.

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APPENDIX 1

Use Attainability Analysis (UAA) Factors

A Use Attainability Analysis (UAA) consists of six factors that are to be considered in determining whether the fishable/swimmable goals of the Clean Water Act (CWA) may be attainable for a particular water body. (Ref: 40 CFR Section 131.10(g). These factors must be looked at holistically for the waterway, and not segmented for each particular aspect of the system, as the draft UAA report has done. Ecological integrity is the summation of all factors which influence the ability of organisms to carry out their full life cycles in a given waterway.

Based on the chemical, physical and biological data available for the waterway, the six factors are outlined below, along with a determination of their applicability to the Lower Des Plaines River UAA:

1. Naturally occurring pollutant concentration prevent the attainment of the use;

>>>Potentially applicable if ammonia is considered a naturally occurring pollutant.

2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met;

>>>Applicable to UAA Reach. See discussion in Paragraph 4 below regarding effect of low flow conditions and water levels.

3. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;

>>>Applicable to UAA Reach.

Widespread, historic sediment contamination (the result of human activities), as well as artificially-controlled flow manipulations and barge traffic disturbances affect the entire length of the UAA reach, and beyond. Barge traffic has been shown to be lethal to fish. Also, there has been no proposal made to remediate the existing sediment contamination problem and a means to prevent future sediment contamination from non-point sources is unknown. The impounded nature of the waterway will continue to result in the deposition of fine-grained, silty sediments (contaminated or not), which are not conducive to the development of higher quality fish and macroinvertebrate habitat. As water-borne commerce, transportation and industrial uses are protected uses under the CWA, it is unlikely that these activities will cease in the foreseeable future. As such, the waterway will continue to be dominated by upstream POTW and industrial effluents, artificial flow control, channelization and barge traffic effects.

APPENDIX 1

Use Attainability Analysis (UAA) Factors

4. Dams, diversions, or other types of hydrologic modifications preclude the attainment of use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in attainment of the use;

>>>Applicable to the UAA Reach.

The entire Upper Illinois Waterway (UIW), including the UAA reach, is basically a series of pools separated by locks and dams. Flow in the system is controlled entirely by diversions from Lake Michigan, effluents from large POTWs, and level manipulation to accommodate barge traffic. Besides their hydraulic influence, these dams greatly affect habitat quality by eliminating riffles, causing silty sediment deposition and reducing current speed, etc.

Flow rates are sporadic in nature and vary widely in magnitude on any given day. Flow patterns do not follow any natural, seasonal cycle and cannot be forecast with any measure of accuracy due to their completely artificial nature.

5. Physical conditions related to the natural features of the water body, such as the lack of proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or

>>>Applicable to the UAA Reach.

Limitations on available, suitable habitat in the system is the primary constraint which prevents further substantive improvements in the indigenous aquatic community. What habitats do exist are also continually disturbed by barge traffic and artificially controlled river flows and levels. There is little or no shoreline cover, fast water areas, riffles or other physical features needed for more desirable fish species to establish viable populations in this portion of the Lower Des Plaines River. The species that do exist and actually thrive in this system are those whose life history characteristics are better suited to the physical characteristics and conditions of the waterway.

6. Controls more stringent than those required by Section 301(b)(1)(A) and (B) and 306 of the CWA would result in substantial and widespread economic and social impact.

>>Applicable to the UAA Reach.

The cost to install and operate supplemental cooling for the three Midwest Generation Stations situated along this waterway to meet General Use thermal limitations would constitute a significant economic hardship on the company (assuming that installation is

even feasible, due to physical space constraints at the sites). These costs would not be offset by any comparable significant environmental benefit, and would, conversely, create a serious and potentially dangerous situation in which the power supply of northern Illinois citizens could be severely jeopardized in times of greatest demand, because the Joliet #9, Joliet #29 and Will County Stations would be forced to shut down to meet the tighter General Use thermal water quality limits. The citizens of Illinois would suffer, and the aquatic community of the Lower Des Plaines would likely see no measurable or meaningful improvement.

APPENDIX 2

Executive Summary of UIW Study, Results and Conclusions

The UIW Investigation was initiated in late 1991 with an invitation to Illinois and Federal regulatory and water management agencies, certain public interest groups, and other water-users to participate. In response to this solicitation, a multi-institutional group - the Upper Illinois Waterway Task Force - was formed and charged with the design and oversight of studies that would clarify the current status of the waterway and aid in predicting future conditions. ComEd, in turn, committed to conduct the requisite studies deemed necessary by the Task Force and utilize this technical information base to develop recommendations for alternative thermal standards applicable to its power plants.

The investigation included a broad base of ecological studies of the waterway relevant to evaluating the aquatic ecosystem. It included studies of available habitats, biota that would be expected to be present in these habitats, levels of water and sediment contamination, chemical risk screening, surface thermal imagery of the entire waterway as well as in the immediate vicinities of the power stations, 3-dimensional reconstructions of the thermal plumes for each power station to evaluate zones of passage around the warmest parts, mathematical thermal modeling of the entire geographic reach considering all other relevant features affecting water temperature (including calibration using actual field measurements), and a 40+ year climatological reconstruction to estimate water temperatures under all historically known combinations of ambient weather and plant operating conditions. It included a thorough literature review of previous UIW studies, including contaminants in fish tissues. It also included literature reviews on effects of temperature on fish, interactions of temperature and chemicals of freshwater biota, and effects of turbidity and barge traffic on aquatic ecosystems. **These studies, in combination with the biological monitoring of phytoplankton/periphyton, macrophytes, benthic invertebrates, ichthyoplankton, fish, and fish diseases comprise the most thorough study of this portion of the UIW ever conducted.**

The studies and surveys performed clearly demonstrate that conditions in the waterway remain limiting for aquatic life. Lack of diversity and stability of physical habitats clearly are limiting factors, as are the pervasive chemical contamination in sediments and occasional depressed dissolved oxygen levels. The limitations are mostly severe in the upper pools. Prospects for improving physical habitat conditions are limited and tend to conflict with the predominant uses of the waterway, namely barge transport and conveyance of treated point and non-point source discharges. Similarly, there are no obvious practical and economical short-term solutions to the residual chemical contamination in sediments that persist throughout the system.

The biological studies conducted under the UIW Task Force's direction support the conclusion that, due to physical and chemical limitations, the UIW remains incapable of sustaining a high quality aquatic biota representative of the region. At the same time, **the studies provide no indication that the contribution to higher water temperature caused by power plant operation is constraining the establishment of aquatic biota suited to the physical and chemical limitations of the system.** Species that find physical circumstances that suit their natural history appear to flourish within the limits set by both chemical contamination

and limited habitat. Species tolerant of the physical and chemical limitations that define the system are typically tolerant of the elevated temperature regime as well.

In short, operation of ComEd's (now Midwest Generation's) power plants does not interfere with maintaining a reasonably balanced indigenous community of aquatic organisms in the UIW consistent with its limited physical habitat, abnormal thermal pattern even in the absence of power stations, and history of chemical contamination that remains in sediments.

Based on the results of these studies, alternative thermal limitations for the I-55 Bridge were developed and submitted to the Illinois Pollution Control Board in the spring of 1996. The Board approved the proposed standards on October 3, 1996. The NPDES permits were modified to include the standards by February, 1997. **It is important to note that while alternate thermal limitations were approved for I-55 based on the study results, the supporting information contained in the UIW study reports also confirms that the Secondary Contact thermal limits remain generally supportive of the existing indigenous aquatic community in the upstream reaches, especially given the other permanent limitations in the system.** Midwest Generation continues to obtain information about the waterway by conducting focused studies on particular areas of concern, including potential effects on the fisheries community and temperature/dissolved oxygen interactions. All recent data suggest that temperature is not a significant contributor to the current biological integrity of the system. A reassessment of the conditions in the waterway will be made as conditions warrant.

APPENDIX 2

Executive Summaries from All Individual
Upper Illinois Waterway Studies

(included with original January 24, 2003 report--electronic copies not available)

APPENDIX 3

List of Individual Biological, Chemical and Physical Study Reports Associated with the Upper Illinois Waterway, 1990 to present

LITERATURE REVIEW

- EA Compilation/Annotation of Physical, Chemical & Biological Data Pertaining to CSSC, Lower Des Plaines & UIW 1980 - 1991
  - Main Report & Appendices - (July 1992)
- Reviews of Literature Concerning:
  - Effects of Temp. on fish
  - Effects of Freshwater Biota from Interactions of Temperature and Chemicals
  - Effects of Turbidity and Barge Traffic on Aquatic Ecosystems (Dec. 18, 1995)

PHYSICAL/CHEMICAL

- ENSR Physical-Chemical Study of UIW - Summer '93 - Spring '94
- ENSR D.O./Temp. Monitoring @ I-55 (1995)
- EA D.O./Temp. Monitoring @ I-55 (1997)
- EA D.O./Temp. Monitoring @ I-55 (1998)
- EA D.O./Temp. Monitoring @ I-55 (1999)
- EA D.O./Temp. Monitoring @ I-55 (2000)
- EA D.O./Temp. Monitoring @ I-55 (2001)
- EA D.O./Temp. Monitoring @ I-55 (2002)
- EA D.O./Temp. Monitoring @ I-55 (2003)--In progress

- Appendix A - Summary of Physico-chemical Measurements Collected by Municipal & Industrial Dischargers within ComEd's Area of Concern (1993)
  (reference copy only)
- Aerial Imagery of Surface Temps using Infrared (IR) Imagery
  - Summer 1993
  - Winter 1994
- Thermo-Hydrodynamic Model of the Chicago Sanitary & Ship Canal and the Lower Des Plaines River (Dec. 1994)
  (volumes 1 & 2)
- Fly-Over Photos (Natural & IR) (multiple years throughout study period)
- UIW Report on Estimation of Water Temperature Exceedance Probabilities in the UIW using Thermo-Hydrodynamic Modeling (Jan. 1996)
- LMS UIW Chemical Risk Screening (Jan. 1996)
  (Main Report & Appendices A - P)
- UIW 1994 - 1995 Sediment Contamination Assessment, G. Allen Burton Dec. 18, 1995

APPENDIX 3

List of Individual Biological, Chemical and Physical Study Reports Associated with the Upper Illinois Waterway, 1990 to present

PHYSICAL/CHEMICAL (cont).

- Continuous In-Situ Monitoring and Thermal Effect Characterization Tasks - Final Report June 18, 1998 (July 1997 - March 1998)
- Continuous In-Situ Monitoring and Thermal Effect Characterization Tasks - Final Report March 11, 1999 (July 1998 - October 1998)
- Habitat Evaluation of the Dresden Pool (May, 2003--unpublished), performed by EA Engineering, Science and Technology for Midwest Generation.

BIOLOGICAL

- Des Plaines River Long-Term Monitoring Program: Aquatic Biology Section Technical Report Phase I 1986 (6)
- Des Plaines River Long-Term Monitoring Program: Aquatic Biology Section Technical Report Phase II (87/04)

- Des Plaines River Long-Term Monitoring Program: Vegetation Analyses and Habitat Characterization (88/5)
- Des Plaines River Long-Term Monitoring Program -- Vegetation Analyses and Habitat Characterization (July 1992)

- 1993 Phytoplankton Survey (March 1994)

- Aquatic Macroinvertebrates within the Upper Illinois Waterway 1992-1993 Report (Feb. 2, 1994)

- 1993 Benthic Macroinvertebrate Investigation and Habitat Assessment (RM. 272-323) (Feb. 2, 1994)
- UIW 1994 Benthic Macroinvertebrate Investigation and Habitat Assessment (March 2, 1995)

- 1994 Aquatic Macrophyte Investigation and Habitat Assessment (Feb. 21, 1995)
- 1995 Aquatic Macrophyte Investigation and Habitat Assessment (Jan. 5, 1996)

- Winter Fisheries Survey on the Des Plaines River 1992 (May 1992)
- Lower Des Plaines River Aquatic Monitoring - Final Report 1992 (Jun 1993)
- Winter Fisheries Studies in the UIW 1993 (Oct. 1993)
- Spring Spawning Survey in the UIW 1993 (Oct. 1993)

APPENDIX 3

List of Individual Biological, Chemical and Physical Study Reports Associated with the Upper Illinois Waterway, 1990 to present

BIOLOGICAL (cont).

- 1994 Winter Fisheries Survey (July 1994)
- 1994 Ichthyoplankton Investigation (UIW) (April 1995)

- UIW 1993 Fisheries Investigation (March, 1994) (Report & Appendix)
- UIW 1994 Fisheries Investigation (March, 1995) (Report & Appendix)
- UIW 1995 Fisheries Investigation (Dec., 1996) (Report & Appendix)
- UIW 1997 Fisheries Investigation (Feb. 1998)
- UIW 1998 Fisheries Investigation (April 1999)
- UIW 1999 Fisheries Investigation (May, 2000)
- UIW 2000 Fisheries Investigation (March, 2001)
- UIW 2001 Fisheries Investigation (April, 2002)
- UIW 2002 Fisheries Investigation (May, 2003)
- UIW 2003 Fisheries Investigation (In Progress)

uiwstudies.doc

APPENDIX 4

Joliet 29 Near-Field Thermal Compliance Model

1.0 Introduction

This model calculates a "fully-mixed" receiving water temperature immediately downstream of the Joliet 29 condenser cooling water discharge. Compliance with the Secondary Contact temperature standards specified in the Joliet Station 29 NPDES permit is determined based on the output of this model. (Note: A similar model has also been developed for Joliet 9, but does not include operation of the supplemental cooling towers in its calculations).

The model determines the fully-mixed receiving water temperature by calculating a weighted average temperature of the receiving stream, after mixing with the station's condenser cooling water discharge, based on the effective temperature and flow of the condenser cooling water discharge and the temperature and flow of the receiving stream. This approach is patterned after the general mass balance procedure for conservative substances outlined in IEPA's *Illinois Strategy for Point Source Wasteload Allocation*, January 17, 1991.

2.0 Thermal Balance Procedure for Determination of Effective Discharge Temperature

The effective discharge temperature input for the model is determined by consideration of condenser cooling water flow, condenser cooling water discharge temperature, cooling tower flow, and cooling tower discharge temperature. When the cooling towers are not in operation, the effective discharge temperature is equal to the condenser cooling water discharge temperature. The basic thermal balance equation for determination of the effective discharge temperature is:

$$T_{EF} = \frac{T_{CW}(Q_{CW} - Q_T) + T_T Q_T}{Q_{CW}}$$

Term	Description
T_{EF}	Calculated effective condenser cooling water discharge temperature after mixing with cooling tower discharge, in degrees F.
T_{CW}	Actual condenser cooling water discharge temperature in degrees F. Temperature is continuously monitored by Bailey and Endeco systems at head of discharge canal.
Q_{CW}	Condenser cooling water flow in cubic feet per second (cfs). Flow is based on the number of circulating water pumps on at the time in question. Each of the four circulating water pumps is rated at 230,000 gpm (512.5 cfs).
Q_T	Flow of condenser cooling water routed through the cooling towers in cfs. Flow is based on the number of cooling tower pumps on at the time in question. Each of the 48 cooling tower pumps is rated at 7500 gpm (16.7 cfs).

T_T Cooling tower discharge temperature in degrees F. Temperature is continuously monitored by three thermocouples in the cooling tower discharge flume. Input for the model is the average of the three readings.

3.0 Thermal Balance Procedure for Determination of Fully-Mixed Receiving Water Temperature

Fully mixed receiving water temperatures are determined using a thermal balance model that considers condenser cooling water flow, effective condenser cooling water discharge temperature, upstream river flow, and upstream river temperature. The basic thermal balance equation for determination of the fully-mixed receiving water temperature is:

$$T_{FM} = \frac{T_{EF}Q_{CW} + T_{US}(0.5*Q_{AV})}{Q_{CW} + (0.5*Q_{AV})}$$

Term	Description
T_{FM}	Calculated fully-mixed receiving water temperature in degrees F.
T_{EF}	Calculated effective condenser cooling water discharge temperature after mixing with cooling tower discharge, in degrees F. Determined using thermal balance procedure outlined in step 2.0.
Q_{CW}	Condenser cooling water flow in cubic feet per second. Flow is based on the number of circulating water pumps on at the time in question. Each of the four circulating water pumps is rated at 230,000 gpm (512.5 cfs).
Q_{AV}	Available receiving stream dilution flow in cfs. Available dilution flow is determined by subtracting condenser cooling water flow from the upstream river flow. If the upstream river flow is equal to or less than the condenser cooling water flow, the available receiving stream dilution flow is zero. Upstream river flow is the average value of flow recorded during the 24-hour period preceding the time in question. The primary source of flow data is the gauging station operated by the Army Corps of Engineers at the Brandon Road Lock and Dam. Secondary sources for flow data are the gaging station on the Chicago Sanitary and Ship Canal at Romeoville operated by the United States Geological Survey, and the Des Plaines River gaging station at Riverside, operated by the Army Corps of Engineers.
T_{US}	Upstream river temperature in degrees F. Temperature is continuously monitored by Bailey and Endeco systems in the station intake canal.

4.0 Near-Field Thermal Compliance Matrix

The excel-based Near-Field Thermal Compliance Matrix can be used by station personnel on an as-needed basis to insure that compliance with the Secondary Contact thermal standards is maintained under current receiving stream conditions. Input the condenser cooling water discharge temperature and flow and the cooling tower discharge temperature and flow; the matrix displays fully-mixed receiving water temperatures at various upstream river flows and temperatures. A sample output of the matrix is attached.

Example of Joliet 29 Near-Field Compliance Matrix:

APPENDIX 4

Enter Cooling Tower Pump Rating in gpm and number of pumps on:
Cooling Tower Pump Rate: 7,500 gpm Number of Pumps On: 36
Calculated Tower Flow: 602 cfs

Enter Cooling Tower Discharge Temp: 84 degrees F

Enter Circ Water Pump Rating in gpm and number of pumps on:
Circ Water Pump Rate: 230,000 gpm Number of Pumps On: 3
Calculated Circ Water flow: 1537 cfs

Enter Circ Water Temp: 100 degrees F

Calculated effective discharge temp: 93.74 degrees F

		River Temperature													
Upstream River Flow, cfs	Available Dilution Flow*, cfs	75	76	77	78	79	80	81	82	83	84	85	86	87	88
2050	513	92.30	92.37	92.45	92.53	92.60	92.68	92.76	92.84	92.91	92.99	93.07	93.14	93.22	93.30
2250	713	91.79	91.90	92.00	92.10	92.21	92.31	92.42	92.52	92.62	92.73	92.83	92.94	93.04	93.14
2450	913	91.32	91.45	91.58	91.71	91.83	91.96	92.09	92.22	92.35	92.48	92.61	92.74	92.87	93.00
2650	1113	90.87	91.02	91.17	91.33	91.48	91.63	91.79	91.94	92.09	92.25	92.40	92.55	92.71	92.86
2850	1313	90.44	90.62	90.79	90.97	91.15	91.32	91.50	91.67	91.85	92.03	92.20	92.38	92.55	92.73
3050	1513	90.04	90.24	90.43	90.63	90.83	91.03	91.22	91.42	91.62	91.82	92.01	92.21	92.41	92.61
3250	1713	89.66	89.87	90.09	90.31	90.53	90.75	90.96	91.18	91.40	91.62	91.84	92.05	92.27	92.49
3450	1913	89.29	89.53	89.77	90.01	90.24	90.48	90.72	90.95	91.19	91.43	91.67	91.90	92.14	92.38
3650	2113	88.95	89.20	89.46	89.71	89.97	90.23	90.48	90.74	90.99	91.25	91.50	91.76	92.02	92.27
3850	2313	88.62	88.89	89.16	89.44	89.71	89.98	90.26	90.53	90.80	91.08	91.35	91.62	91.90	92.17
4050	2513	88.30	88.59	88.88	89.17	89.46	89.75	90.04	90.33	90.62	90.91	91.20	91.49	91.78	92.07
4250	2713	88.00	88.31	88.62	88.92	89.23	89.53	89.84	90.15	90.45	90.76	91.06	91.37	91.68	91.98
4450	2913	87.72	88.04	88.36	88.68	89.00	89.32	89.64	89.97	90.29	90.61	90.93	91.25	91.57	91.89
4650	3113	87.44	87.78	88.11	88.45	88.79	89.12	89.46	89.79	90.13	90.47	90.80	91.14	91.47	91.81
4850	3313	87.18	87.53	87.88	88.23	88.58	88.93	89.28	89.63	89.98	90.33	90.68	91.03	91.38	91.73
5050	3513	86.93	87.29	87.65	88.02	88.38	88.74	89.11	89.47	89.83	90.20	90.56	90.93	91.29	91.65
5250	3713	86.68	87.06	87.44	87.81	88.19	88.57	88.94	89.32	89.70	90.07	90.45	90.83	91.20	91.58
5450	3913	86.45	86.84	87.23	87.62	88.01	88.40	88.79	89.17	89.56	89.95	90.34	90.73	91.12	91.51
5650	4113	86.23	86.63	87.03	87.43	87.83	88.23	88.63	89.03	89.44	89.84	90.24	90.64	91.04	91.44
5850	4313	86.01	86.43	86.84	87.25	87.66	88.08	88.49	88.90	89.31	89.72	90.14	90.55	90.96	91.37
6050	4513	85.81	86.23	86.65	87.08	87.50	87.92	88.35	88.77	89.19	89.62	90.04	90.46	90.89	91.31

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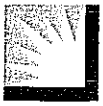
ATTACHMENT 7

August 26, 2003
Midwest Generation Reply Letter to USEPA Region 5



MIDWEST
GENERATION EME, LLC

An *EDISON INTERNATIONAL*™ Company

Basil G. Constantelos
Director, Environmental,
Health & Safety

August 26, 2003

Ms. Linda Holst
Chief, Water Quality Branch
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: Summary of Discussions Regarding Midwest Generation's Use Attainability Analysis (UAA) Thermal Report

Dear Ms. Holst:

We appreciate the opportunity to have met with you and your staff on August 6, 2003 to discuss the various issues highlighted in your June 3, 2003 letter to Illinois EPA. Based on the meeting discussion, Midwest Generation (MWGen) will revise certain portions of our report entitled "Appropriate Thermal Water Quality Standards for the Lower Des Plaines River," dated January 24, 2003 (the "Thermal Report") to provide greater clarification and additional data and information, where necessary, to address the issues raised by the U.S. EPA Region 5. We believe the revisions will lend further support to the Thermal Report's finding that the entire UAA reach (i.e., from Lockport to I-55) meets Factors 3 and 4 of the six UAA factors outlined in 40 CFR 131.10(g), allowing for the application of a use designation other than General Use.

We also appreciated hearing Region 5's concurrence with the Biological Subcommittee's conclusion that the biological potential of the Brandon Pool is limited due to habitat alterations resulting from a combination of Factor 3 (Human-caused conditions), Factor 4 (Dams, diversions and other hydrologic modifications), and/or Factor 5 (Physical conditions) influences. This confirmed our understanding that the scope of the UAA process includes consideration of physical and biological integrity, not simply chemical water quality, in order to determine the attainable use for the waterway. (We recognize that this understanding also was put forth in the results of the National Symposium on "Designating Attainable Uses for the Nation's Waters" held on June 3-4, 2002 in Washington, D.C. but it was still beneficial to have this clarified in our meeting discussion.)

MWGen believes that the information that is provided in our Thermal Report, as supplemented by the information that we discussed during our August meeting, will allow for similar concurrence by Region 5, as well as Illinois EPA and the UAA Biological Subcommittee, that the Upper Dresden Pool does not meet the physical and biological criteria necessary to support a General Use designation.

Midwest Generation EME, LLC
One Financial Place
440 South LaSalle Street
Suite 3500
Chicago, IL 60605
Tel: 312 583 6029
Fax: 312 583 6111
bconstantelos@mwgen.com

However, we also believe that any site-specific use designation for the Upper Dresden Pool must accurately reflect both the improvements made in chemical water quality over the past 30 years and the inherent physical and biological limitations which continue to exist in the waterway. MWGen supports the need to protect the existing water quality of the Upper Dresden Pool.

In an effort to summarize the information presented during the August 6th meeting, we have put together this synopsis, which is organized to respond to the items outlined in your comment letter in the order presented.

U.S. EPA Comment, Page 1, bottom:

The Agency refers to the finding in the Hey and Associates report that "thermal discharges from the power generation facilities owned and operated by MG are a contributing factor in preventing the lower Des Plaines River from reaching its full biological potential."

MWGEN Response: The information relied upon by Hey and Associates/AquaNova International (henceforth referred to as the "IEPA Consultants") to determine that MWGen's thermal discharges are having detrimental impacts was predicated on false assumptions and/or conclusions based on inaccurate, misrepresented or misused data. This matter was discussed in detail at the June 6th meeting of IEPA, MWGen and IEPA consultant representatives. As such, U.S. EPA should not rely on the IEPA Consultant's erroneous assumptions and conclusions to determine whether or not MWGen's discharges are having a detrimental impact on the existing aquatic community in the lower Des Plaines River. It is our understanding that the thermal portion of the draft UAA report has been revised by Hey and Associates, based on MWGen's submitted comments and corrections, will be issued for the UAA Workgroup's review shortly. MWGen has provided a significant amount of actual stream monitoring data which supports the position that our thermal discharges are not having a detrimental impact on the aquatic population which is or would be reasonably expected to be present in the waterway, especially given the other permanent limitations of the system (e.g. those characteristics that are considered under Factors 3 and 4 of the UAA regulations).

U.S. EPA Comment, Page 2, Factor 2 Section:

Natural flow conditions prevent the attainment of use.

The Agency states that the Thermal Report did not describe how water levels prevent the attainment of use, and only stated that they are controlled by diversions, POTW flow and manipulated for barge traffic. The Agency commented that even with the flow variations experienced in the system, the base flow is sufficient to support a General Use classification.

MWGEN Comment: Some clarification of the text of the Thermal Report is needed to address this misunderstanding of the relevant issue here. Our intent was to describe the adverse impacts caused by the fluctuations in water levels within the UAA reach, not to focus on flow fluctuations. We intended to point out that there are certain areas within the UAA waterway that are continually disturbed by frequent and often dramatic level fluctuations. The Brandon tailwater area, which has been found to contain the best physical habitat in the Upper Dresden Pool, is the most heavily impacted by these level changes. This could result in stranding of eggs, larvae, or even adults and certainly could affect the reproductive success of various species, especially nest builders, and also could increase predation, especially during low water periods.

Water levels in the system as a whole are maintained by the Corps of Engineers controlling works at Brandon Road Lock and Dam and the MWRD-controlled Lockport Lock. Water levels in the main body of the river rarely fluctuate, being maintained at a relatively constant navigational depth, but water flow rates change hourly, and by several thousand cubic feet per second. While we agree that there is always sufficient water in the system (i.e. it is not, by any means, an ephemeral stream), the rate or velocity at which the water passes through the system can greatly affect the aquatic life which resides there, especially at critical times of the year.

In a completely natural system, spring thaws result in a "flushing effect", which is then followed by relatively constant flows through the course of the summer. In the lower Des Plaines, there is no seasonality to these flushing events, which occur any time there is significant rainfall in the Metropolitan Chicago area. The artificial conveyance designed to take treated sewage away from Lake Michigan (i.e. the Chicago Sanitary and Ship Canal) cannot accommodate the large volumes of runoff water which result from a heavy rainfall. The MWRD's TARP system also isn't presently large enough to accommodate the large influx of flow from both runoff and the combined sewer overflows (CSO's) which occur during heavy rains. As a result, all of this water must be quickly shunted down to the lower Des Plaines River to effect flow control, resulting in short-term river flows that surpass 20,000 cfs at times. During dry weather, the flows continue to fluctuate on an hourly basis. There is no "steady-state" flow in the river which would be beneficial for the colonization of higher quality benthic organisms, or accommodating to those fish species which need such conditions to successfully carry out their life histories.

In addition, the question of whether the flow conditions described above can be considered "natural" in the context of the UAA factor, is a difficult one. The entire waterway is not a natural stream, and has a man-made flow regime, as the result of human-induced conditions. As such, MWGen believes that the effects of this altered flow regime could be equally applicable under both UAA Factors 3 and 4.

U.S. EPA Comment, Page 3, Top; Factor 3 Section:

Human caused conditions or sources of pollution prevent attainment of use and cannot be remedied.

The Agency comments that MWGen does not demonstrate that, absent the thermal impacts of our generating facilities, that sediment contamination and flow alterations would be sufficient to preclude a more diverse aquatic community than already exists.

MWGen Response: Our report, "Appropriate Thermal Water Quality Standards for the Lower Des Plaines River" does address this issue on pages 26-32. Lack of clean, suitable substrate, along with an erratic flow regime, frequently traversed by barge traffic, will serve to limit the number of fish species which can be expected to inhabit the system, even in the absence of thermal discharges. While it may not be possible to separate the various stressors to the system to determine which ones are most responsible for the limitations on the biological potential of the waterway, thermal discharges alone are not sufficient to account for the lack of a balanced indigenous fish community in the lower Des Plaines River. As discussed during our meeting, additional supporting information on this finding will be included in a revision of MWGen's report.

Clarification on Sediment Issues:

The potential for sediment remediation was not addressed by MWGen in our report since it has not been established what entity would be responsible for such an undertaking, or if and when, realistically, it could potentially be done. Our report describes contaminated sediments as "limiting." We will clarify this description to explain that the physical characteristics of the sediment in the system (fine, silty, organic) are not amenable to many higher quality fish species which need a hard, clean substrate for spawning. Even if the stream was remediated and the existing sediment (contaminated or not) removed, the nature of the waterway itself (e.g. impounded) would ensure that additional fine, silty sediment (whether clean or contaminated) would continue to be deposited, thereby preventing an improved habitat for better quality aquatic life. It is the physical quality of the sediments in the system that are limiting further biological improvements, with existing, depositional area sediment contamination exacerbating the siltation problem.

In a recently completed (May, 2003) habitat evaluation on the Dresden Pool, it was found that sedimentation was moderate to severe in many (23 out of 34 or approx. 70%) of the areas where QHEI scores were calculated. Sedimentation appears to have gotten worse over the past 5-10 years. (*e.g.*, DuPage Delta). Our report will be revised to include this information.

With respect to the U.S. EPA sediment sampling results (Table 1 on Page 3 of June 3, 2003 letter), we do not believe that it is appropriate to average sets of samples from varying locations in the waterway for use in any meaningful analysis. (See also the data contained in Figure 1 in the same letter). Sediment distribution (and any associated contamination) is extremely heterogeneous in nature. Depositional areas, such as those found just above or below lock and dams or backwaters/side channels, have large accumulations of sediment, while locations near the main channel may have sparse or no sediment accumulation, due to the scouring effects of barges and sporadic high river flows. The depositional areas are also the primary sources of available habitat for the fish community of the lower Des Plaines. As such, the fish are likely exposed to

whatever contamination currently exists within these specific areas. When multiple sites are averaged together, it becomes impossible to determine where any specific contamination "hot spots" may be located. In addition, lumping all data together to determine an "average" concentration of chemicals/metals/toxics does not provide a true picture of where the specific areas of contamination are, as well as the associated levels. Averaging dampens out the heterogeneity of sediment quality and distribution, which is an extremely important factor in determining exposures to biological organisms.

The data presented do not state where each of the respective sampling locations was, nor do they differentiate which locations had cores, versus ponar grabs, etc. This information is vital in order to assess the overall sediment quality of any particular location within the waterway. While the results do indicate the presence of sediment contamination, in varying degrees related to depth, for the reasons indicated above, we do not believe that compositing the results for the entire lower Des Plaines River is appropriate.

Clarifications/Cautions Regarding Burton Sediment Toxicity Studies:

Regarding the Burton 1999 studies, there are several reasons why MWGen feels that this data should be viewed with caution. First, we firmly believe that actual river temperature and biological data is more reliable and probative than any laboratory or artificially controlled in-situ study. Fisheries data collected on the lower Des Plaines River during the summer period for more than 20 years show the indigenous fish populations to be largely unaffected by water temperatures which are often above what Burton has stated to be the critical threshold temperature for indigenous species in the Upper Illinois Waterway.

Within the body of the Burton report itself, questions are raised regarding the reliability of some of the study conclusions.

The results of this particular series of tests had a considerable amount of scientific error and/or uncertainty associated with them. The greater mortality rates of the fathead minnows used in the study was attributed to handling/shipping induced stress resulting in overall poor organism health. In addition, some of the mortality observed during the laboratory tests has been, in part, attributed to increased ammonia levels associated with the feeding of the test organisms. The acclimation period for the organisms (24-36 hours) also may not have been sufficient. Also, since the testing was done by holding the test organisms in a chamber for a 7-day period with a constant exposure to contaminants and/or high temperatures, it should not be assumed that this is how organisms would react in a real-world situation in which there are refuge areas for them to move to if conditions become unfavorable. As stated in the report, the level of stress imparted on any test organism is dependent on: species sensitivity, exposure period, acclimation temperature and presence of other stressors, such as ammonia or water and sediment with associated contaminants. In sum, the testing done has inherent inaccuracies and variabilities common in biological testing protocols and should be considered as an effort to model the hypothetical "worst case" condition; a condition

which has not been found in the actual river monitoring data and biological studies conducted to date.

U.S. EPA Comment, Page 4, Bottom:

One example of the far-reaching statements made in the report that are not entirely supported by the existing data is on page 27 of the 1999 Burton report referenced by Region 5 which states that "Most of the river upstream of I-55 does not contain depositional sediments, such as those found in the Brandon Lock & Dam pool."

MWGen Response: This statement is largely unsupported by the actual river data that was obtained and submitted as part of the UIW studies, as well as the recent studies done on the Dresden Pool. As evidenced by the recent QHEI score attributes, there is a significant amount of depositional sediment within the Upper Dresden Pool). Depositional sediments occur throughout the waterway, primarily in main channel border, side channel, backwater and tributary areas. Accurately stated, depositional sediments are found throughout the Upper Dresden Pool, to varying degrees, but are primarily found in main channel border, side channel and backwater areas and are not generally present in the main channel.

U.S. EPA Comment, Page 4, Surface Water Toxicity:

The Agency points out that in the 1995 Burton report, the studies demonstrated that heat from the Joliet Power plant was increasing surface water toxicity in the lower Des Plaines.

MWGEN Response: The Burton 1995 Report, submitted as part of the UIW Study effort, states that "(t)hese results suggest that the upper warm waters of the thermal plume may be exerting a slight effect on some species (with regard to toxicity); however the Des Plaines River exerts a greater effect". (emphasis added). [Page. 8 of December 18, 1995 report]. This was especially apparent after large storm events resulted in greater test organism toxicity, due to increased turbidity and CSO influences. In addition, the report goes on to say that "(t)he effects observed at 35 °C (referring to the greater study mortalities at higher continual temperature exposures) likely do not occur in the UIW because organisms are not exposed to 35 °C (95 °F) water for 7 day periods and no effects were observed in 7 day exposures at 30 °C (86 °F)." Our recent (2002) thermal plume study data confirm that the higher temperatures, in fact, located closer to the surface of the river and cooler temperatures are found at greater depths in the waterway.

In another section of the report, not cited by U.S. EPA, poorer survival of test organisms *C. dubia* and *H. azteca* was observed in the sediment and site water treatments at cold temperatures, as compared to controls. This suggests that colder temperatures increased the adverse effects of continual exposures when in the presence of other metal or organic stressors occurring in the sample sites (Page 9 of December 18, 1995 report).

U.S. EPA appears to be focusing only on those portions of the Burton 1995 Report that indicate potential thermal concerns. The Report as a whole ultimately suggests that there are likely inherent toxicity issues in the waterway which are not either directly linked to or significantly influenced by MWGen's thermal discharges.

MWGen's power stations comply with all applicable thermal water quality standards, which are, by regulatory definition, designed to be protective of the indigenous fish community. As such, our contribution of heat to the waterway is not, in and of itself, having a toxic effect. If, as the UIW studies have indicated, there is inherent toxicity in both the sediments and/or overlying water column at certain locations at certain times, depending on exposure time and concurrent temperature conditions at the sediment/water interface, then it should not be MWGen's charge to further limit our discharges when they are not directly or indirectly impacting toxicity. Since our thermal discharges are surficial in nature, higher temperature water does not come into direct contact with the bottom sediments, and thus does not have an exacerbating effect on any toxic fractions in the sediments.

U.S. EPA Comment, Page 5, Habitat Modifications to Support Navigation:

The Agency states that MWGen does not demonstrate the extent to which barge traffic impacts the aquatic community or the ways in which these impacts can be mitigated.

MWGen Response: As we understand it, U.S. EPA does not disagree that barge traffic is frequent and heavy on the lower Des Plaines River. Instead, Region 5 is asking for more information on the effects of that frequent and heavy traffic on the aquatic community. Observation of the response of the river to a passing barge tow shows a dramatic change in the shoreline water level before and after passing a given point along the channel. Tow boat props stir up sediments, which are then deposited either upstream or downstream of their point of origin--this can be seen in aerial photos, as well as by general observation. The entire river channel is effected, to some extent, when a barge tow passes. While temporary in nature, this disturbance is nonetheless a negative influence on the biota which reside in the waterway. Unfortunately, much of the scientific study of barge traffic effects has focused on the potential impacts on overall water quality by the passage of tows, and not on the impacts to the aquatic community which resides in the waterway. The physical forces in play during a barge tow likely have a significant impact on any organism who is trying to establish a "home" within these zones of frequent disturbance of the bottom sediments. MWGen has not studied these effects, but common sense suggests that they do occur.

Furthermore, a recent study by USGS and the INHS has documented direct mortality caused by towboats. Gutreuter et al (2003) found that various medium to large fish were killed as a result of propeller strikes in Pool 26 of the Mississippi River, as well as the lower portion of the Illinois River. They estimated that 790,000 gizzard shad were killed in just this area as a result of propeller strikes. The number of fish killed was a function of the number of fish killed per kilometer times the amount of barge traffic (kilometers traveled). On a large river such as the Mississippi, at least some fish will move away in

response to oncoming barge traffic. (Lowery 1987, Todd et al 1989). In a smaller, narrower river like the Des Plaines, propeller avoidance would likely be more difficult, so it is reasonable to assume that the mortality rate estimated for the Mississippi River will at least be as high and may be higher in the Des Plaines River. So, in addition to detrimental effects due to re-suspension of sediment (contaminated and otherwise) and localized changes in water levels, direct mortality to the aquatic community due to barge traffic has now been established. This information will be incorporated into MWGen's revised thermal report.

In addition, the fact that the flow regime of the entire waterway is artificially controlled also negatively impacts the aquatic community in various ways, as discussed in our report on Page 13. It is our understanding that commercial navigation is a protected use under Section 303(c)(2)(A) of the Clean Water Act 40 CFR 131.10(a) and therefore will remain a factor limiting the overall potential of the aquatic community of the lower Des Plaines River in the future. Since the waterway is controlled to accommodate commercial navigation, the operation of the locks and dams, including flow/level control, as well as impoundment, the protected, navigational impacts appear to satisfy both Factor 3 (Human caused conditions), as well as Factor 4 (Dams, diversions and other types of hydrologic modifications) of the UAA criteria to support an alternate use designation.

Based on our discussion, we understand that Illinois EPA will take the lead on establishing a dialog with the U.S. Army Corps. of Engineers to determine whether beneficial changes can be made to existing water control operations to enhance the biological integrity of the entire UAA study reach, with particular emphasis on the Upper Dresden Pool. MWGen would also be benefited by the establishment of a more predictable flow regime for the lower Des Plaines River, if this could realistically be accomplished. We look forward to hearing the response of the U.S. Army Corps at a future UAA workgroup meeting.

U.S. EPA Comment, Page 5, mid-page: The Agency stated: "(R)egarding the habitat limitations in the UAA segment resulting from extensive modifications to the natural waterway, U.S. EPA states that the QHEI score cited in the MG report cannot be considered definitive when it falls between two categories of use such as the modified warmwater and warmwater use classifications. The Brandon Pool is more characteristic of a modified warmwater stream while the Dresden Pool shares characteristic of both use classes. When habitat scores fall between use designations a further analysis of the system is required along with an investigation into the possibilities for remediation. No information was provided that indicates that habitat alteration or other modifications could not improve the habitat."

MWGen Response: While using the Ohio use classification as a reference is useful, as agreed to by the Biological Subcommittee, until Illinois develops its own sub-classification system for its waterways, we are left with only General Use or Secondary Contact classifications to which to compare QHEI scores. The QHEI scores for the UAA waterway are all clearly well below what would be expected for a General Use stream under the Illinois use classification system.

Modifications to the QHEI factors which could improve overall habitat should be considered by Illinois EPA and their consultants as part of the UAA analysis, but this is not the charge of MWGen. On the whole, the individual QHEI metrics which are the major contributors to degraded habitat quality are those that cannot be easily or successfully mitigated, including flow alteration, sediment quality (not necessarily contamination, but the consistency of the sediments), lack of riffle areas, little or no sinuosity and poor riparian development.

As discussed at length during the meeting, EA Engineering, Science and Technology has reviewed the QHEI scores collected at 34 locations at 0.5 mile increments throughout Dresden Pool in May, 2003 and determined that poor habitat is pervasive throughout the Pool. Provided below are the 10 major components of the QHEI that contributed to the low scores:

Factor	No. of Locations Affected (out of 34)
Poor Development (of riffles)	ALL
No Riffles	32
Current Speed None or Slow	32
Recent Channelization or Lack or Recovery	30
No Sinuosity	23
Moderate to Heavy Silt	23
Extensive or Moderate/Extensive Embeddness	19
Only Substrate Silt or Detritus	10
Poor (≤ 6) Instream cover	8
Urban or Industrial Riparian Zone	6

Practically speaking, these factors either cannot be remediated (e.g. lack of sinuosity, substrate only silt) or the effort to remediate them, (e.g., the amount of instream cover) would be unprecedented for a stream of this size.

In addition, EA has reviewed the observed habitat characteristics of the Brandon and Upper Dresden Pools and has compared them to the published criteria for the Ohio use designations of Warm Water Habitat (WWH) and Modified Warm Water Habitat (MWH) to provide the additional analysis that U.S. EPA had requested. The results of this exercise are presented in the following table. As can be seen from this data, both the Brandon and Upstream Dresden Pool areas share many of the characteristics of modified warm water habitat streams, and except for depth, possess none of the characteristics associated with warm water habitat streams.

Comparison of warm water habitat (WWH) and modified warm water habitat (MWH) characteristics of the Des Plaines River.

	Brandon Pool	Upper Dresden Pool
WWH Characteristics		
No Channelization or Recovered		
Boulder, Cobble, Gravel Substrates		
Silt Free		
Good-Excellent Development		
Moderate-High Sinuosity		
Cover Moderate to Extensive		
Fast currents & Eddies		
Low/Normal Substrate Embeddness		
Max Depth > 40cm	X	X
Low/No Riffle embeddness		
Total WWH Characteristics	1	1
MWH Characteristics with High Influence		
Recent Channelization		
Silt/Muck Substrates	X	X
No Sinuosity	X	X
Sparse/No Cover	X	X
Total MWH (High)	3	3
MMH Characteristics With Moderate Influence		
Recovering Channelization	X	X
High or Moderate Silt Over Other Substrates		
Sand Substance (Boat)		
Fair/Poor Development	X	X
Low Sinuosity		
Only 1-2 Cover Types		
Intermittent or Interstitial		
Max Depth < 40cm		
High Embeddness of Riffle Substrates	X	X
Lack of Fast Current	X	X
Total MWH (Moderate	4	4
Total MWH (All)	7	7

As U.S. EPA has already agreed that the Brandon Pool cannot meet General Use due to unalterable physical/habitat alterations, MWGen believes that the above information meets the test for UAA Factors 3 and 4 to qualify the Upper Dresden Pool for a use designation other than General Use.

U.S. EPA Comment, Page 5, Bottom: The Agency states that: "MG fails to demonstrate that habitat, rather than temperature, is the primary factor limiting the aquatic community. MG presents data that show similarities between the fish community above the I-55 Bridge (secondary contact), and below the I-55 Bridge (general use) to illustrate that, since both segments have similar habitat, habitat rather than thermal regime must be limiting the aquatic community. What MG fails to disclose is that the segment below the bridge is subject to a thermal variance, allowing higher ambient temperatures than permitted under Illinois' general use standards. Temperatures at this location consistently remain at the upper levels of the temperature range. The most probable explanation for the similarities in the fish community is the similarities in the thermal regime." (emphasis added)

MWGen Comments: MWGen did not "fail to disclose" anything. There is no thermal variance which covers the waterway downstream of the I-55 Bridge--that area is subject to the General Use thermal limits. MWGen retains an alternate thermal standard (AS96-10) which is only applicable at the I-55 Bridge location, not any area downstream. This alternate thermal standard is a set of monthly/semi-monthly temperature limits which vary on a seasonal basis, but are identical to the General Use numeric limits during both the summer months (mid-May through September) and the winter months (January and February). Moreover, during the remainder of the months (April through early May and October- November), the monthly limits at I-55 are actually more stringent than General Use numeric limits would allow. As an example, in April, the General Use limits would allow a maximum temperature of 90 °F (with an allowable excursion up to 93 °F); the alternate I-55 standard for April only goes up to 80 °F (with an allowable excursion up to 83 °F).

AS96-10 ALTERNATE THERMAL LIMITATIONS FOR THE I-55 BRIDGE:

	Jan	Feb	Mar	Apr 1-15	Apr 16-30	May 1-15	May 16-30	Jun 1-15	Jun 16-30	Jul	Aug	Sep	Oct	Nov	Dec
oF	60	60	65	73	80	85	90	90	91	91	91	90	85	75	65

These standards may be exceeded by no more than 3°F during 2% of the hours in the 12-month period ending December 31, except that at no time shall Midwest Generation's plants cause the water temperature at the I-55 Bridge to exceed 93°F.

March and December are the only months in which the Alternate I-55 Thermal Standards allow a temperature of 65 °F when the corresponding General Use Thermal Standard for the same time period is 60 °F (with an allowable excursion of up to 63 °F).

Winter Temperatures in the Lower Des Plaines River:

So far, no one involved in the UAA has addressed the winter temperature limit, which is of equal concern to MWGen as the summer temperature limit. There are periods during the Winter and Spring when ambient river temperatures currently exceed the corresponding General Use thermal water quality limit, largely due to the influences of the MWRDGC's Stickney Treatment plant, which provides up to 100 % of the flow to the waterway during the winter months. The temperature of the Stickney outfall is elevated from what would be found in a natural waterway during this time of year, and as a result, the entire system follows an altered thermal regime, regardless of the input of heat from MWGen's plants.

U.S. EPA Comment, Page 6, second paragraph: The Agency questioned the validity of MWGen's selection of Representative Important Species (RIS) for the lower Des Plaines River and the analysis which showed that the biological community is not impacted by the thermal discharges. U.S. EPA believes that the species used in the RIS should include species representing the potential biological community and should not be dominated by those species that already exist in the system. The Agency believes that there are a number of cool water species that should be represented, including walleye, other percids and esocids, since they are present in the Kankakee River and could potentially migrate into the lower Des Plaines.

MWGen Response: U.S. EPA is correct that "potential" fish communities should be considered. This is why redhorse were included in MWGen's RIS. However, the species suggested by U.S. EPA are not appropriate representatives of the potential fish community. Not only is the Upper Dresden Pool near the edge of their natural ranges, but there is little or no habitat in the Brandon and Upper Dresden Pools to support them. We do not disagree that northern pike and yellow perch (we assume that U.S. EPA is referring to this species when they say "other percids") are cool water species. However, both require clear, well-vegetated lakes, pools, or backwaters to thrive and particularly to reproduce. Such areas are rare to nonexistent in these pools. Therefore, these species will be limited naturally.

U.S. EPA implies that if Upper Dresden Pool were assigned the General Use thermal standard, then good northern pike and yellow perch populations would become established based on recruits from the Kankakee River. Since, as shown during EA's recent habitat survey of the entire Dresden Pool, habitats upstream and downstream of I-55 are similar, it follows that these species should have been able to establish viable populations in lower Dresden Pool, which is already subject to the General Use thermal standard. However, data collected over the past nine years (See Table 1, attached), show that only one yellow perch and one northern pike have been collected from the General Use portion of the pool. Since populations of these two species in lower Dresden Pool

are already protected by the General Use thermal standard, the only logical reason for their extreme rarity in lower Dresden Pool is lack of proper habitat or other non-thermal causes. Given that they are habitat limited, it follows that they should not be designated as RIS. Both species are also rare in upper Marseilles Pool (See Table 2, attached). U.S. EPA (1977) guidance supports MWGen's approach that species at the edge of their range should normally not be designated RIS. The U.S. EPA report stated (p. 36) that "[w]ide-Ranging species at the extremes of their ranges would generally not be considered acceptable as 'particularly vulnerable' or 'sensitive' representative species" though they still could be considered important." Here, based not only on their peripheral nature but also the obvious habitat limitations, the U.S. EPA guidance does not support their inclusion in the RIS designation.

Walleye are more thermally tolerant than yellow perch or northern pike and, as a result, are more widely distributed in Illinois (Smith 1979). Thus, they were not excluded from the MWGen RIS list based on being peripheral. However, like the two species just discussed, they clearly are habitat limited. Most walleye populations spawn over clear cobble or rubble areas, but some populations can spawn in flooded, well-vegetated backwaters. However, except for a small portion of the Brandon tailwaters, both habitat types are rare in Dresden Pool. Examination of data from Lower Dresden Pool and Upper Marseilles Pool supports our contention that walleye are habitat limited. Nine years of collecting fish has yielded only one walleye from the Lower Dresden Pool and only one from the Upper Marseilles Pool (See Tables 1 and 2) despite the fact that General Use thermal standards prevail in both areas. Thus, there is no reason to believe that walleye would be any more successful in the Upper Dresden Pool than the Lower Dresden Pool.

If we compare catches of walleye with those of smallmouth bass, a species considered to have similar thermal tolerance, or to redhorse, which are likely more thermally sensitive (Reash et al 2000), it is equally clear that walleye numbers in these areas are constrained by something other than temperature. For example, Lower Dresden Pool, which yielded only one walleye, produced 477 smallmouth bass and 571 redhorse (all redhorse species combined) during the same period (See Table 1), and upper Marseilles Pool, which also yielded only one walleye, yielded 172 smallmouth bass and 348 redhorse. The only possible interpretation of this data is that walleye are habitat limited while the other two species, which have roughly similar thermal requirements, are not. Given that it is habitat limited, walleye is clearly not an appropriate RIS.

U.S. EPA Comment, last sentence of the 3rd paragraph : *"In addition, there are a number of other critical temperatures related to gamete maturation, spawning, early life history survival, preference, avoidance, and optimum growth."*

MWGen Response: We interpret U.S. EPA's comment to mean that there are other life cycle endpoints to consider. We agree. However, we believe these have been addressed. Not by comparison with laboratory – derived endpoints but rather by examining the large biological data set that has been collected form this area, a more reliable, holistic and ecologically meaningful exercise. Good populations will be maintained only if there is

adequate early life history survival, successful spawning, etc. Our examination of the long term data sets has indicated that those species tolerant of the broad set of limiting conditions that exist in the study area (*e.g.*, gizzard shad, most centrarchids , various minnows, etc.) are doing quite well, whereas those that are more sensitive to these limitations (e.g., redhorse and darters) are not. Thus, it is factors other than temperature (*e.g.*, sedimentation, poor habitat, silty and/or contaminated sediments, etc.) that determine and limit the Upper Dresden and Brandon fish communities. Temperature plays a small and largely secondary role. In other words, there would be no significant change in these fish populations even if General Use thermal standards were applied to the Upper Dresden and Brandon Pools.

U.S. EPA Comment, Page 6, Fourth paragraph: The Agency states that temperature affects dissolved oxygen levels in this system by depressing the saturation levels, which has the effect of exacerbating diurnal DO sags due to increased algal growth and photosynthesis. The Agency also states that it is aware of other factors that may be responsible for some of the low DO's observed at the I-55 continuous monitoring station. Region 5 is recommending that the QUAL2E model developed and calibrated by MWRDGC be reevaluated and re-run with current conditions in the waterway.

MWGen Comments: If algal growth and photosynthesis is increased, then this would also result in super-saturation during the daylight hours. The DO measurements taken at I-55 over the past 6 years show this to occur. DO sags are also common occurrences, but do not normally drop down and remain at a level which would be biologically limiting. Overall, the average DO in the waterway is well above that needed to sustain the indigenous biological community, as evidenced by both our continuous I-55 monitoring, as well as measurements taken as part of our long-term fisheries monitoring program. These data continue to show more than adequate levels of DO at all of the sampling locations in the lower Des Plaines River, including the immediate generating station discharge canals, where water temperatures are the highest.

Use and/or manipulation of QUAL2E is not the responsibility of Midwest Generation. MWRDGC is already in the process of having QUAL2E recalibrated by Marquette University in order to make it a more dynamic, versus steady-state, model of the waterway. Since MWGen has several years of continuous, in-stream temperature/DO measurements near the I-55 Bridge, as well as frequent DO grabs throughout the lower Des Plaines River, this real data should take precedence in making a determination on the overall impact (or lack thereof) of water temperature on the dissolved oxygen levels in the waterway. Our analysis of this data, as well as the fisheries monitoring results, shows that there have been no adverse impacts on the indigenous aquatic community of the lower Des Plaines River from any hypothesized temperature-related effects on DO levels.

U.S. EPA Comment, Page 6, Factor 4, last paragraph:

Dams, diversions or other types of hydrologic modifications preclude attainment.

U.S. EPA does not agree that hydrologic modifications are sufficient to preclude improvements to the aquatic community. U.S. EPA believes that MWGen should provide more information to support its claim that the hydrologic modifications of the lower Des Plaines River are limiting the aquatic community. "Consistent with Federal regulations at 40 CFR 131.10(g), such a demonstration should also show that the hydrologic modifications cannot be operated in such a manner as to mitigate the impacts on the aquatic community.".

MWGen Response: The QHEI data provided to U.S. EPA and the UAA workgroup clearly demonstrate the impact of a hydrologically altered system on habitat availability/quality. In addition, the nature of the sediments in the system (fine, silty) regardless of the presence of contamination or not, is not conducive to those fish species which require gravel/cobble substrates for successful spawning to occur. The flow regime is not that of a natural waterway, and has large, localized fluctuations in level below the Brandon Lock and Dam that would be adverse to any nest-building species. The velocity at which water is released from the lock and dam may also have negative effects on the biota in the immediate vicinity of the release.

As acknowledged by U.S. EPA and well-established in the literature, dams reduce the abundance and diversity of riverine species. This is a result of interrupting or eliminating migration, the pooling effect upstream of each dam, the sediment that build up behind dams, etc. The studies that U.S. EPA conducted and/or sponsored on the Fox River clearly demonstrate these impacts as shown by declines in IBI scores upstream of each dam. These adverse impacts are recognized by other Region 5 States. For example, Wisconsin and Michigan are actively promoting dam removal. Ohio has a separate use classification based on effects from dams. Species most effected are so-called fluvial specialists (e.g., most darters, many suckers, etc.), whereas habitat generalists (e.g., common carp, gizzard shad, channel catfish), and pelagic species (e.g. emerald shiner, freshwater drum) do quite well under impounded conditions. Similarly, simple lithophiles (e.g., redhorse and most darters), which require clean, hard substrates, do poorly in impounded situations because of increased siltation while those that are nest builders (e.g., centrarchids), or have modified spawning strategies (e.g., bluntnose minnow) do quite well under the same set of circumstances.

To ignore the impacts associated with hydraulic modifications is to disregard the considerable body of research that has been collected during the past 20 years and the precedents that have been established by other states, such as Ohio. Even the IEPA Consultant's Draft UAA report acknowledged (pg 8-16) that expectations for Upper Dresden Pool were lower because of hydraulic impacts and thus created the category "General Use Impounded". Clearly, the biological expectations for such areas are indeed lower than for "full" General Use. These conditions support either retention of the existing Secondary Contact use (or creating a new use that includes modified thermal and other standards). There is nothing in the regulations which would require Secondary Contact to retain the identical thermal limitations that it has now. These may be modified in order to protect the current and expected assemblage of aquatic life that would reside

in the Upper Dresden Pool, given the permanent constraints on the system under UAA Factors 3, 4 and/or 5.

The system's hydraulic modifications are solely under the control of MWRDGC and the U.S. Army Corps of Engineers, and are in place exclusively to accommodate flood control and commercial navigation. As stated earlier, Illinois EPA has assumed the responsibility to address this issue with the Corps.

U.S. EPA Comment, Page 7, First paragraph, Factor 5:

Physical conditions related to the natural features of the water body, such as lack of proper substrate, cover, flow depth, preclude attainment of use.

U.S. EPA states that, "given the extensive modifications of this system, it is difficult to attribute the habitat limitations to "natural features" of the waterbody. Therefore, this factor does not seem to be relevant to the UAA for the lower Des Plaines River. In fact, where the river does exhibit more "natural" features, the habitat resembles closely that of other waters that are classified as General Use."

MWGen Response: If U.S. EPA agrees that the waterway's habitat limitations are the result of the fact that it is not a natural system, then such "permanent" alternations (natural or manmade) should be considered equally in assessing whether the waterway can support a higher use. Habitat is defined by the existing and future anticipated physical conditions of the waterway, whether the result of natural or man-made influences. QHEI scores for the entire UAA reach are much lower than would be expected for a General Use waterway. In fact, even the General Use waterway directly downstream of I-55 has QHEI scores lower than what would be considered as General Use. IBI scores in the entire Dresden Pool are also similar, and much below that expected for a General Use Stream (see MWGen's Thermal Report, pages 39-41, also included in attachments). As stated earlier, this is not due to the input of heat, since the General Use thermal standards apply to this segment. The only logical explanation is that the habitat of the entire system (although it may appear, from the surface, to be more "natural") still has inherent limitations which prevent it from sustaining more sensitive/higher quality aquatic species.

Indeed, the results of the recent pool-wide habitat assessment and the poor IBI scores throughout Dresden pool suggest that, if anything, it is lower Dresden pool that is misclassified. Because of poor habit conditions due to impounding and the other factors discussed previously, the biological data supports a lowering of the use classification of lower Dresden Pool and does not support upgrading the use designation of the upper Dresden Pool.

U.S. EPA Comment, Page 7, Second paragraph. Factor 6:

Controls more stringent than those required by Section 301(b)(1)(A) and (B) of the Clean Water Act would result in substantial and widespread economic and social impact.

U.S. EPA states that no "extraordinary controls" would be required on point source dischargers in the lower Des Plaines to improve chemical water quality in the lower Des Plaines River. Therefore, "it seems unlikely that point source discharge(r)s would incur any extraordinary costs to achieve the chemical water quality needed to support an improved aquatic community."

MWGen Response: While this may be true of many of the more conventional chemical pollutants, U.S. EPA's position does not adequately consider the bacterial contamination of the waterway Secondary Contact water quality limits currently have no fecal coliform (or e. coli) limit on dischargers. Imposition of General Use water quality standards would require a bacterial limit, as well as a Total Residual Chlorine limit which is very stringent. Effecting such control for a municipal or industrial discharger will result in considerable costs. In order to implement the disinfection process needed to control the bacterial content of the discharge, the amount of chlorine required would certainly require dechlorination. These combined processes (chlorination/dechlorination) would introduce additional contaminants into the waterway (chloramines--bioaccumulative, bisulfite--a known oxygen scavenger, etc) which could pose additional risks to the aquatic community. And in the end, the result would be an effluent which is likely of higher quality than the receiving stream itself, due to the continued presence of bacterial contamination from wildlife, runoff and CSO events. The economic burden on the regulated community would be significant, but the environmental benefit would be negligible. The Upper Dresden Pool is unlikely to become a sought-after primary contact recreational area, and bacterial contamination has little impact on the indigenous aquatic community.

U.S. EPA Comment, Page 7, Paragraph 3: The U.S. EPA identified the statement in MWGen's Thermal Report that heat from the Will County generating plant is lost to the atmosphere prior to it reaching the Brandon Pool portion of the UAA. U.S. EPA contends that if that were the case, this portion of the system would be meeting the General Use standard.

MWGen Response: The wording in the MWGen report will be revised to clarify the meaning. The heat from Will County Station's thermal discharge is gradually dissipated to the atmosphere along the approximate five mile reach from the station to the Lockport Lock, and receives further cooling as it mixes with the discharge from the Upper Des Plaines River below Lockport. We did not intend to imply that the added heat was completely lost before reaching the Brandon Lock and Dam. The revised report will reflect this clarification.

The intake temperatures at Will County Station often meet or exceed the General Use thermal limits, especially during the winter months, so even if the heat discharged by the station were to fully dissipate by the time it reaches Brandon Road Lock and Dam (which, in most cases, it does not), the ambient temperature in the waterway is already close to or over the applicable General Use thermal limit before it reaches Joliet Station. The temperature regime of the entire waterway is strongly influenced by the discharge from the MWRDGC Stickney plant, which contributes up to 100% of the entire flow in the waterway during the winter months (per conversation with Dick Lanyon, MWRDGC). This factor must be taken into consideration regarding future seasonal temperature limits for the waterway, especially for winter conditions.

U.S. EPA Comment, Page 7, Paragraph 4, Factor 6:

Controls more stringent than those required by Section 301(b)(1)(A) and (B) of the Clean Water Act would result in substantial and widespread economic and social impact.

U.S. EPA states that MWGen does not provide the economic data necessary to demonstrate that providing additional cooling at its facilities will result in substantial and widespread social and economic impacts. In addition, the cost that has been expended by society to improve the water quality of this system must be factored into this analysis.

MWGen Response: MWGen did not provide economic data for the installation of additional cooling capacity for our facilities because the information in our report demonstrated that other UAA factors were applicable to the waterway, such that a full socio-economic impact study was not necessary. We have agreed to provide Illinois EPA with the cost information that will be necessary for them to fully consider the cost/benefit of the imposition of more stringent standards, and will provide additional biological/habitat data that will allow Illinois EPA to make an informed decision regarding the overall environmental benefit to be attained by the imposition of more stringent thermal limits on the lower Des Plaines River.

It is unclear what costs the U.S. EPA is including by its reference to the cost borne by "society" to improve water quality. Accordingly, we are unable to respond to this comment. However, it is also questionable whether this comment is relevant to or supported by the language of the UAA regulation concerning the review of social and economic impacts caused by the proposed use upgrade.

U.S. EPA Comment, Page 7, Paragraph 5: The Agency has reviewed MWGen's current operation of the Joliet #29 cooling towers and assumes that it would be possible to operate them when discharge temperatures are less than low-to mid 90 ° F to accommodate seasonal temperature needs. In terms of space, it was noted that there appears to be space adjacent to Joliet 9 and there may be space that can be purchased. U.S. EPA references the effectiveness of the cooling towers at Joliet 29 and assumes that temperatures consistent with more protective thermal criteria could be achieved.

MWGen Response: Current operation of the cooling towers is geared towards remaining in compliance with both the near-field (Secondary Contact) and far-field (I-55) temperature standards. The towers are normally turned on when the circulating water discharge temperature exceeds 93 °F for an extended period of time. The towers do not operate as efficiently when the inlet to the towers (e.g. the circulating water discharge temperature) is less than 90 ° F, so it cannot be assumed that simply by turning them on sooner, or running them for a longer period of time, that this would allow a lower near-field temperature limit to be met. (i.e. tower efficiency is not a constant). Seasonality also has a significant impact on tower operation, since the towers are not currently designed to operate during the cooler times of the year. They do not have plume abatement controls, which means that significant fogging/icing could be expected during winter operation to meet a more stringent near-field limit, should it even be technically feasible to do so. Such fogging is a major concern, due to the proximity of both a major interstate highway, as well as a small municipal airport. Installation of plume abatement technology can also easily double the overall cost of any supplemental cooling system.

U.S. EPA's solution to MWGen's current space constraints for additional cooling towers is very simplistic. We agree that there is some space available on the Joliet 9 side of the river for some towers, however, Joliet 9 does not have the same thermal effect on the waterway as the larger Joliet 29 does. Even if towers were installed at Joliet 9, they would only serve to control Joliet 9's discharge, and would do nothing for Joliet 29's near-field compliance. Space constraints at Joliet 29 were the primary focus of the statements made in MWGen's report. Purchasing additional property on which to build towers, even if it were available (which is doubtful) would place them at a significant distance from the site, which would involve additional piping, pumping and electrical hook-ups to route the cooling water through them and back to the river. Installation of supplemental cooling when there is evidence of a significant detrimental effect of the thermal discharge on the indigenous aquatic community, or if a facility cannot comply with currently applicable thermal limits, may be warranted, but without such evidence or supporting data, the need for, and any environmental benefit to be derived from, such measures is questionable.

U.S. EPA Comment, Page 7, Bottom: U.S. EPA's position is that MWGen has not demonstrated that any of the six factors listed in the Federal regulations at 40 CFR 101.10(g) prevent improvements to the aquatic community in the lower Des Plaines River regardless of the thermal impacts resulting from MWGen's generating facilities. (emphasis added).

MWGen Response: U.S. EPA admits, on page 7 , first paragraph of their comment letter, that there have been "extensive modifications of this system", yet it disregards these modifications and assumes that thermal effects are a primary cause of the limited aquatic community in the waterway. However, even in the draft UAA report, several chapters come to the conclusion that one or more of the 6 factors are met in the waterway, thus allowing for consideration of a less than full General Use designation. The fact that these individual chapter conclusions are not incorporated into the final UAA summary is problematic.

We hope that this summary has provided you with detailed information and clarifications regarding the issues raised in your June 3, 2003 letter and subsequently discussed on August 6, 2003. We will revise our draft report to be consistent with the changes indicated herein and forward it for review by Illinois EPA and the UAA Biological Subcommittee.

MWGen maintains that UAA Factors 3, 4 and 5 are applicable to the Upper Dresden Pool, which prevent it from being able to meet full General Use criteria. As such, we would be glad to work with Illinois EPA to develop appropriate temperature limitations for this river reach, under either the existing use designation (Secondary Contact) or under a new use designation which will reflect both the improvements and the inherent limitations of the lower Des Plaines River which prevent it from being able to support a balanced, indigenous aquatic community.

Please contact Julia Wozniak or myself if you have any questions or comments regarding this matter.

Sincerely,

Basil G. Constantelos
Director, Environmental Health and Safety

cc: Ed Hammer--U.S. EPA Region 5
Toby Frevert--Illinois EPA

Attachments: Tables 1 and 2
MWGen Thermal Report Figures 4, 5 and 6

TABLE 1. NUMBER, CPE (No./km), AND RELATIVE ABUNDANCE OF ALL FISH TAXA COLLECTED ELECTROFISHING FROM LOWER DRESDEN POOL (between the I-55 bridge and Dresden Lock and Dam) FOR THE PERIOD OF 1994-2002.

SPECIES	LOWER DRESDEN POOL		
	#	CPE	%
LONGNOSE GAR	32	0.16	0.079
SHORTNOSE GAR	1	0.01	0.002
UNID GAR	3	0.02	0.007
SKIPJACK HERRING	35	0.18	0.087
GIZZARD SHAD	12,070	62.00	29.881
THREADFIN SHAD	391	2.01	0.968
GRASS PICKEREL	4	0.02	0.010
NORTHERN PIKE	1	0.01	0.002
CENTRAL STONEROLLER	5	0.03	0.012
GOLDFISH	9	0.05	0.022
GRASS CARP	1	0.01	0.002
COMMON CARP	1,022	5.25	2.530
CARP X GOLDFISH HYBRID	134	0.69	0.332
BIGHEAD CARP	2	0.01	0.005
GOLDEN SHINER	21	0.11	0.052
PALLID SHINER	3	0.02	0.007
EMERALD SHINER	3,781	19.42	9.360
GHOST SHINER	12	0.06	0.030
STRIPED SHINER	20	0.10	0.050
SPOTTAIL SHINER	347	1.78	0.859
RED SHINER	2	0.01	0.005
SPOTFIN SHINER	400	2.05	0.990
SAND SHINER	3	0.02	0.007
REDFIN SHINER	1	0.01	0.002
MIMIC SHINER	3	0.02	0.007
CHANNEL SHINER	1	0.01	0.002
BLUNTNOSE MINNOW	2,602	13.37	6.442
FATHEAD MINNOW	1	0.01	0.002
BULLHEAD MINNOW	1,141	5.86	2.825
RIVER CARPSUCKER	141	0.72	0.349
QUILLBACK	90	0.46	0.223
UNID CARPIODES	1	0.01	0.002
WHITE SUCKER	11	0.06	0.027
SMALLMOUTH BUFFALO	363	1.86	0.899
BIGMOUTH BUFFALO	21	0.11	0.052
BLACK BUFFALO	9	0.05	0.022
SPOTTED SUCKER	4	0.02	0.010
SILVER REDHORSE	28	0.14	0.069
RIVER REDHORSE	6	0.03	0.015
BLACK REDHORSE	1	0.01	0.002
GOLDEN REDHORSE	358	1.84	0.886
SHORTHEAD REDHORSE	177	0.91	0.438
UNID MOXOSTOMA	1	0.01	0.002
BLACK BULLHEAD	3	0.02	0.007
YELLOW BULLHEAD	47	0.24	0.116
CHANNEL CATFISH	376	1.93	0.931
UNID AMEIURUS	1	0.01	0.002
TADPOLE MADTOM	4	0.02	0.010
FLATHEAD CATFISH	17	0.09	0.042
TROUT-PERCH	1	0.01	0.002
BLACKSTRIPE TOPMINNOW	16	0.08	0.040
BROOK SILVERSIDE	98	0.50	0.243
WHITE PERCH	4	0.02	0.010
WHITE BASS	9	0.05	0.022
YELLOW BASS	8	0.04	0.020
HYBRID MORONE	2	0.01	0.005
UNID MORONE	5	0.03	0.012
ROCK BASS	11	0.06	0.027
GREEN SUNFISH	3,146	16.16	7.788
PUMPKINSEED	26	0.13	0.064
WARMOUTH	5	0.03	0.012
ORANGESPOTTED SUNFISH	3,040	15.62	7.526
BLUEGILL	7,271	37.35	18.000
LONGEAR SUNFISH	67	0.34	0.166
REDEAR SUNFISH	1	0.01	0.002
HYBRID SUNFISH	108	0.55	0.267

TABLE 1 (cont.)

SPECIES (cont.)	LOWER DRESDEN POOL		
	#	CPE	%
UNID LEPOMIS	110	0.57	0.272
SMALLMOUTH BASS	477	2.45	1.181
LARGEMOUTH BASS	1,659	8.52	4.107
UNID MICROPTERUS	1	0.01	0.002
WHITE CRAPPIE	15	0.08	0.037
BLACK CRAPPIE	35	0.18	0.087
BANDED DARTER	1	0.01	0.002
YELLOW PERCH	1	0.01	0.002
LOGPERCH	126	0.65	0.312
BLACKSIDE DARTER	1	0.01	0.002
SLENDERHEAD DARTER	3	0.02	0.007
WALLEYE	1	0.01	0.002
FRESHWATER DRUM	439	2.26	1.087
TOTAL FISH	40,394	207.50	100.000

TABLE 2. NUMBER, CPE (No./km), AND RELATIVE ABUNDANCE OF ALL FISH TAXA COLLECTED ELECTROFISHING DOWNSTREAM OF DRESDEN LOCK AND DAM FOR THE PERIOD OF 1994, 1995, AND 1999-2002.

SPECIES	D/S DRESDEN L&D		
	#	CPE	%
LONGNOSE GAR	18	0.41	0.239
SHORTNOSE GAR	1	0.02	0.013
UNID GAR	2	0.05	0.027
SKIPJACK HERRING	23	0.52	0.305
GIZZARD SHAD	1,003	22.80	13.301
THREADFIN SHAD	55	1.25	0.729
GOLDEYE	1	0.02	0.013
GRASS PICKEREL	1	0.02	0.013
NORTHERN PIKE	3	0.07	0.040
GRASS CARP	1	0.02	0.013
COMMON CARP	178	4.05	2.360
CARP X GOLDFISH HYBRID	2	0.05	0.027
GOLDEN SHINER	2	0.05	0.027
EMERALD SHINER	2,565	58.30	34.014
GHOST SHINER	7	0.16	0.093
STRIPED SHINER	7	0.16	0.093
SPOTTAIL SHINER	50	1.14	0.663
RED SHINER	5	0.11	0.066
SPOTFIN SHINER	422	9.59	5.596
SAND SHINER	36	0.82	0.477
MIMIC SHINER	9	0.20	0.119
SUCKERMOUTH MINNOW	8	0.18	0.106
BLUNTNOSE MINNOW	265	6.02	3.514
BULLHEAD MINNOW	257	5.84	3.408
RIVER CARPSUCKER	91	2.07	1.207
QUILLBACK	69	1.57	0.915
HIGHFIN CARPSUCKER	1	0.02	0.013
UNID CARPIODES	2	0.05	0.027
NORTHERN HOG SUCKER	7	0.16	0.093
SMALLMOUTH BUFFALO	180	4.09	2.387
BIGMOUTH BUFFALO	1	0.02	0.013
BLACK BUFFALO	1	0.02	0.013
SILVER REDHORSE	50	1.14	0.663
RIVER REDHORSE	3	0.07	0.040
BLACK REDHORSE	2	0.05	0.027
GOLDEN REDHORSE	236	5.36	3.130
SHORTHEAD REDHORSE	56	1.27	0.743
GREATER REDHORSE	1	0.02	0.013
BLACK BULLHEAD	1	0.02	0.013
CHANNEL CATFISH	126	2.86	1.671
FLATHEAD CATFISH	4	0.09	0.053
TROUT-PERCH	1	0.02	0.013
MOSQUITOFISH	2	0.05	0.027
BROOK SILVERSIDE	24	0.55	0.318
WHITE PERCH	3	0.07	0.040
WHITE BASS	50	1.14	0.663
YELLOW BASS	7	0.16	0.093
HYBRID MORONE	3	0.07	0.040
UNID MORONE	50	1.14	0.663
ROCK BASS	2	0.05	0.027
GREEN SUNFISH	466	10.59	6.180
PUMPKINSEED	1	0.02	0.013
ORANGESPOTTED SUNFISH	11	0.25	0.146
BLUEGILL	559	12.70	7.413
LONGEAR SUNFISH	7	0.16	0.093
HYBRID SUNFISH	2	0.05	0.027
SMALLMOUTH BASS	172	3.91	2.281
LARGEMOUTH BASS	174	3.95	2.307
WHITE CRAPPIE	2	0.05	0.027
BLACK CRAPPIE	8	0.18	0.106
LOGPERCH	36	0.82	0.477
SLENDERHEAD DARTER	1	0.02	0.013
WALLEYE	1	0.02	0.013
FRESHWATER DRUM	207	4.70	2.745
TOTAL FISH	7,541	171.39	100.000

Figure 4. Mean IBI Scores Within the Upstream and Downstream I-55 Segments, 1999.

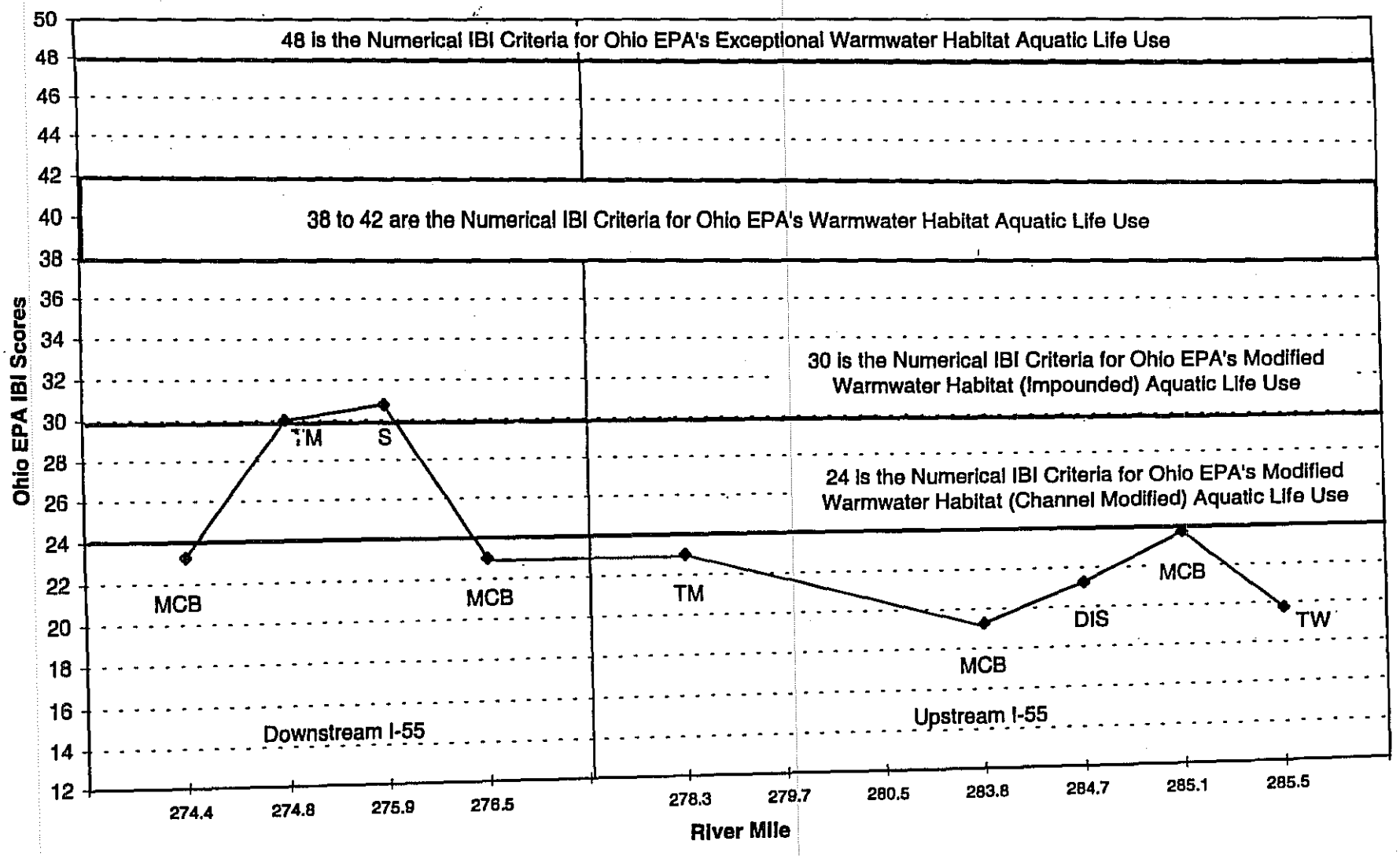


Figure 5. Mean IBI Scores Within the Upstream and Downstream I-55 Segments, 2000.

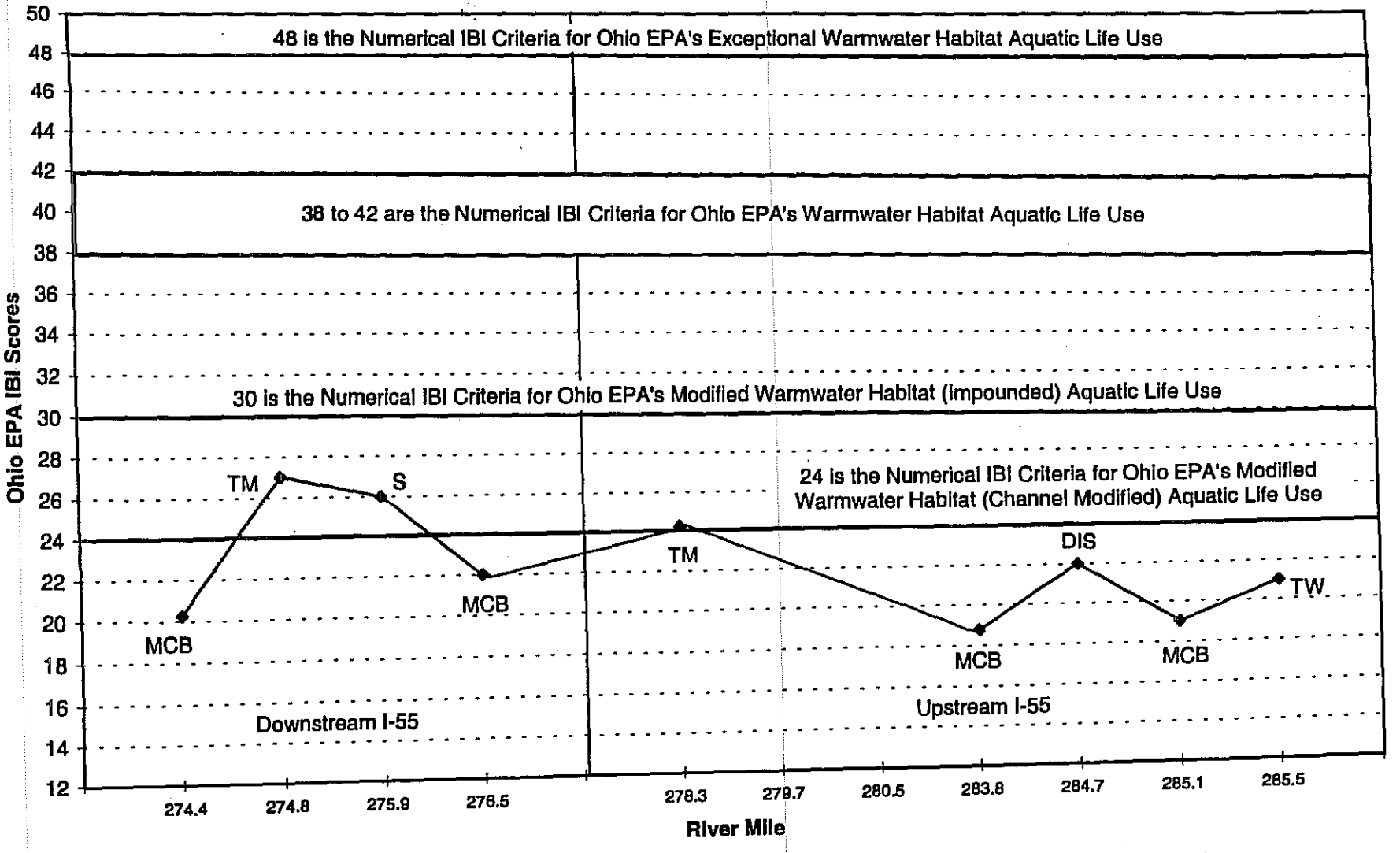
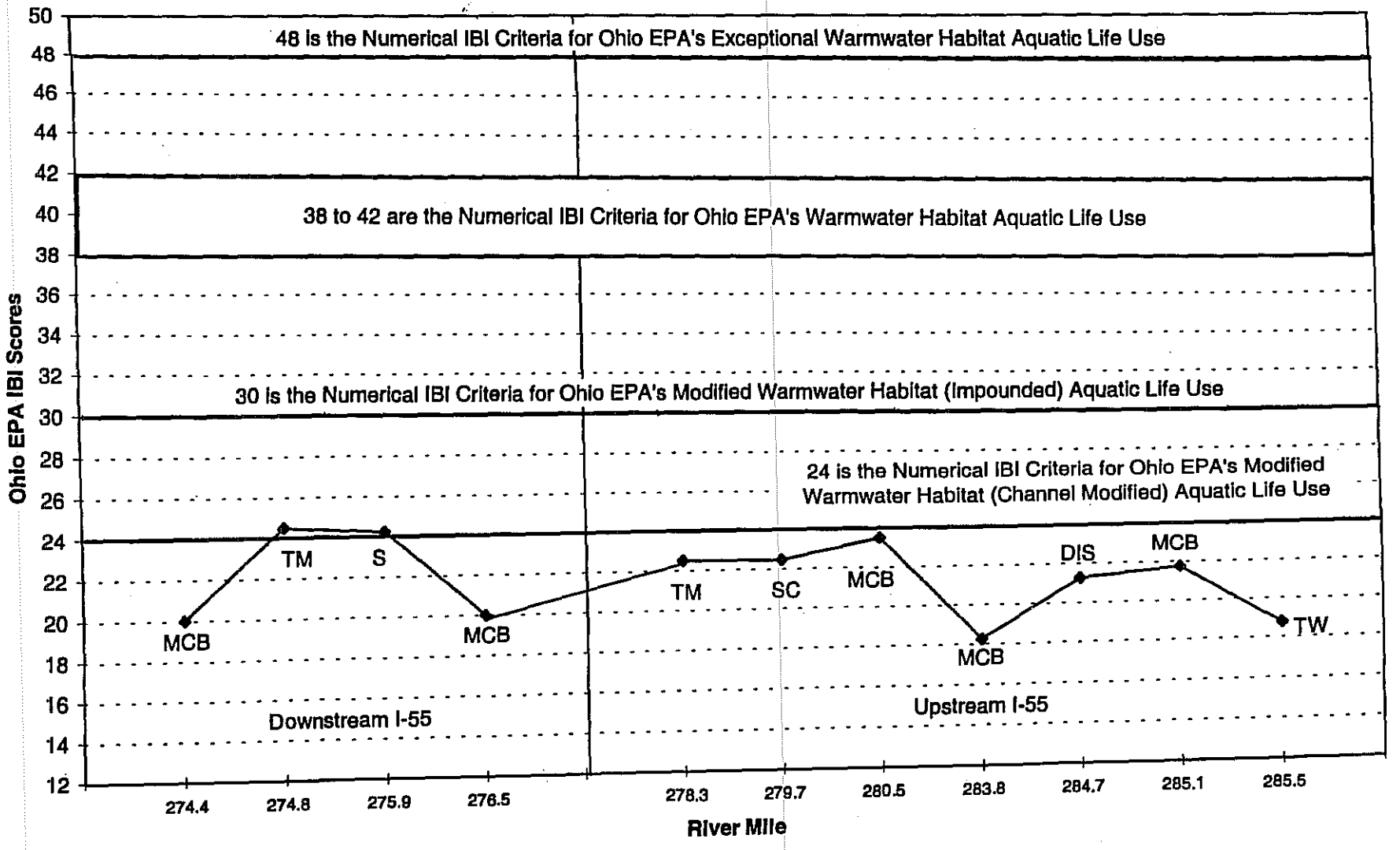


Figure 6. Mean IBI Scores Within the Upstream and Downstream I-55 Segments, 2001.



ATTACHMENT 8

October 15, 2003
Midwest Generation Comments on Revised Draft Thermal Section of the Lower Des Plaines River UAA Report

Midwest Generation Comments on Draft UAA Report

INTRODUCTION-- COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
1-8, bottom	303(d) listing incomplete/abbreviated	Should also specifically include: PCBs, and flow alternation. It should also be noted that heat is NOT listed as a parameter of concern for any of the UAA segments in the most recent 305(b)/303(d) reports
	Plant design data (in Table 1.2 on page 1-11) is INAPPROPRIATELY APPLIED to determine that MWGEN plants consistently use entire river for cooling--This is NOT TRUE	Design data should only be considered as "worst-case" and should not be applied to any analysis without consultation with MWGEN on actual station operating conditions, which are adjusted to ensure compliance with all thermal limits, including mixing zone and zone of passage provisions required by Section 302.102 . In addition, consultant assumes "low flow" conditions to come to flawed conclusions, when actual flow data is readily available and would show that condenser flow rates are normally less than the flow in the river system. Consultant fails to compare actual temperature data to actual flow data for the same time periods.
	Table is incomplete and values in last column of table are either taken out of context or not properly cited. Insufficient information is given in order to look up referenced data.	It is uncertain what the values in the last column represent, since there were several different scenarios run in the thermal modeling work done as part of the UIW Study. Poor citations and lacking references make fact checking extremely difficult for this report.
	Cooling towers referenced as being used to control far-field compliance only; no information is provided on effect (i.e. efficiency) of cooling tower operation in lowering discharge temperature of Joliet 29	Towers are used to control both near and far-field thermal compliance. This information was provided in MWGEN presentation to Biological subcommittee. (Ref: June 4, 2002 presentation)
1-22 footnote	Consultant refers to cooling towers being "commonly used" and "mandatory" with references that are not cited	Recent DOE EIA 767 data for rivers in IL and WI show that only 3 out of 13 and 5 out of 17 power plants (respectively) have closed cycle cooling, with the rest being open-cycle.
1-23, #3	Report refers to "improved sediment quality", but values presented still indicate that contamination is still prevalent in the waterway. Need to differentiate results between main channel and depositional areas. as well as core versus grab sample results.	Biological subcommittee was never been given the opportunity to review the USEPA sediment sampling methods/results; Sediment contamination is very heterogeneous in nature; a few samples and averaged results shouldn't be relied upon to establish that overall quality has improved.

Midwest Generation Comments on Draft UAA Report

WATERBODY ASSESSMENT: Chemical Parameters
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-66--figure 2.30	MWRD and MWGen described as being "side by side" comparisons--inaccurately described	Data is NOT from the same location in the waterway
2-66-figure 2.31	MWGEN data "re-plotted" from hard copy; accuracy questioned (This is only one example of "re-plotting" or reorganizing our data to meet consultant's needs)	Data provided by MWGEN should not be taken out of context; we would have provided the electronic files, with accurately documented data, if a request had been made to us.
2-71	Complete misrepresentation of data provided by MWGEN; Statement attributed to Wozniak, 2002 that maximum temperature in the upper part of Dresden Pool was 100 °F or more for an extensive period of time in 1999 is absolutely FALSE.	Data on intake and discharge temperatures at Joliet Stations, provided by MWGEN during June 4, 2002 subcommittee meeting, showed maximum month condenser outlet temperatures, which were explained to the group as NOT being representative of the discharge to the river due to the impact of cooling tower operations. Towers are capable of cooling the station discharge down by a minimum of 5 °F before it enters the lower Des Plaines River and receives further mixing with ambient river water. In addition, the condenser outlet temperatures presented represent the highest 15 minute value recorded in any given month, and CANNOT be assumed to have been in effect for the ENTIRE MONTH, as the consultant did. The Consultant then proceeds to apply his inaccurate assumption on main river temperature to the remainder of the UAA Report, to the extent that he alleges that MWGEN was in violation of the Secondary Contact thermal limits for months at a time.
	Consultant fails to acknowledge the Secondary Contact thermal limits also include 26 acre thermal plume, zone of passage and excursion hour provisions.	
2-72, top	Consultant implies that misrepresented high river temperatures are responsible for low D.O. in the river (i.e. temperature is driving D.O. out of the waterway) 2nd to last para: ..."no single cause of the low DO can be pinpointed." Compare this statement to the one at the right>>>>>>>>>	No actual data or information is presented to support this position. Temp/DO studies done for MWGEN do not show any strong correlations. p. 2-79, 2nd para: states the causes of instantaneous DO excursions in the Dresden Pool as being definitively caused by nutrient enrichment and cloudy days. (No citation of supporting data) Example of inconsistencies in report statements/conclusions.

Midwest Generation Comments on Draft UAA Report

WATERBODY ASSESSMENT: Chemical Parameters
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-74	Reference to QUAL2E model as applicable to UAA	QUAL2E assumes steady state flows, complete vertical/horizontal mixing, one-way flow---all of which are not applicable to the lower Des Plaines River.
2-81, third bullet	Misrepresented high temperature is again cited as the cause of low D.O. Consultant misuses MWGEN data to show that temperatures exceeding 100 °F (falsely assumed to be in the entire river) have occurred.	Complete misrepresentation and misuse of MWGEN data, resulting in false assumptions and conclusions which target thermal discharges as being in noncompliance with existing standards. MWGEN has actual data, as well as recent river study results, to demonstrate that this is NOT TRUE.

Midwest Generation Comments on Draft UAA Report

WATER BODY ASSESSMENT FOR TEMPERATURE--
CHAPTER COMMENTS:
(Pages 2-82 through 2-104--original draft references)

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-82, para. 2	Reference to Table 1.2 (p. 1-11)-- power plant capacities and heat rejection information	This information represents design or worst-case values , and are NOT representative of current plant operations.
2-82, para. 2	Reference to Table 1.2 (p 1-11)--summer delta T in the river at low flow	This information was NOT presented in either the Holly (1994) or Wozniak (2002) references--Where did it come from and what is the intent of presenting it? Holly and Bradley (1994) report reference is also absent from review of literature listing.
2-82, para. 2	Reference to Joliet Cooling Towers (in footnote to Table 1.2, p. 1-11)	No mention is made anywhere in the report of the benefit of cooling tower use on the condenser outlet temperatures, nor the fact that towers were in use during all of the periods when the consultant erroneously claims that main river temperatures were in excess of 100 °F
2-82, para. 3	Consultant misuses/manipulates information provided by MWGen and deliberately omits discussion on use of unit deratings to maintain compliance when cooling towers alone are not sufficient (even through this information was clearly presented by MWGEN at the Biological Subcommittee meeting).	MWGen uses the 24 cooling towers at Joliet 29 to the full extent possible to control our thermal discharges to comply with both near and far-field thermal limits. When towers alone cannot reduce temperatures to an acceptable level, significant unit deratings (i.e. decreases in megawatt load) are taken to control temperatures in the waterway. MWGen has consistently had to derate during critical summer periods, when the demand for electricity is highest. MWGen has incurred costs in $M's to remain in compliance with the existing thermal limitations.
2-85, mid	Report cites history of thermal limits in the waterway, with particular emphasis on the role that ComEd has played--but fails to mention that all prior proceedings were supported by biological data. Consultant also does not recount the most recent Board order, which states that conditions in the river have not changed appreciably since the I-55 adjusted thermal standards were first granted.	Consultant omits the fact that the I-55 adjusted thermal standards were subsequently transferred to MWGEN by the IPCB in March, 2000, at which time IEPA concurred with their original conclusion, based on the supporting data previously submitted by ComEd, that the adjusted limits remain fully supportive of the indigenous aquatic community at I-55.

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2-86 para. 1	Consultant relies on design or worst-case parameters, combined with simplistic, unsupported assumptions and suppositions, to imply that the Joliet Stations are not in compliance with the Secondary Contact thermal limits.	MWGen operates Joliet Station in order to consistently comply with both near and far-field thermal limitations, utilizing cooling towers and significant unit deratings, when necessary to ensure compliance. Since 1999, cooling towers have been in use and condenser flow rates have been adjusted downward to optimize station operations, as well as cooling tower efficiency. Supporting data confirming continuing compliance during the 1999 summer period, as well as more recent periods, has been presented to both IEPA and USEPA (June, 2002).
	Consultant also assumes that Joliet Station discharges combine with each other and leave no mixing zone in the river. Actual data shows that this is NOT TRUE.	Recent thermal plume studies performed by MWGen (EA. 2003), along with temperature analyses previously presented to IEPA and USEPA (June, 2002) clearly demonstrate Joliet Stations' continuing compliance with all applicable thermal standards and there is no interaction of thermal plumes from Joliet 9 and 29 until temperatures are already within the specified Secondary Contact limits. In addition, the data provided by MWGEN DOES NOT show main river temperature, so there is no actual data to support the consultant's simplistic and inaccurate assumptions.

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2-86 para. 3	Consultant assumes that station condenser discharge temperatures are equivalent to main body river temperatures, even though they acknowledge the existence and use of cooling towers. This implies that the cooling towers have no effect--This is NOT TRUE.	The erroneous assumptions made regarding the required power plant flow versus the river flow are not supported by any actual data and allege that Midwest Generation has been in chronic violation of the Secondary Contact thermal limits. The assumption that there is no mixing zone in the river is based on the gross misinterpretation of station operating parameters, river flow dynamics and appalling disregard for the need of substantive support for such statements. Data from recent thermal plume studies conducted by Midwest Generation clearly refute these allegations.
		Condenser discharge temperature (as reported in Joliet Station #29 DMRs and in the presentations given by Wozniak in 2001 and 2002) is NOT equivalent to the temperature entering the lower Des Plaines River. Use of the cooling towers, which actually treat almost 50% of the condenser flow (due to lower than design condenser flow rates), decrease discharge canal temperatures by a minimum of 5 °F . This "effective discharge" then enters the river and mixes with cooler upstream water to effect addition reductions in overall plume temperature.
	Consultant claims that I-55 temperature in 1999 was above the General Use limit of 32 °C (90 °F)	The maximum General Use limit is 33.9 °F (93 °F)--which is identical to the I-55 adjusted thermal limit during the summer months. I-55 temperatures have remained at or below 93 °F since continuous monitoring began in 1988.

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2-88, para. 1	Consultant again erroneously concludes, using simplistic and biased assumptions, that the temperature of Joliet's condenser discharges is equivalent to the temperature of the entire river downstream of the plants. This is NOT TRUE and is not supported by recent field measurements and confirmatory studies submitted to IEPA and USEPA. Again, MWGEN is cited as the source of this information, which has been misinterpreted, misused and manipulated by the consultant to support wholly inaccurate assumptions.	Mass-balance calculations, as well as actual field data, demonstrate that this is NOT TRUE. The Joliet Stations are operated to ensure continuing compliance with all existing near and far-field thermal limitations. MWGen has presented a proposed near-field thermal compliance model to IEPA and USEPA for use in monitoring and assessing near-field compliance on an on-going basis. This model is based on IEPA's guidance on Point Source Wasteload Allocation (1991). If the condenser discharge temperature were equivalent to the fully mixed temperature in the river, the I-55 thermal limits would consistently be exceeded during the hot summer months, which continuous monitoring data has shown is not the case. Compliance with the I-55 adjusted thermal standards has been maintained since the limits became effective in Nov. 1996.

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2-89	Consultant wrongly assumes constant low flow conditions dominate river system, without checking real data to confirm validity of assumptions, and then misuses MWGEN provided information to determine how our plants impact the waterway. This is extremely biased, as well as unrealistic. In fact, elsewhere in the report, the flow of the waterway is characterized as greatly fluctuating, as the graph on this page shows. It should be noted that this graph is "replotted" from the US Army Corps of Engineers website, which depicts 6 am values only, so this graph is NOT representative of continuous flow data for the entire time period and only represents one hour each day. In addition, it was acknowledged that the flow is supplemented by diversion flow during the summer period---Both these factors would indicate that there is no "constant" low flow which would result in the kinds of situations that the consultant presumes to occur in the lower Des Plaines river.	MWGEN maintains continuous records of intake, discharge and I-55 temperatures, as well as circulating water flow rates, cooling tower flow rates and cooling efficiency and river flow rates. MWGen also retains a complete record of 2-hour Corps of Engineers flow data for Brandon Road. All of this REAL DATA was offered to the IEPA consultants, but it was never requested. Another example of inconsistency within the report and/or disregard for information or data that weakens consultant's arguments.
	Cooling towers are again mentioned, but discounted as not having any beneficial impact on the station discharge.	Information presented to the workgroup discussed the use of the towers and their efficiency in reducing the temperature of the station discharge a minimum of 5 °F before it enters the river. (p. 60 of 6/4/2002 presentation). This data was not included in the draft UAA Report.
	The statement "*Most* current power plants located on rivers such as the Des Plaines River used closed cycle cooling with natural draft or mechanical cooling towers (for example, the WE power plants near Portage and Kenosha, Wisconsin) or lakes (plants near Dresden or Springfield, IL); is incorrect and misleading.	There are many open cycle power plants in the Midwest, including several on the Ohio River in Ohio and Wabash River in Indiana. Closed cycle cooling was a requirement for all plants built after 1970, which is the type of plant the consultant may be referring to. The Joliet and Will County plants were built before this requirement was in place, and were built to utilize cooling water from an industrialized, Secondary Contact waterway, not comparable to any river in Portage or Kenosha, Wisconsin. (Ref. DOE EIA Data from 2000)

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2-89, bottom	EXTREME MISREPRESENTATION SELECTIVE USE OF DATA: Consultant cites MWGEN as stating that "...the use of the existing cooling towers alone is often not sufficient to control the magnitude of the thermal discharge to meet current near and far-field limits." but FAILS to include the immediately following statement (on the same page), which was provided in the both the 6/4/2002 MWGEN PowerPoint presentation and hand-outs which stated : "•Under these situations, units have been and will continue to be derated when compliance conditions warrant (both at Joliet and Will County). •Forced loss of power occurs when it is most needed by the citizens and businesses of Northern Illinois."	Data recently presented to IEPA and USEPA confirm that even under critical summer conditions, Joliet Station continues to remain in compliance with all near and far-field thermal limits, through the adjustments in station circulating flow rate, use of cooling towers and unit deratings.
2-90	Example of poor report preparation: Where are the first three items regarding temperature effects? #4-#11 discuss impacts of "excessive" temperature but does not quantify the magnitude at which adverse effects would be expected to occur.	These points appear to be taken from a basic textbook on water pollution. How do these points relate to specific information provided for lower Des Plaines River? How does the real in-stream data compare? Are these effects documented in the Lower Des Plaines River?

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2-91 top	#11 implies that there is a proliferation of blue-green algae in the waterway	Data provided by the UIW study on periphyton and phytoplankton was not referenced, although the information was readily available to the consultant. Contrary to the consultant's statements, the UIW studies of phytoplankton and periphyton clearly show that the system is NOT dominated by blue-green algae. It is, in fact, populated by the same species assemblage as other similar river-reservoir navigation channels. Phytoplankton density at Joliet was comparable to the density observed in Pool 19 of the Mississippi River, which is not thermally impacted.
	Figure 2.43 inaccurately depicts the "Range of summer temperatures in the Upper Dresden Island Pool" as being between 95 and 100 °F (still going along with the completely invalid and erroneously derived assumption that a single monthly maximum condenser outlet temperature equates to a fully mixed river temperature for an entire month).	The premise that water temperatures in the main body of the river are equivalent to Joliet Station discharge temperatures is prevalent throughout the report and is ENTIRELY INCORRECT (as explained previously).
2-91, bottom	The statement made in the last sentence of paragraph 1: "... the standards should not be developed to protect the ***inferior*** biotic composition. The standards should also contain some margin of safety." (emphasis added) implies that the Secondary Contact thermal limits are not adequately protective of the types of aquatic species expected to be found in this waterway. What criteria does the consultant use to determine that the current biotic composition is "inferior" for the lower Des Plaines River, or is this just another opinion, without evidence or support? Define "inferior" in the context of the UAA reach. Years of monitoring data show significant improvements in the fish community over time, despite continued input of heat.	Midwest Generation's recently submitted report (dated January 24, 2003, as well as the more recently issued revision) discusses this matter in great detail and relies on a comprehensive data base of field-collected data to come to the conclusion that the existing limits do adequately support the current and potential aquatic populations in the waterway, based on other permanent limiting factors in the waterway. The so-called "inferior" species are those that are best suited to the available habitat/flow regime present in the waterway.

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2-91 bottom	The last statement on the page implies that the current Secondary Contact thermal limits are already above the lethal limit for indigenous fish species, and charges IEPA with supporting a "lethal standard". To the contrary, the in-stream biological data demonstrates that there has been no lethality observed with the current Secondary Contact thermal standards in place.	The only way a statement like this could be made is by believing the simplistic and erroneous assumption that water temperatures in the main body of the river are allowed to remain at 100 °F (the Secondary Contact maximum limit) for an unspecified amount of time, thereby eliminating any species whose lethal thermal limit is below this value. If one reads all of the requirements related to the Secondary Contact thermal limits, it can be seen that any water temperatures in the main body of the river are strictly limited between 93 °F and 100 °F to only 5% of the hours in any 12-month period. In addition, the general water quality provisions at Il.Adm. Code 302.102 specifically state the mixing zone and zone of passage requirements be maintained for all thermal discharges to the waterway, be it General Use or Secondary Contact. The purpose of these combined regulations is to ensure that there continues to be an adequate margin of safety to ensure the health and well-being of the indigenous aquatic community.
2.92 mid	Is there truly a belief that the river "*can reach its ecological optimum that would be commensurate with the goals of the Clean Water Act.*", that is supported by actual data, or is this solely the opinion of the consultant?	Our understanding of the UAA process was that is it was the consultant's task was to take all available data on the waterway and provide a summary which could then be used the IEPA to determine which water quality limitations would be adequately protective of the existing and potential indigenous aquatic community. The statements made within the draft report go well beyond this, with little, if any, supporting information and data. At no point during the UAA workgroup discussions was there any preconceived idea that the entire lower Des Plaines River would become full General Use, other that that professed by the consultant, at the outset of the study. This bias has carried through since the first workgroup meeting, and is apparent the draft report.

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2-92	Consultant surmises, by selectively pulling information from previous Board rulings, that the Secondary Contact standards were implemented and accepted ..."to avoid the cost of cooling on the Lower Des Plaines River that was perceived as hopelessly polluted."	This statement seriously misrepresents the basis upon which the determination of the appropriateness of the Secondary contact standards, as well as previous thermal variances, was based. Significant amounts of actual field data, biological, chemical and physical, were presented to determine the ecological and biological integrity of the waterway (not dissimilar to what the current UAA study should be doing). Based on the data presented, the determination was made, by both Agency and supporting consultants, that the lower Des Plaines River could not support a full complement of aquatic life due to permanent limitations unrelated to heat.
2-93 bottom	Data for Figure 2.44 was provided within the context of several different MWGEN documents, but is SELECTIVELY MISUSED in the figure to FALSELY imply that Secondary Contact limits were routinely exceeded by MWGEN discharges, as well as to try to demonstrate that the existing Secondary Contact limits are lethal, by MISUSING provided thermal limit data (Table 2 of 2003 MWGEN/EA Report) without regard for the qualifying information in the text (p. 28 of MWGEN/EA Report)	As stated previously, consultant continues to mis-use MWGEN-provided discharge temperature data to try to demonstrate lethality of the temperatures encountered in the main body of the river. If temperatures at or above 100 °F were prevalent in the river, there would be massive fish kills observed, or the marked absence of fish during the hottest times of the year. MWGEN's continuing fisheries monitoring program has not documented either of these occurrences. To the contrary, the program continues to document a varied assemblage of warm water species thriving within close proximity to our thermal discharges. IDNR also has supporting data on fisheries in the waterway and can confirm that no fish kills have been documented in the lower Des Plaines River (even in 1999).

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2-93		All of the species listed in Figure 2.44 can and do live in the lower Des Plaines River. The most recent EA fisheries study (2001), which was submitted to the UAA workgroup as well as IEPA's consultants, shows that the species assemblage in the upper and lower Dresden pools are dominated by gizzard shad, bluntnose minnow, bluegill, emerald shiner, green sunfish, common carp, spot tail shiner and bull head minnow. In addition, the populations of freshwater drum, smallmouth bass, largemouth bass and channel catfish have all either increased or stayed relatively constant between the years 1994-1995 and 2000-2001. All of the fisheries monitoring work is done during the period from May through September, during the height of the warm-weather period of the year. If the consultant is correct and the entire Dresden pool's temperature has exceeded the lethal limit for these species, then one would not expect to find them thriving in the system.
	Maximum temperature of the waterway is again MISREPRESENTED/WRONGLY EXTRAPOLATED from MWGEN data. In addition, monthly maximum condenser discharge values are WRONGLY extrapolated to have lasted for entire months at a time--implying noncompliance.	Estimated maximum temperature in the Upper Dresden Pool is not equal to the pre-cooling tower, condenser outlet temps. provided by MWGEN! Alleging noncompliance with the existing thermal limits, without proof or justification, is not within the scope of the UAA work.
	Another example of poor report preparation: *Temperature* is misspelled in both graphs on pages 2-92 and 2-93.	Typographical, as well as significant grammatical errors are found throughout the report. Missing pages/sections, etc. Spell-check was not done prior to submittal of report to IEPA.
2-93/2-94	Figures 2.44 and 2.45--The consultant is completely off-base in estimating the maximum temperature of the lower Dresden pool by using maximum Joliet Station discharge canal temperature data. MWGEN's data has been misused, misinterpreted and misrepresented throughout	The discharge temperatures are measured at the condenser outlet and do not reflect the impact of the cooling towers on decreasing this temperature before it is discharged to the main body of the river. Under even the most critical weather and flow conditions, the use of Joliet's cooling

	this report.	towers, along with significant unit deratings, ensures that compliance with all applicable thermal limits continues to be maintained.
2-94 bottom	Perseverating on the original misinterpretation/misuse of MWGEN data, the consultant implies, through "speculation" and "deduction", that the power plants were in non-compliance with the applicable thermal limits.	Careful review of the existing data would show that the values that the consultant purports are representing the temperatures in the main body of the river are actually maximum recorded condenser outlet temperatures, and do not account for the cooling provided by the towers that were in operation at the time, nor is the actual river flow during this time considered. The consultant also assumes that the design data provided by the UIW report and Midwest Generation are representative of the actual operating conditions at the plant. Our facilities could not physically operate at maximum loading if river flow conditions were consistently below our circulating water flow rates. Back pressure would necessitate significant unit deratings. However, this seldom occurs for two reasons: (1) river flow is constantly fluctuating by orders of magnitude, and therefore, extremely low river flows are only sporadic (i.e. on the order of hours), rather than chronic, and (2) Midwest Generation maintains vigilant watch over river and station operating temperatures and use the available cooling towers, as well as unit deratings, to ensure that all thermal limits are met in the main body of the river (i.e. where the Secondary Contact limits are in effect). Trying to equate a condenser outlet temperature with a main river temperature, using a worst case estimate of condenser and river flow is NOT appropriate, especially when actual data for all time periods in question is available. Thermal plume monitoring studies done during 2002 by Midwest Generation conclusively show that the thermal plumes from the two Joliet stations well within the current Secondary Contact limits and their discharge temperatures are not equivalent to the temperature in the main body of the river under typically encountered summer weather flow and operating conditions.

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2-95 mid	The statement that the I-55 temperature during the 1999 period did not meet the maximum General Use thermal limit of 93 °F is WRONG. The consultant states that the maximum allowable General Use temperature is 91.7 °F Figure 2.46--"Replots" and again misinterprets/misrepresents MWGEN's condenser discharge temps, as well as I-55 temps, by assuming that a monthly maximum value (based on 15 minute readings) is equivalent to entire month of data.	In reality, the maximum General Use thermal limit is 93 °F--which is identical to the maximum adjusted I-55 standard that is applicable to Midwest Generation's discharges. Errors of this nature should not occur in a carefully prepared technical report. The reader should not be forced to make these significant editorial corrections. The discharge canal temperatures plotted in Figure 2.46 represent condenser outlet temperatures, and do not reflect the beneficial impact of the cooling towers at Joliet 29, which significantly decrease the overall temperature of the discharge before it enters the lower Des Plaines River.

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2-96	The consultant takes it upon himself to account for the total number of hours during which the temperature exceeded 90 °F, even though he does not clarify WHERE this temperature is measured, and whether the main river standard is even applicable to an end-of-pipe value. Further, there is no way that any number of hours can be determined from the data provided, since it represents monthly maximum values only (based on 15 minute readings). Therefore, the maximum for any given month may have only lasted for 15 minutes, and yet the consultant has wrongly extrapolated this to mean that a monthly maximum value lasted for the **entire** month.	There is no current regulatory requirement to maintain any specific condenser discharge temperature, as long as the main body of the river is within the specified Secondary Contact thermal limits at the edge of the allowable mixing zone and the zone of passage considerations are met. Midwest Generation continues to operate the two Joliet Stations to consistently comply with these limitations.
	The first sentence in para. 2 states that "...the Secondary Contact Indigenous Aquatic Life standard is above the lethal temperature of several warmwater fish species." The consultant goes on to say that adult fish would vacate the river during the hotter months of the year to escape the "lethal" temperatures allowed in the waterway.	If this were truly the case, Midwest Generation's routine fisheries monitoring program, as well as the programs run by the Illinois Department of Natural Resources, would pick up such a drastic change. In reality, there has been, and continues to be a healthy assemblage of resident warmwater fish species in the waterway, despite the continued operations of the Joliet units. Avoidance of the immediate discharge canal has been documented during the hottest times of the year, but fish continue to be found both upstream and downstream of these areas. There is no data to suggest a "mass migration" of fish to the Kankakee River during the summer period. Nor is there any evidence to support the consultant's supposition that younger fish are killed by higher temperatures. To the contrary, the Midwest Generation fisheries monitoring program continues to collect both adult and young fish throughout the expanse of the Dresden Pool.

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2-96 bottom	The lower Des Plaines River is not currently classified as "marginal" or "nuisance", as incorrectly stated by the consultant in the seventh line of the third paragraph.	The exact definition of Secondary Contact is as follows: (Il.Adm. Code Title 35, Subtitle C, Chapter I, Section 302.402) ***Secondary contact and indigenous aquatic life standards are intended for those waters not suited for general use activities but which will be appropriate for all secondary contact uses and which will be capable of supporting an indigenous aquatic life limited only by the physical configuration of the body of water, characteristics and origin of the water and the presence of contaminants in amounts that do not exceed the water quality standards listed in Subpart D.*** Based on this definition, the current Secondary contact standards continue to be appropriate for the lower Des Plaines River. There is no inference in the language above that such waters are considered "nuisance" or "marginal", only that they are influenced by factors which may prevent them from becoming full-body contact recreational or supporting a balanced indigenous aquatic community.

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2-97	The consultant again attacks the Secondary Contact thermal limit as being "lethal".	As stated earlier, the assumption made by the consultant that the limit allows 100 °F temperatures in the main body of the river is WRONG. The additional safeguards provided by excursion hour allowance between 93 °F and 100 °F, along with the mixing zone and zone of passage provisions, adequately ensures that aquatic organisms in the system are adequately protected. The field monitoring data collected by both Midwest Generation and MWRDGC demonstrate this, in that there have been consistent populations of indigenous aquatic organisms throughout the lower Des Plaines River, even with the addition of heat.
	The consultant readily "deduces", again misusing both UIW study and well as Midwest Generation-provided information, that the 5 °F delta T above natural temperature General Use limitation is violated in the waterway.	How can the consultant base this conclusion on "reasonable scientific confidence" when the data needed to draw this conclusion is not available, by the consultant's own admission? Also, since the General Use thermal limits do not currently apply to the upper Dresden Pool, there is no reason why the 5 °F delta T limit should be expected to be met.
	Although the consultant states that they were directed by IEPA to defer on a recommendation regarding future temperature limitations for the lower Des Plaines River, they have done exactly that. In line 10, they state that a socio-economic study is "... the only reason a departure from the Illinois General Use standard can be justified. This study has concluded that the first five reasons for downgrading the thermal standard form that specified by the Illinois General Use standards cannot be applied."	The correct legal interpretation is that if any one or more of the 6 UAA regulatory factors is met, a less than fully fishable/swimmable use can be justified. We submit that the actual field data show that UAA Factors 3, 4 and/or 5 are met in the Lower Des Plaines River. Therefore, a socio-economic impact study (Factor #6) is NOT the sole reason for a departure from the Illinois General Use standards.

	The two issues which IEPA requested the consultant address related to temperature were: (1) determination of whether current thermal conditions are detrimentally impacting the aquatic community that inhabits the study reach, and (2) determination of whether *the* currently applicable state standard (Secondary Contact and Indigenous Aquatic Life standards <u>modified</u> *(what does this mean?)* for the Dresden Pool) ~~is~~ *are* adequate to protect the aquatic community otherwise capable of inhabiting the study reach. bottom of page: example of poor grammar "issues addressed to be addressed..."	The Midwest Generation report (January, 2003 and October, 2003 revision) specifically addresses these two issues and should be carefully reviewed by both the Agency and the Biological Subcommittee. Our preference was to use actual field-collected data, as opposed to unsupported allegations and statistics, to develop biologically supportable thermal limits for the lower Des Plaines River. Our intention is to work with the Agency and other stakeholders to propose a new thermal standard that would be both biologically protective and financially and technically attainable. MWGen submits, based on the available data, that Factors 3, 4 and/or 5 are met for both the Brandon and Dresden Pools.
2-98	Consultant's conclusions are not based on the actual data presented for consideration by MWGEN and others.	(1) Ammonia toxicity is known to be influenced by temperature, but the source of ammonia itself has not been fully dealt with. Ammonia is sometimes considered a natural pollutant, in which case it would fall under UAA factor #1. (2) The system is <u>not</u> dominated by blue-green algae (as documented by the UIW report, Chapter 5). The system also does not support swimming, therefore, this point is not applicable to the lower Des Plaines River in any way. (3) Here, the consultant alleges that temperature is the sole reason why some values below the General Use dissolved oxygen limit have been encountered at certain locations, although other causes of low D.O. are discussed elsewhere in the report. (4) The thermal limits are again attacked as being lethal (using the same false assumption on discharge vs. main river temperature), and it is implied that temperature is the only limiting factor to a better fish assemblage in the system. The consultant completely ignores habitat constraints, flow alterations, barge traffic and sediment contamination and/or quality as having any effect on the current or future fish assemblages in the lower Des Plaines River.

		(5) Comparison of the Secondary Contact thermal limits with those found in other states is not valid, since the lower Des Plaines is a unique waterway, whose combined characteristics are not equaled elsewhere.
2-98 bottom	There is inconsistency with the conclusions drawn in this section, compared to other sections of the report, especially with regard to meeting and of the six factors. In some instances, the consultant's response does not answer the question posed by the factor.	(1) The consultant states that the elevated temperatures in the Dresden pool are not natural, but does not provide any data to support this statement or provide a definition of "elevated". The UIW modeling studies have shown that, even without power plant inputs, this waterway would have warmer temperatures year round than a waterway of similar size in a non-urbanized area. Therefore, "elevated" temperature may be an intrinsic characteristic of this river. MWRD's discharge ensures warmer temps. during the winter months. (2) The consultant discounts the sporadic low flow conditions in the waterway as being limiting to the aquatic community. A statement is made that river flow is increased by diversions, but this only occurs during the summer months, and the diversion amount is not always great enough to provide a flow rate comparable to a "natural" waterway. Flow fluctuations may not negatively impact water quality, but they do impact fish habitat, esp. in the Brandon tailwater, one of the best physical habitats in the system. (3) The consultant's response to the issue of whether human caused conditions or sources of pollution prevent the attainment of use and cannot be remedied or would cause more environmental damage to correct than to leave in place is : "Reducing temperature would improve biotic integrity of the Lower Des Plaines River." This response ignores all of the other human-induced limiting factors in the system which limit the aquatic life in the system much more than temperature may. Just because temperature is perceived to be a parameter that is "easily controllable", it does not mean that it should be singled out as the only potentially adverse variable in this complex system. The UAA workgroup and subcommittee meetings have gone through lengthy

		discussions regarding the variety of limiting factors in the waterway, but these discussions have apparently been ignored by the consultants, in deference to the unsupported premise that temperature in the waterway is severely limiting its recovery. All of the data and information presented in both the 1995 UIW Study, as well as the more recent Midwest Generation January, 2003 report and October 2003 revision demonstrate that thermal inputs are not a significant limiting factor preventing the waterway from attaining a higher status--physical characteristics and human-caused conditions are the primary factors. (4) The consultant, and without basis or support, dismisses the premise that dams, diversions or other types of hydrologic modifications preclude the attainment of use. The above factors are the primary basis for the system not being able to attain full General Use (Factor 4). The waterway is significantly impacted by frequent barge traffic, unnatural hydrologic modifications and flow alterations caused by lock and dam operations and summer lake diversions that are not matched during the winter months, when the waterway becomes completely dominated by POTW effluents and runoff. (5) The consultant summarily dismisses the concept that physical habitat limitations in the system preclude the attainment of aquatic life protection uses. The current Secondary Contact limits are adequately protective of the resident aquatic community, which is most limited by the lack of available habitat, proper substrate, flow, cover and depth. The channelized lower Des Plaines does not provide the variety and/or quality of habitat necessary to support a higher quality fishery, regardless of the existing water quality or thermal conditions. This is supported by the data presented in both the UIW Study and the Midwest Generation 2003 report. Improvements to habitat of the nature described in the report would not result in QHEI values even approaching a General Use stream.

Midwest Generation Comments on Draft UAA Report

WATER BODY ASSESSMENT FOR TEMPERATURE--
CHAPTER COMMENTS:
(Pages 2-82 through 2-104--original draft references)

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-99	The consultant flatly states : " While the General Use thermal standard is ***necessary*** and ***appropriate*** to protect the aquatic community otherwise attainable within the Upper Dresden Island pool,..." (emphasis added). IEPA did not charge the consultant with the task of determining what the appropriate thermal limits should be for the waterway, but they take it upon themselves to do so, without a sound basis of actual supporting data to justify this position. They have also provided "guidance" for the Agency and Midwest Generation on how to develop a standard that would "provide adequate protection to the potentially indigenous aquatic species that would reside in the Dresden Island pool.." and suggest that the General Use limits provide the baseline for limit development, based on the lethality data in Figures 2.44 and 2.45, which were previously noted as being misrepresented and inconsistent.	Midwest Generation submits that UAA Factors 3, 4 and/or 5 do apply to the entire lower Des Plaines River. Therefore, the waterbody cannot meet the definition of General Use and should have specific standards set which are appropriate for the unique conditions in the lower Des Plaines River. Midwest Generation has proposed a set of appropriate thermal standards, and have offered to continue to work with IEPA and the stakeholders to present these site-specific standards to the Board for review and approval.
2-102	The MWGEN/EA 2003 Report is referenced, but is not used in any way other than to misinterpret the fish lethality data found in Section XI	IEPA has subsequently distributed the MWGen report for review by the full workgroup. We have obtained comments from IEPA, USEPA and MWRD, which we have incorporated into our revised report (issued October, 2003). The information and data referenced in the MWGen report should be fully reviewed and considered by the Agency for use in the UAA decision-making process

Midwest Generation Comments on Draft UAA Report

WATER BODY ASSESSMENT: Sediment--
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
3-5 footnote	Uses same FALSE assumption on main river temperature to negate conclusions reached by UIW toxicity testing, by stating that a temperature of 100 °F might have been maintained or exceeded in 1999 in the Upper Dresden Island Pool for a period of two months. Consultant independently concluded, based on qualified, in-vitro laboratory results by Burton, , that "the only reason for 100% mortality was temperature."	Directly below the information presented in the Burton report is a qualifying statement *"It should be noted that the acclimation period for these experiments was approximately 2 hours. This relatively short period may have induced stress in the test organisms and influenced their response."* As discussed in the MWGEN/EA 2003 report, acclimation time is important, and organisms residing in the river have substantially more acclimation time as the temperature of the water slowly changes in accordance with a seasonal cycle. In addition, an in-situ or in-vitro test does not afford the test organism the opportunity to move away from any potential stressors, unlike the real-world situation, where there are always refuge areas available. Dr. Burton's studies were <u>not</u> designed to establish what the appropriate temperature limits should be in the waterway.
3-19 bottom	Consultant wrongly compares sediment sampling results from different locations and different gear types to come to the conclusion that sediment quality has improved since the UIW studies were conducted. Comparing sediment from the navigational channel and depositional areas is not valid. Sediment is known to be heterogeneously distributed, so many samples in the same location are needed to make a valid, scientific evaluation of overall sediment contamination.	The navigational channel provides no habitat for aquatic organisms, while the depositional areas, side channels, etc. provide the only habitat available in the waterway. This is the reason why the Burton studies used sediment from these areas. The consultant's reasoning that the Brandon Road tail water presents a "worst-case" condition is in direct conflict with other statements made in the report that indicate this area is an "exceptional" habitat. Characteristics which define biological habitat quality include both physical and chemical criteria.
3-21	Consultant uses USEPA's 2001 sediment study results to determine that conditions have improved since the Burton studies were	Why has this data only been revealed in the context of the consultant's draft UAA Report? It is not fully referenced, so it is

	conducted, but again is INVALIDLY comparing locations, gear-types and level of effort.	impossible to go back to the data source to review methodology, sampling protocol, etc. This is true of many of the consultant's data sources--they are poorly referenced, or not referenced at all. As part of the UAA process, all data, reports and documentation used in the analysis should be made available to reviewers in the form of appendices. Will this be done to allow for independent confirmation of results/conclusions?

Midwest Generation Comments on Draft UAA Report

WATER BODY ASSESSMENT: Physical Assessment--
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
4-32--4-34	*"The physical habitat formed by the navigation system fall under reasons 4 and 5 for a change of the designated use outlined in Box 1.1."*	If any of the 6 reasons is invoked, this should allow for a lesser use to be applied. This is not the final conclusion of the report, even though individual chapters (Chapters 4, 5, 6) indicate this to be appropriate.
	Habitat assessment confirms that poor habitat in the lower Des Plaines River is the result of a lack of riffle/run habitat, limited hard substrates, channelization, poor riparian habitat, lack of stream cover and impounded water. This system does meet the optimum for warmwater use. These factors fall under Reasons 4 and 5 of the UAA. However, the consultant feels that improvements can result in QHEI scores above 60 in the Dresden Pool and 50 in the Brandon Pool.	Why is final conclusion not consistent with information provided within the body of the draft UAA report?

Additional Comments on Chapter 4 (Habitat)

4-16 (2nd para) QHEI measures both the "emergent" properties and the factors that shape them (3rd para) – Some changes can occur over a 9-10 year period . . . e.g. amount of macrophyte development, degree of sedimentation, etc.

4-17 The QHEI form shown is outdated 4-33 & 4-34 (Conclusions) – The authors acknowledge that habitat quality presently is poor within Upper Dresden Pool but suggest that it could be improved enough to meet the target score of 60. These improvements would come as the result of "placement of artificial in-stream . . . habitat" and expansion of the riparian corridor. Although such habitat manipulations are feasible for small streams, they are not feasible for a river the size of the Des Plaines. To our knowledge, habitat manipulation of this scale has never been attempted in the United States.

The costs of such efforts would almost certainly be in the 10's of millions of dollars. There is no regulatory basis by which IEPA or USEPA could force such an effort and neither agency has this kind of money to devote to such a project. The only realistic conclusion is that habitat, which is acknowledged to be limiting in Upper Dresden Pool, will continue to be so.

In tables 4.3 and 4.4, single QHEI scores are presented at each river mile. While some of these indeed are single values, others are based on the authors taking the mean of two or three QHEIs. For example, in Table 4.4, QHEI scores for RM 284.8 were calculated by three groups of investigations (EA, ESE, and LMS); who reported QHEIs of 42, 44, and 50.5 at RM 284.8. In the current report, the mean of these values was reported. Depending on how these multiple QHEIs are handled, the grand average at the bottom of the table may change and the standard deviation certainly will change.

Midwest Generation Comments on Draft UAA Report

EXISTING AND POTENTIAL MACROINVERTEBRATE COMMUNITY--
CHAPTER COMMENTS:

Page Reference	Report Citation	General Comment
5-18	*"The results of the macroinvertebrate sampling were heavily influenced by lack of habitat and barge traffic. Results of the macroinverteberate analysis need to be viewed as only one component of the "weight of evidence" needed to draw conclusions about the current biological use of the Lower Des Plaines River."*	This chapter presents probably the most balanced and accurate assessment of the data provided for analysis. It does not take limited data and come to any broad, sweeping conclusions, and it rightly acknowledges that there are many different factors that need to be considered before determining the appropriate use of a waterway.

Midwest Generation Comments on Draft UAA Report

EXISTING AND POTENTIAL FISHERY COMMUNITY--
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
6-25	Conclusion of the Fisheries assessment chapter indicate that *"part of the reason for the poor IBI values throughout the Lower Des Plaines River is the lack of adequate habitat".*	If any of the 6 reasons is invoked, this should allow for a lesser use to be applied.
	Based on reason No. 4, it is recommended the entire Lower Des Plaines River, including the Brandon and Dresden Island Pools be considered for a modified stream classification that would reflect the currently altered habitat of the waterway.	This is not the final conclusion of the report, even though individual chapters indicate this to be appropriate.

Additional Comments on Chapter 6: Existing and Potential Fishery Community:

P 6-17 – last para

According to the authors "the large and significant difference in IBI between the impounded and free-flowing stations of the Fox River make a strong case that the habitat modifications resulting from pooling of water behind dams results in major declines in biotic integrity, independent of other interacting watershed factors."

Later in the chapter (p. 6-24) when discussing the results from the Fox River, the authors state that "the presence of and proximity to dams has significant effects on the fish biotic integrity."

And in the chapter summary of p. 6-25, they recommend "that the entire Lower Des Plaines River, including the Braden Road and Dresden Island Pools be considered for a modified stream classification that would reflect the currently altered habitat of the waterway."

Given the acknowledgement of the deleterious effects caused by impounding rivers and their own recommendation as quoted above, the report's recommendation in Chapter 8 that Upper Dresden Pool be upgraded to General Use is totally unsupported by their own assessments and recommendations contained in Chapter 6. As such, the conclusion in Chapter 8 is not supported by the data and information in the body of the UAA report.

p. 6-20. The percentages shown for top carnivores in the Fox River (lower right graph) seem far too high. We request that the authors verify these percentages.

p. 6-22. The authors state "Mean IBI scores for Upper and Lower Dresden were not significantly different from each other following the removal of the effects of Habitat Type and Month, but both were still significantly higher than Brandon Pool."

Given the fact that scores are virtually indistinguishable (see Figure 6.12) after habitat effects are removed, there is no basis to conclude that the Secondary Use thermal standards are impacting Upper Dresden Pool. This also indicates that imposing General Use thermal limits on Upper Dresden Pool will not result in any measurable improvement to the fish community.

In summary, the analyses and conclusions in Chapter 6 fail to support our contention that fish communities in the UAA Reach are limited by factors other than temperature.

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PATHOGENS AND RECREATION-- CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
7-9---7-11	Consultant appears to be selectively interpreting published USEPA guidance regarding primary vs. secondary contact	Many of the factors which would prevent primary contact in the lower Des Plaines are present, and not able to be controlled by point source discharges. Safety concerns are significant, due to heavy barge traffic, channelization and lock and dam operations. MWGen's perspective, based on the Agency guidance, is that there is sufficient justification to retain the entire lower Des Plaines River as Secondary contact for recreational purposes.
7-19/20	Consultant acknowledges that even with effluent chlorination, the Illinois General Use Std. for primary contact recreation would not be met, yet goes on to suggest that primary contact use would be attainable.	This suggestion, without scientific support, would result in an unnecessary risk to the general population than maintaining the current Secondary Contact use designation Reference waterbodies also do not meet the criteria for primary contact.
7-22	Evidence presented suggests that the ambient ("natural") least impacted waterways in the state cannot meet the std. for primary contact recreation.	This factor alone should be sufficient to determine that the UAA waterway should retain its Secondary Contact use designation. Physical factors and safety concerns would further support the need to limit full body contact recreation.
7-24--7-27	Figures presented inaccurately depict the true nature of the waterway; there are no barges in any of the photographs, which leaves the reader with the impression that the waterway is not heavily used for navigational traffic and industrial activity	Another example of bias.
7-27	The channel cross-section figure implies that the "littoral zone" in the upper Dresden pool would be conducive to swimming and wading	In reality, these areas are those most heavily impacted by siltation. The bottom sediments are often several feet thick and would be a hazard for anyone attempting to walk on them. In addition, most of the shoreline property in the Dresden pool, especially along the shallower shoreline areas, is privately owned, which would prevent access by the general public.
7-34	Consultant acknowledges that the waterway is effluent dominated and there are other than point sources contributing to the bacterial load in the system	By suggesting further control of point sources, there is no guarantee that the ambient water quality will improve by requiring POTW chlorination/dechlor. In addition, chlorination itself and the by-products created imposes greater risks to the aquatic community. Additional safety would be afforded only if the primary source of bacterial

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		contamination is from point sources; this report, as well as data from IEPA, suggest that this is not the case.
7-37	Report states that "Navigation may not be impeding the recreational opportunities in the Dresden Island Pool and limited recreation is feasible in most sections."	Limited recreation can and does occur in the Dresden Pool, but primary contact recreation is incidental, at best. Recreational opportunities and uses are of a secondary contact nature, and should remain so for public safety reasons.
7-39 bottom	Swimming in the Dresden Island Pool is infrequent and occurs mostly in the section downstream of the I-55 Bridge. This type of use cannot be characterized as existing primary contact recreational use.	If this is the case, why has the consultant suggested that chlorination be required of point source dischargers? If primary contact is not an existing use, it does not need to be protected. There needs to be some minimum accepted threshold of individuals that take part in primary contact activities in order to for such a use to be acknowledged.
7-44	Report states that the lower Dresden Pool (downstream of I-55) does not have a General Use thermal standard	MWGen maintains an adjusted thermal standard only at the I-55 Bridge--General Use thermal water quality standards are in effect directly downstream of I-55. (There is no longer a "Five Mile Stretch" variance, which existed in the early to mid-1980's).
7-44, #2	Report states that "the biological character of the Brandon Pool was found as marginal, below the threshold for the general use, but not much different from the section of the Dresden Pool downstream of I-55. **These concerns doe not prevent designating the entire reach as General Use."** (emphasis added) (Reference to Chapter 7 puzzling, since this statement is found in Chapter 7)	According to USEPA guidance, a UAA must consider physical, chemical and biological factors when determining appropriate use designations. Biological integrity/potential cannot be ignored. Upgrading a waterway based solely on chemical integrity is not appropriate.
7-45 #5	"Downstream of RM 283 the river is surrounded by forests and natural lands valued by the citizens."	Where is the documentation and support for this statement? What citizens? Most "natural lands" in this area are privately owned and not open for public access.
7-45 #6	Report minimizes safety concerns brought about by barge traffic	There are several deaths each year on this waterway, due to barge-related accidents, and these are related to secondary contact uses only. Primary contact would likely increase the number of incidents/fatalities.
7-45	"Logically, the entire Dresden Island Pool should have the same standards and will have for most other parameters (see Chapter 7)".	It is the consultant's own opinion that General Use should be extended throughout the Dresden Pool. Careful consideration of the actual fisheries and habitat data would show that indeed, the whole Dresden Pool should have the same designation, BUT none of it is commensurate with full General Use criteria.

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		Also, this is in chapter 7, so the reference is incorrect.
7-47	Consultant offers Options I and II for classifying the waterway regarding recreation; Option I is recommended--extending primary contact to the entire Dresden Pool, even with the acknowledged safety concerns and uncertainties associated with being able to meet the required bacteriological standards.	Why doesn't the consultant mention the possibility of defining a new use designation for this reach (with restricted primary contact use), which would not need to be re-visited every 3 years and would take on full standing as a state WQ standard? This is allowed by the UAA regs, as long as at least one of the 6 factors is met.
Chapter 7 General		No where in this section is it mentioned that higher temperatures actually limit the amount of time that bacterial contamination is present within the waterway. Higher temperature water also increases the effectiveness of chlorination.

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MODIFIED WATER USE DESIGNATION FOR BRANDON ROAD D POOL AND CORRESPONDING STANDARDS--
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
8-2	**Indiana**-Michigan Canal	Should be Illinois-Michigan Canal
8-7/8	The modified impounded use designation criteria described for Brandon Pool would also be applicable to the upper Dresden Pool.	Ohio's modified warmwater habitat (impounded) would be appropriate for the UAA Waterway.
8-8, bottom	"Ideally, the goal for a water body in this category (modified impounded) is supporting a balanced aquatic biota and limited contact recreation."	The data presented in the report indicates that there is not a balanced aquatic community in either the Brandon or Dresden Pools, as the result of Factors 4 and 5, therefore, this use should be appropriate for the entire UAA waterway.
8-13, Fig. 8.10	Figure description notes "good habitat conditions"	"good" habitat is not merely a function of the presence of shallow, main channel border areas. The substrate characteristics, current, amount of cover, etc (all QHEI criteria) must be taken in to account to determine the overall quality of a given habitat for target organisms.
8-14 figure	MWGEN (ComEd) data inappropriately used; comparison of data which groups different gear types, different locations and different levels of effort is NOT SCIENTIFICALLY DEFENSIBLE! Consultant also makes unsupported statements regarding the existence of early life stages in the Brandon Pool.	The data presented on early life stages from the UIW study (1993-1994) was not intended to quantify the extent or success of spawning activity. The graph is also incorrectly annotated, as this was data from a ComEd, not MWGen, study
8-15, top	The data presented do not acknowledge the fact that the physical features of the Brandon Road pool **prevent** development of early life.	Unsupported statement.
8-15/16	Report compares the Fox River to the lower Des Plaines and claims that this was the consensus of the biological subcommittee	Inappropriate comparison. Also, this was NOT agreed upon by the Biological Subcommittee.
8-16	Dresden ~~Dam~~-Pool paragraph; while the subcommittee did agree that Brandon Pool could not be considered General Use, it did not do so based on the absence of early life forms alone. Next Paragraph: Consultant puts forth reasoning why Dresden pool cannot be considered as "modified impounded" using flawed logic, versus relying on the data and analyses provided within the body of the report.	Both Brandon and Dresden Pools share many of the same characteristics which prevent the attainment of full aquatic life use and primary contact recreation.

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8-16	The consultant's suggest an IBI criterion of 30 for the modified category and 40 for the general use, impounded category.	First, the authors do not have nearly a large enough data set to allow development of biocriterion. Furthermore, the IBIs they calculated from the "reference" stream data sets appear to have been calculated using improperly scored metrics. You can not use metric scoring guidelines based on one set of classifications and then use a different set of classifications for assigning "proportional" scores and resultant use designations.
8-23	Data from MWGEN again misrepresented to try to demonstrate that summer temperatures in the Upper Dresden Pool typically exceed 100 °F , and ultimately affect D.O.	Data on lower Des Plaines temps. was misinterpreted by consultant. End of pipe temperatures are NOT equivalent to the temps. in the main body of the river, where the temp. standards are met.
8-32 bottom /8-33 top	Consultant recommends that the entire Dresden Pool be designated as General Use and that none of the 6 factors (save for #6) is applicable.	No substantive support is provided to negate either Factors 3, 4 and/or 5 from being applicable to the Dresden Pool. Consultant chooses to ignore analyses and conclusions present in other sections of the report to promote preconceived notion of full use attainment for the Dresden Pool. MWGen has provided real data and information to demonstrate that Factors 3, 4 and/or 5 are applicable, which allows for a more appropriate, modified use to be applied to this portion of the waterway.
8-33	Consultant asserts that a socio-economic impact study is the only means to obtain a less stringent thermal limit than General Use. Consultant states that the installation of closed cycle cooling is "common" and will not cause widespread socio-economic impact.	USEPA regulations state that if ANY of the 6 factors is met, a lesser use can be pursued, which would allow for a different set of chemical/physical limitations which are appropriate for the waterbody under consideration. EIA 767 data demonstrate that closed cycle cooling on large river systems in the Midwest is NOT common. Again, the bias which the consultant showed at the outset of the UAA process has prevailed in the conclusions, without the support of actual data or factual information.
8-34 / 8-35	Consultant recommends that socio-economic impact study be performed by MWGen and other thermal dischargers to waterway and states that if the burden of proof is not met, General Use standards should be applied.	UAA regs. allow for different limitations if any one of the 6 factors are met. MWGen asserts that Factors 3, 4 and/or 5 are met for the entire UAA waterway, therefore, a socio-economic impact study is NOT required.

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SUGGESTED ACTION PLAN--CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
9-2	Consultant states that General Use thermal limits are met in the Brandon Pool	Monitoring data show that General Use thermal limits are NOT met in the Brandon Pool; ambient, upstream temperatures, especially during the winter months, are often higher than the allowable General use limits, due to the dominance of the MWRD discharge in establishing the "ambient" conditions in the waterway.
9-2 bottom	"...an excellent but impaired by pollution habitat zone at the confluence of the river and Hickory Creek." Consultant assumes that the habitat conditions in the Dresden pool may *someday* be able to meet the Ohio WWH criteria.	grammatical improvements to this report are necessary throughout No scientific support is given for this statement, as it is purely opinion. Since the river will remain impounded and affected by barge traffic and artificial flow modifications, it will not ever meet the higher criteria assigned as WWH by Ohio.
9-3	Secondary Contact thermal limits again referred to as lethal to the indigenous community	MWGen fisheries monitoring shows that indigenous community is doing well under existing thermal regime.
9-6	#7--top: Secondary contact alleged as not being protective of the existing or proposed use and should be changed to the General Use standard	No basis for this statement, other than the false assumption that the fully mixed river temp. is at the limit for extended periods of time (MWGen demonstrated, with data, that this is not true and that fish community is not negatively impacted by existing thermal limits)
9-8 top	Consultant refers to "problem" with temperature in the Upper Dresden Pool	Based on mis-used/misinterpreted information from MWGen; river is NOT at 100 deg. F for any period of time. Current thermal limits are consistently met.
9-8 Middle	Consultant overrides the results of Burton's studies and assumes that USEPA proves that there is less contamination present in the waterway	USEPA data is not presented in a manner conducive to comparison with Burrton's results. Locations, sampling protocol etc. are not summarized in the report. Also, since sediment contamination is extremely heterogeneous, it is possible that one sample taken directly adjacent to another may have significantly different results. As such, it is not appropriate to state that contamination has lessen as there is insufficient data on which to base this conclusion. Contaminated or not, the quality/physical nature of the sediment is the most limiting factor preventing the establishment of a more diverse assemblage of fish in the waterway.

Midwest Generation Comments on Draft UAA Report

General Comments:

The chapters of the draft UAA report that were submitted to the Biological Subcommittee and Workgroup for prior review have changed little, if at all, from the original drafts. Significant comments had been prepared and submitted by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), Illinois EPA's biologists, the Three Rivers Manufacturing Association (TRMA), as well as Midwest Generation, but have apparently been ignored or dismissed in the preparation of the draft UAA report.

In addition, the draft report contains several chapters, as well as associated conclusions, which were not discussed among the Biological Subcommittee members prior to publication. This especially true for the assessment made for the Dresden Pool. It appears, based on review of the actual data presented during the course of the UAA process, that many of the report's conclusions are unsupported by genuine, field-collected data and are, rather, the opinion of IEPA's consultants.

Misspellings and poor grammar are common throughout the report, with little effort made in corrections which would have been caught if a spell-checker had been employed. Statements scattered through the report, such as "scientific judgment", "one may speculate", "reasonable to assume", "by a great margin", etc. have no place in a technical report.

In addition, the IEPA consultants appear to selectively use the U.S. EPA guidance provided regarding both UAAs and water quality criteria in general.

ATTACHMENT 9

October 22, 2003
Midwest Generation Comments on
Draft Lower Des Plaines River UAA Report

Midwest Generation Comments on Draft UAA Report

INTRODUCTION-- COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
1-8, bottom	303(d) listing incomplete/abbreviated	Should also specifically include: PCBs, and flow alternation. It should also be noted that heat is NOT listed as a parameter of concern for any of the UAA segments in the most recent 305(b)/303(d) reports
	Plant design data (in Table 1.2 on page 1-11) is INAPPROPRIATELY APPLIED to determine that MWGEN plants consistently use entire river for cooling--This is NOT TRUE	Design data should only be considered as "worst-case" and should not be applied to any analysis without consultation with MWGEN on actual station operating conditions, which are adjusted to ensure compliance with all thermal limits, including mixing zone and zone of passage provisions required by Section 302.102 . In addition, consultant assumes "low flow" conditions to come to flawed conclusions, when actual flow data is readily available and would show that condenser flow rates are normally less than the flow in the river system. Consultant fails to compare actual temperature data to actual flow data for the same time periods.
	Table is incomplete and values in last column of table are either taken out of context or not properly cited. Insufficient information is given in order to look up referenced data.	It is uncertain what the values in the last column represent, since there were several different scenarios run in the thermal modeling work done as part of the UIW Study. Poor citations and lacking references make fact checking extremely difficult for this report.
	Cooling towers referenced as being used to control far-field compliance only; no information is provided on effect (i.e. efficiency) of cooling tower operation in lowering discharge temperature of Joliet 29	Towers are used to control both near and far-field thermal compliance. This information was provided in MWGEN presentation to Biological subcommittee. (Ref: June 4, 2002 presentation)
1-22 footnote	Consultant refers to cooling towers being "commonly used" and "mandatory" with references that are not cited	Recent DOE EIA 767 data for rivers in IL and WI show that only 3 out of 13 and 5 out of 17 power plants (respectively) have closed cycle cooling, with the rest being open-cycle.
1-23, #3	Report refers to "improved sediment quality", but values presented still indicate that contamination is still prevalent in the waterway. Need to differentiate results between main channel and depositional areas. as well as core versus grab sample results.	Biological subcommittee was never been given the opportunity to review the USEPA sediment sampling methods/results; Sediment contamination is very heterogeneous in nature; a few samples and averaged results shouldn't be relied upon to establish that overall quality has improved.

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WATERBODY ASSESSMENT: Chemical Parameters
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-66--figure 2.30	MWRD and MWGen described as being "side by side" comparisons--inaccurately described	Data is NOT from the same location in the waterway
2-66-figure 2.31	MWGEN data "re-plotted" from hard copy; accuracy questioned (This is only one example of "re-plotting" or reorganizing our data to meet consultant's needs)	Data provided by MWGEN should not be taken out of context; we would have provided the electronic files, with accurately documented data, if a request had been made to us.
2-71	Complete misrepresentation of data provided by MWGEN; Statement attributed to Wozniak, 2002 that maximum temperature in the upper part of Dresden Pool was 100 °F or more for an extensive period of time in 1999 is absolutely FALSE.	Data on intake and discharge temperatures at Joliet Stations, provided by MWGEN during June 4, 2002 subcommittee meeting, showed maximum month condenser outlet temperatures, which were explained to the group as NOT being representative of the discharge to the river due to the impact of cooling tower operations. Towers are capable of cooling the station discharge down by a minimum of 5 °F before it enters the lower Des Plaines River and receives further mixing with ambient river water. In addition, the condenser outlet temperatures presented represent the highest 15 minute value recorded in any given month, and CANNOT be assumed to have been in effect for the ENTIRE MONTH, as the consultant did. The Consultant then proceeds to apply his inaccurate assumption on main river temperature to the remainder of the UAA Report, to the extent that he alleges that MWGEN was in violation of the Secondary Contact thermal limits for months at a time.
	Consultant fails to acknowledge the Secondary Contact thermal limits also include 26 acre thermal plume, zone of passage and excursion hour provisions.	
2-72, top	Consultant implies that misrepresented high river temperatures are responsible for low D.O. in the river (i.e. temperature is driving D.O. out of the waterway) 2nd to last para: ..."no single cause of the low DO can be pinpointed." Compare this statement to the one at the right>>>>>>>>>	No actual data or information is presented to support this position. Temp/DO studies done for MWGEN do not show any strong correlations. p. 2-79, 2nd para: states the causes of instantaneous DO excursions in the Dresden Pool as being definitively caused by nutrient enrichment and cloudy days. (No citation of supporting data) Example of inconsistencies in report statements/conclusions.

Midwest Generation Comments on Draft UAA Report

WATERBODY ASSESSMENT: Chemical Parameters
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-74	Reference to QUAL2E model as applicable to UAA	QUAL2E assumes steady state flows, complete vertical/horizontal mixing, one-way flow---all of which are not applicable to the lower Des Plaines River.
2-81, third bullet	Misrepresented high temperature is again cited as the cause of low D.O. Consultant misuses MWGEN data to show that temperatures exceeding 100 °F (falsely assumed to be in the entire river) have occurred.	Complete misrepresentation and misuse of MWGEN data, resulting in false assumptions and conclusions which target thermal discharges as being in noncompliance with existing standards. MWGEN has actual data, as well as recent river study results, to demonstrate that this is NOT TRUE.

Midwest Generation Comments on Draft UAA Report

WATER BODY ASSESSMENT FOR TEMPERATURE--
CHAPTER COMMENTS:
(Pages 2-82 through 2-104--original draft references)

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-82, para. 2	Reference to Table 1.2 (p. 1-11)-- power plant capacities and heat rejection information	This information represents design or worst-case values , and are NOT representative of current plant operations.
2-82, para. 2	Reference to Table 1.2 (p 1-11)--summer delta T in the river at low flow	This information was NOT presented in either the Holly (1994) or Wozniak (2002) references--Where did it come from and what is the intent of presenting it? Holly and Bradley (1994) report reference is also absent from review of literature listing.
2-82, para. 2	Reference to Joliet Cooling Towers (in footnote to Table 1.2, p. 1-11)	No mention is made anywhere in the report of the benefit of cooling tower use on the condenser outlet temperatures, nor the fact that towers were in use during all of the periods when the consultant erroneously claims that main river temperatures were in excess of 100 °F
2-82, para. 3	Consultant misuses/manipulates information provided by MWGen and deliberately omits discussion on use of unit deratings to maintain compliance when cooling towers alone are not sufficient (even through this information was clearly presented by MWGEN at the Biological Subcommittee meeting).	MWGen uses the 24 cooling towers at Joliet 29 to the full extent possible to control our thermal discharges to comply with both near and far-field thermal limits. When towers alone cannot reduce temperatures to an acceptable level, significant unit deratings (i.e. decreases in megawatt load) are taken to control temperatures in the waterway. MWGen has consistently had to derate during critical summer periods, when the demand for electricity is highest. MWGen has incurred costs in $M's to remain in compliance with the existing thermal limitations.
2-85, mid	Report cites history of thermal limits in the waterway, with particular emphasis on the role that ComEd has played--but fails to mention that all prior proceedings were supported by biological data. Consultant also does not recount the most recent Board order, which states that conditions in the river have not changed appreciably since the I-55 adjusted thermal standards were first granted.	Consultant omits the fact that the I-55 adjusted thermal standards were subsequently transferred to MWGEN by the IPCB in March, 2000, at which time IEPA concurred with their original conclusion, based on the supporting data previously submitted by ComEd, that the adjusted limits remain fully supportive of the indigenous aquatic community at I-55.

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WATER BODY ASSESSMENT FOR TEMPERATURE--
CHAPTER COMMENTS:
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Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-86 para. 1	Consultant relies on design or worst-case parameters, combined with simplistic, unsupported assumptions and suppositions, to imply that the Joliet Stations are not in compliance with the Secondary Contact thermal limits.	MWGen operates Joliet Station in order to consistently comply with both near and far-field thermal limitations, utilizing cooling towers and significant unit deratings, when necessary to ensure compliance. Since 1999, cooling towers have been in use and condenser flow rates have been adjusted downward to optimize station operations, as well as cooling tower efficiency. Supporting data confirming continuing compliance during the 1999 summer period, as well as more recent periods, has been presented to both IEPA and USEPA (June, 2002).
	Consultant also assumes that Joliet Station discharges combine with each other and leave no mixing zone in the river. Actual data shows that this is NOT TRUE.	Recent thermal plume studies performed by MWGen (EA. 2003), along with temperature analyses previously presented to IEPA and USEPA (June, 2002) clearly demonstrate Joliet Stations' continuing compliance with all applicable thermal standards and there is no interaction of thermal plumes from Joliet 9 and 29 until temperatures are already within the specified Secondary Contact limits. In addition, the data provided by MWGEN DOES NOT show main river temperature, so there is no actual data to support the consultant's simplistic and inaccurate assumptions.

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Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-86 para. 3	Consultant assumes that station condenser discharge temperatures are equivalent to main body river temperatures, even though they acknowledge the existence and use of cooling towers. This implies that the cooling towers have no effect---This is NOT TRUE.	The erroneous assumptions made regarding the required power plant flow versus the river flow are not supported by any actual data and allege that Midwest Generation has been in chronic violation of the Secondary Contact thermal limits. The assumption that there is no mixing zone in the river is based on the gross misinterpretation of station operating parameters, river flow dynamics and appalling disregard for the need of substantive support for such statements. Data from recent thermal plume studies conducted by Midwest Generation clearly refute these allegations. Condenser discharge temperature (as reported in Joliet Station #29 DMRs and in the presentations given by Wozniak in 2001 and 2002) is NOT equivalent to the temperature entering the lower Des Plaines River. Use of the cooling towers, which actually treat almost 50% of the condenser flow (due to lower than design condenser flow rates), decrease discharge canal temperatures by a minimum of 5 °F . This "effective discharge" then enters the river and mixes with cooler upstream water to effect addition reductions in overall plume temperature.
	Consultant claims that I-55 temperature in 1999 was above the General Use limit of 32 °C (90 °F)	The maximum General Use limit is 33.9 °F (93 °F)--which is identical to the I-55 adjusted thermal limit during the summer months. I-55 temperatures have remained at or below 93 °F since continuous monitoring began in 1988.

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WATER BODY ASSESSMENT FOR TEMPERATURE --
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Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-88, para. 1	Consultant again erroneously concludes, using simplistic and biased assumptions, that the temperature of Joliet's condenser discharges is equivalent to the temperature of the entire river downstream of the plants. This is NOT TRUE and is not supported by recent field measurements and confirmatory studies submitted to IEPA and USEPA.	Mass-balance calculations, as well as actual field data, demonstrate that this is NOT TRUE. The Joliet Stations are operated to ensure continuing compliance with all existing near and far-field thermal limitations. MWGen has presented a proposed near-field thermal compliance model to IEPA and USEPA for use in monitoring and assessing near-field compliance on an on-going basis. This model is based on IEPA's guidance on Point Source Wasteload Allocation (1991).
	Again, MWGEN is cited as the source of this information, which has been misinterpreted, misused and manipulated by the consultant to support wholly inaccurate assumptions.	If the condenser discharge temperature were equivalent to the fully mixed temperature in the river, the I-55 thermal limits would consistently be exceeded during the hot summer months, which continuous monitoring data has shown is not the case. Compliance with the I-55 adjusted thermal standards has been maintained since the limits became effective in Nov. 1996.

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Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-89	Consultant wrongly assumes constant low flow conditions dominate river system, without checking real data to confirm validity of assumptions, and then misuses MWGEN provided information to determine how our plants impact the waterway. This is extremely biased, as well as unrealistic. In fact, elsewhere in the report, the flow of the waterway is characterized as greatly fluctuating, as the graph on this page shows. It should be noted that this graph is "replotted" from the US Army Corps of Engineers website, which depicts 6 am values only, so this graph is NOT representative of continuous flow data for the entire time period and only represents one hour each day. In addition, it was acknowledged that the flow is supplemented by diversion flow during the summer period---Both these factors would indicate that there is no "constant" low flow which would result in the kinds of situations that the consultant presumes to occur in the lower Des Plaines river.	MWGEN maintains continuous records of intake, discharge and I-55 temperatures, as well as circulating water flow rates, cooling tower flow rates and cooling efficiency and river flow rates. MWGen also retains a complete record of 2-hour Corps of Engineers flow data for Brandon Road. All of this REAL DATA was offered to the IEPA consultants, but it was never requested. Another example of inconsistency within the report and/or disregard for information or data that weakens consultant's arguments.
	Cooling towers are again mentioned, but discounted as not having any beneficial impact on the station discharge.	Information presented to the workgroup discussed the use of the towers and their efficiency in reducing the temperature of the station discharge a minimum of 5 °F before it enters the river. (p. 60 of 6/4/2002 presentation). This data was not included in the draft UAA Report.
	The statement "*Most* current power plants located on rivers such as the Des Plaines River used closed cycle cooling with natural draft or mechanical cooling towers (for example, the WE power plants near Portage and Kenosha, Wisconsin) or lakes (plants near Dresden or Springfield, IL). is incorrect and misleading.	There are many open cycle power plants in the Midwest, including several on the Ohio River in Ohio and Wabash River in Indiana. Closed cycle cooling was a requirement for all plants built after 1970, which is the type of plant the consultant may be referring to. The Joliet and Will County plants were built before this requirement was in place, and were built to utilize cooling water from an industrialized, Secondary Contact waterway, not comparable to any river in Portage or Kenosha, Wisconsin. (Ref. DOE EIA Data from 2000)

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Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-89, bottom	EXTREME MISREPRESENTATION SELECTIVE USE OF DATA: Consultant cites MWGEN as stating that "...the use of the existing cooling towers alone is often not sufficient to control the magnitude of the thermal discharge to meet current near and far-field limits." but FAILS to include the immediately following statement (on the same page), which was provided in the both the 6/4/2002 MWGEN PowerPoint presentation and hand-outs which stated : "•Under these situations, units have been and will continue to be derated when compliance conditions warrant (both at Joliet and Will County). •Forced loss of power occurs when it is most needed by the citizens and businesses of Northern Illinois."	Data recently presented to IEPA and USEPA confirm that even under critical summer conditions, Joliet Station continues to remain in compliance with all near and far-field thermal limits, through the adjustments in station circulating flow rate, use of cooling towers and unit deratings.
2-90	Example of poor report preparation: Where are the first three items regarding temperature effects? #4-#11 discuss impacts of "excessive" temperature but does not quantify the magnitude at which adverse effects would be expected to occur.	These points appear to be taken from a basic textbook on water pollution. How do these points relate to specific information provided for lower Des Plaines River? How does the real in-stream data compare? Are these effects documented in the Lower Des Plaines River?

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Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-91 top	#11 implies that there is a proliferation of blue-green algae in the waterway	Data provided by the UIW study on periphyton and phytoplankton was not referenced, although the information was readily available to the consultant. Contrary to the consultant's statements, the UIW studies of phytoplankton and periphyton clearly show that the system is NOT dominated by blue-green algae. It is, in fact, populated by the same species assemblage as other similar river-reservoir navigation channels. Phytoplankton density at Joliet was comparable to the density observed in Pool 19 of the Mississippi River, which is not thermally impacted.
	Figure 2.43 inaccurately depicts the "Range of summer temperatures in the Upper Dresden Island Pool" as being between 95 and 100 °F (still going along with the completely invalid and erroneously derived assumption that a single monthly maximum condenser outlet temperature equates to a fully mixed river temperature for an entire month).	The premise that water temperatures in the main body of the river are equivalent to Joliet Station discharge temperatures is prevalent throughout the report and is ENTIRELY INCORRECT (as explained previously).
2-91, bottom	The statement made in the last sentence of paragraph 1: "... the standards should not be developed to protect the ***inferior*** biotic composition. The standards should also contain some margin of safety." (emphasis added) implies that the Secondary Contact thermal limits are not adequately protective of the types of aquatic species expected to be found in this waterway. What criteria does the consultant use to determine that the current biotic composition is "inferior" for the lower Des Plaines River, or is this just another opinion, without evidence or support? Define "inferior" in the context of the UAA reach. Years of monitoring data show significant improvements in the fish community over time, despite continued input of heat.	Midwest Generation's recently submitted report (dated January 24, 2003, as well as the more recently issued revision) discusses this matter in great detail and relies on a comprehensive data base of field-collected data to come to the conclusion that the existing limits do adequately support the current and potential aquatic populations in the waterway, based on other permanent limiting factors in the waterway. The so-called "inferior" species are those that are best suited to the available habitat/flow regime present in the waterway.

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2-91 bottom	The last statement on the page implies that the current Secondary Contact thermal limits are already above the lethal limit for indigenous fish species, and charges IEPA with supporting a "lethal standard". To the contrary, the in-stream biological data demonstrates that there has been no lethality observed with the current Secondary Contact thermal standards in place.	The only way a statement like this could be made is by believing the simplistic and erroneous assumption that water temperatures in the main body of the river are allowed to remain at 100 °F (the Secondary Contact maximum limit) for an unspecified amount of time, thereby eliminating any species whose lethal thermal limit is below this value. If one reads all of the requirements related to the Secondary Contact thermal limits, it can be seen that any water temperatures in the main body of the river are strictly limited between 93 °F and 100 °F to only 5% of the hours in any 12-month period. In addition, the general water quality provisions at Il.Adm. Code 302.102 specifically state the mixing zone and zone of passage requirements be maintained for all thermal discharges to the waterway, be it General Use or Secondary Contact. The purpose of these combined regulations is to ensure that there continues to be an adequate margin of safety to ensure the health and well-being of the indigenous aquatic community.
2.92 mid	Is there truly a belief that the river "*can reach its ecological optimum that would be commensurate with the goals of the Clean Water Act.*", that is supported by actual data, or is this solely the opinion of the consultant?	Our understanding of the UAA process was that is it was the consultant's task was to take all available data on the waterway and provide a summary which could then be used the IEPA to determine which water quality limitations would be adequately protective of the existing and potential indigenous aquatic community. The statements made within the draft report go well beyond this, with little, if any, supporting information and data. At no point during the UAA workgroup discussions was there any preconceived idea that the entire lower Des Plaines River would become full General Use, other that that professed by the consultant, at the outset of the study. This bias has carried through since the first workgroup meeting, and is apparent the draft report.

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Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-92	Consultant surmises, by selectively pulling information from previous Board rulings, that the Secondary Contact standards were implemented and accepted ..."to avoid the cost of cooling on the Lower Des Plaines River that was perceived as hopelessly polluted."	This statement seriously misrepresents the basis upon which the determination of the appropriateness of the Secondary contact standards, as well as previous thermal variances, was based. Significant amounts of actual field data, biological, chemical and physical, were presented to determine the ecological and biological integrity of the waterway (not dissimilar to what the current UAA study should be doing). Based on the data presented, the determination was made, by both Agency and supporting consultants, that the lower Des Plaines River could not support a full complement of aquatic life due to permanent limitations unrelated to heat.
2-93 bottom	Data for Figure 2.44 was provided within the context of several different MWGEN documents, but is SELECTIVELY MISUSED in the figure to FALSELY imply that Secondary Contact limits were routinely exceeded by MWGEN discharges, as well as to try to demonstrate that the existing Secondary Contact limits are lethal, by MISUSING provided thermal limit data (Table 2 of 2003 MWGEN/EA Report) without regard for the qualifying information in the text (p. 28 of MWGEN/EA Report)	As stated previously, consultant continues to mis-use MWGEN-provided discharge temperature data to try to demonstrate lethality of the temperatures encountered in the main body of the river. If temperatures at or above 100 °F were prevalent in the river, there would be massive fish kills observed, or the marked absence of fish during the hottest times of the year. MWGEN's continuing fisheries monitoring program has not documented either of these occurrences. To the contrary, the program continues to document a varied assemblage of warm water species thriving within close proximity to our thermal discharges. IDNR also has supporting data on fisheries in the waterway and can confirm that no fish kills have been documented in the lower Des Plaines River (even in 1999).

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2-93		All of the species listed in Figure 2.44 can and do live in the lower Des Plaines River. The most recent EA fisheries study (2001), which was submitted to the UAA workgroup as well as IEPA's consultants, shows that the species assemblage in the upper and lower Dresden pools are dominated by gizzard shad, bluntnose minnow, bluegill, emerald shiner, green sunfish, common carp, spot tail shiner and bull head minnow. In addition, the populations of freshwater drum, smallmouth bass, largemouth bass and channel catfish have all either increased or stayed relatively constant between the years 1994-1995 and 2000-2001. All of the fisheries monitoring work is done during the period from May through September, during the height of the warm-weather period of the year. If the consultant is correct and the entire Dresden pool's temperature has exceeded the lethal limit for these species, then one would not expect to find them thriving in the system.
	Maximum temperature of the waterway is again MISREPRESENTED/WRONGLY EXTRAPOLATED from MWGEN data. In addition, monthly maximum condenser discharge values are WRONGLY extrapolated to have lasted for entire months at a time--implying noncompliance. Another example of poor report preparation: *Temperature* is misspelled in both graphs on pages 2-92 and 2-93.	Estimated maximum temperature in the Upper Dresden Pool is not equal to the pre-cooling tower, condenser outlet temps. provided by MWGEN! Alleging noncompliance with the existing thermal limits, without proof or justification, is not within the scope of the UAA work. Typographical, as well as significant grammatical errors are found throughout the report. Missing pages/sections, etc. Spell-check was not done prior to submittal of report to IEPA.
2-93/2-94	Figures 2.44 and 2.45--The consultant is completely off-base in estimating the maximum temperature of the lower Dresden pool by using maximum Joliet Station discharge canal temperature data. MWGEN's data has been misused, misinterpreted and misrepresented throughout	The discharge temperatures are measured at the condenser outlet and do not reflect the impact of the cooling towers on decreasing this temperature before it is discharged to the main body of the river. Under even the most critical weather and flow conditions, the use of Joliet's cooling

	this report.	towers, along with significant unit deratings, ensures that compliance with all applicable thermal limits continues to be maintained.
2-94 bottom	Perseverating on the original misinterpretation/misuse of MWGEN data, the consultant implies, through "speculation" and "deduction", that the power plants were in non-compliance with the applicable thermal limits.	Careful review of the existing data would show that the values that the consultant purports are representing the temperatures in the main body of the river are actually maximum recorded condenser outlet temperatures, and do not account for the cooling provided by the towers that were in operation at the time, nor is the actual river flow during this time considered. The consultant also assumes that the design data provided by the UIW report and Midwest Generation are representative of the actual operating conditions at the plant. Our facilities could not physically operate at maximum loading if river flow conditions were consistently below our circulating water flow rates. Back pressure would necessitate significant unit deratings. However, this seldom occurs for two reasons: (1) river flow is constantly fluctuating by orders of magnitude, and therefore, extremely low river flows are only sporadic (i.e. on the order of hours), rather than chronic, and (2) Midwest Generation maintains vigilant watch over river and station operating temperatures and use the available cooling towers, as well as unit deratings, to ensure that all thermal limits are met in the main body of the river (i.e. where the Secondary Contact limits are in effect). Trying to equate a condenser outlet temperature with a main river temperature, using a worst case estimate of condenser and river flow is NOT appropriate, especially when actual data for all time periods in question is available. Thermal plume monitoring studies done during 2002 by Midwest Generation conclusively show that the thermal plumes from the two Joliet stations well within the current Secondary Contact limits and their discharge temperatures are not equivalent to the temperature in the main body of the river under typically encountered summer weather flow and operating conditions.

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Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-95 mid	The statement that the I-55 temperature during the 1999 period did not meet the maximum General Use thermal limit of 93 °F is WRONG. The consultant states that the maximum allowable General Use temperature is 91.7 °F Figure 2.46--"Replots" and again misinterprets/misrepresents MWGEN's condenser discharge temps, as well as I-55 temps, by assuming that a monthly maximum value (based on 15 minute readings) is equivalent to entire month of data.	In reality, the maximum General Use thermal limit is 93 °F--which is identical to the maximum adjusted I-55 standard that is applicable to Midwest Generation's discharges. Errors of this nature should not occur in a carefully prepared technical report. The reader should not be forced to make these significant editorial corrections. The discharge canal temperatures plotted in Figure 2.46 represent condenser outlet temperatures, and do not reflect the beneficial impact of the cooling towers at Joliet 29, which significantly decrease the overall temperature of the discharge before it enters the lower Des Plaines River.

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2-96	The consultant takes it upon himself to account for the total number of hours during which the temperature exceeded 90 °F, even though he does not clarify WHERE this temperature is measured, and whether the main river standard is even applicable to an end-of-pipe value. Further, there is no way that any number of hours can be determined from the data provided, since it represents monthly maximum values only (based on 15 minute readings). Therefore, the maximum for any given month may have only lasted for 15 minutes, and yet the consultant has wrongly extrapolated this to mean that a monthly maximum value lasted for the **entire** month.	There is no current regulatory requirement to maintain any specific condenser discharge temperature, as long as the main body of the river is within the specified Secondary Contact thermal limits at the edge of the allowable mixing zone and the zone of passage considerations are met. Midwest Generation continues to operate the two Joliet Stations to consistently comply with these limitations.
	The first sentence in para. 2 states that "...the Secondary Contact Indigenous Aquatic Life standard is above the lethal temperature of several warmwater fish species." The consultant goes on to say that adult fish would vacate the river during the hotter months of the year to escape the "lethal" temperatures allowed in the waterway.	If this were truly the case, Midwest Generation's routine fisheries monitoring program, as well as the programs run by the Illinois Department of Natural Resources, would pick up such a drastic change. In reality, there has been, and continues to be a healthy assemblage of resident warmwater fish species in the waterway, despite the continued operations of the Joliet units. Avoidance of the immediate discharge canal has been documented during the hottest times of the year, but fish continue to be found both upstream and downstream of these areas. There is no data to suggest a "mass migration" of fish to the Kankakee River during the summer period. Nor is there any evidence to support the consultant's supposition that younger fish are killed by higher temperatures. To the contrary, the Midwest Generation fisheries monitoring program continues to collect both adult and young fish throughout the expanse of the Dresden Pool.

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2-96 bottom	The lower Des Plaines River is not currently classified as "marginal" or "nuisance", as incorrectly stated by the consultant in the seventh line of the third paragraph.	The exact definition of Secondary Contact is as follows: (Il.Adm. Code Title 35, Subtitle C, Chapter I, Section 302.402) ***Secondary contact and indigenous aquatic life standards are intended for those waters not suited for general use activities but which will be appropriate for all secondary contact uses and which will be capable of supporting an indigenous aquatic life limited only by the physical configuration of the body of water, characteristics and origin of the water and the presence of contaminants in amounts that do not exceed the water quality standards listed in Subpart D.*** Based on this definition, the current Secondary contact standards continue to be appropriate for the lower Des Plaines River. There is no inference in the language above that such waters are considered "nuisance" or "marginal", only that they are influenced by factors which may prevent them from becoming full-body contact recreational or supporting a balanced indigenous aquatic community.

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2-97	The consultant again attacks the Secondary Contact thermal limit as being "lethal".	As stated earlier, the assumption made by the consultant that the limit allows 100 °F temperatures in the main body of the river is WRONG. The additional safeguards provided by excursion hour allowance between 93 °F and 100 °F, along with the mixing zone and zone of passage provisions, adequately ensures that aquatic organisms in the system are adequately protected. The field monitoring data collected by both Midwest Generation and MWRDGC demonstrate this, in that there have been consistent populations of indigenous aquatic organisms throughout the lower Des Plaines River, even with the addition of heat.
	The consultant readily "deduces", again misusing both UIW study and well as Midwest Generation-provided information, that the 5 °F delta T above natural temperature General Use limitation is violated in the waterway.	How can the consultant base this conclusion on "reasonable scientific confidence" when the data needed to draw this conclusion is not available, by the consultant's own admission? Also, since the General Use thermal limits do not currently apply to the upper Dresden Pool, there is no reason why the 5 °F delta T limit should be expected to be met.
	Although the consultant states that they were directed by IEPA to defer on a recommendation regarding future temperature limitations for the lower Des Plaines River, they have done exactly that. In line 10, they state that a socio-economic study is "... the only reason a departure from the Illinois General Use standard can be justified. This study has concluded that the first five reasons for downgrading the thermal standard form that specified by the Illinois General Use standards cannot be applied."	The correct legal interpretation is that if any one or more of the 6 UAA regulatory factors is met, a less than fully fishable/swimmable use can be justified. We submit that the actual field data show that UAA Factors 3, 4 and/or 5 are met in the Lower Des Plaines River. Therefore, a socio-economic impact study (Factor #6) is NOT the sole reason for a departure from the Illinois General Use standards.

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	The two issues which IEPA requested the consultant address related to temperature were: (1) determination of whether current thermal conditions are detrimentally impacting the aquatic community that inhabits the study reach, and (2) determination of whether *the* currently applicable state standard (Secondary Contact and Indigenous Aquatic Life standards <u>modified</u> *(what does this mean?)* for the Dresden Pool) ~~is~~ *are* adequate to protect the aquatic community otherwise capable of inhabiting the study reach. bottom of page: example of poor grammar "issues addressed to be addressed..."	The Midwest Generation report (January, 2003 and October, 2003 revision) specifically addresses these two issues and should be carefully reviewed by both the Agency and the Biological Subcommittee. Our preference was to use actual field-collected data, as opposed to unsupported allegations and statistics, to develop biologically supportable thermal limits for the lower Des Plaines River. Our intention is to work with the Agency and other stakeholders to propose a new thermal standard that would be both biologically protective and financially and technically attainable. MWGen submits, based on the available data, that Factors 3, 4 and/or 5 are met for both the Brandon and Dresden Pools.
2-98	Consultant's conclusions are not based on the actual data presented for consideration by MWGEN and others.	(1) Ammonia toxicity is known to be influenced by temperature, but the source of ammonia itself has not been fully dealt with. Ammonia is sometimes considered a natural pollutant, in which case it would fall under UAA factor #1. (2) The system is <u>not</u> dominated by blue-green algae (as documented by the UIW report, Chapter 5). The system also does not support swimming, therefore, this point is not applicable to the lower Des Plaines River in any way. (3) Here, the consultant alleges that temperature is the sole reason why some values below the General Use dissolved oxygen limit have been encountered at certain locations, although other causes of low D.O. are discussed elsewhere in the report. (4) The thermal limits are again attacked as being lethal (using the same false assumption on discharge vs. main river temperature), and it is implied that temperature is the only limiting factor to a better fish assemblage in the system. The consultant completely ignores habitat constraints, flow alterations, barge traffic and sediment contamination and/or quality as having any effect on the current or future fish assemblages in the lower Des Plaines River.

		(5) Comparison of the Secondary Contact thermal limits with those found in other states is not valid, since the lower Des Plaines is a unique waterway, whose combined characteristics are not equaled elsewhere.
2-98 bottom	There is inconsistency with the conclusions drawn in this section, compared to other sections of the report, especially with regard to meeting and of the six factors. In some instances, the consultant's response does not answer the question posed by the factor.	(1) The consultant states that the elevated temperatures in the Dresden pool are not natural, but does not provide any data to support this statement or provide a definition of "elevated". The UIW modeling studies have shown that, even without power plant inputs, this waterway would have warmer temperatures year round than a waterway of similar size in a non-urbanized area. Therefore, "elevated" temperature may be an intrinsic characteristic of this river. MWRD's discharge ensures warmer temps. during the winter months. (2) The consultant discounts the sporadic low flow conditions in the waterway as being limiting to the aquatic community. A statement is made that river flow is increased by diversions, but this only occurs during the summer months, and the diversion amount is not always great enough to provide a flow rate comparable to a "natural" waterway. Flow fluctuations may not negatively impact water quality, but they do impact fish habitat, esp. in the Brandon tailwater, one of the best physical habitats in the system. (3) The consultant's response to the issue of whether human caused conditions or sources of pollution prevent the attainment of use and cannot be remedied or would cause more environmental damage to correct than to leave in place is : "Reducing temperature would improve biotic integrity of the Lower Des Plaines River." This response ignores all of the other human-induced limiting factors in the system which limit the aquatic life in the system much more than temperature may. Just because temperature is perceived to be a parameter that is "easily controllable", it does not mean that it should be singled out as the only potentially adverse variable in this complex system. The UAA workgroup and subcommittee meetings have gone through lengthy

		discussions regarding the variety of limiting factors in the waterway, but these discussions have apparently been ignored by the consultants, in deference to the unsupported premise that temperature in the waterway is severely limiting its recovery. All of the data and information presented in both the 1995 UIW Study, as well as the more recent Midwest Generation January, 2003 report and October 2003 revision demonstrate that thermal inputs are not a significant limiting factor preventing the waterway from attaining a higher status--physical characteristics and human-caused conditions are the primary factors. (4) The consultant, and without basis or support, dismisses the premise that dams, diversions or other types of hydrologic modifications preclude the attainment of use. The above factors are the primary basis for the system not being able to attain full General Use (Factor 4). The waterway is significantly impacted by frequent barge traffic, unnatural hydrologic modifications and flow alterations caused by lock and dam operations and summer lake diversions that are not matched during the winter months, when the waterway becomes completely dominated by POTW effluents and runoff. (5) The consultant summarily dismisses the concept that physical habitat limitations in the system preclude the attainment of aquatic life protection uses. The current Secondary Contact limits are adequately protective of the resident aquatic community, which is most limited by the lack of available habitat, proper substrate, flow, cover and depth. The channelized lower Des Plaines does not provide the variety and/or quality of habitat necessary to support a higher quality fishery, regardless of the existing water quality or thermal conditions. This is supported by the data presented in both the UIW Study and the Midwest Generation 2003 report. Improvements to habitat of the nature described in the report would not result in QHEI values even approaching a General Use stream.

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WATER BODY ASSESSMENT FOR TEMPERATURE--
CHAPTER COMMENTS:
(Pages 2-82 through 2-104--original draft references)

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
2-99	The consultant flatly states : " While the General Use thermal standard is ***necessary*** and ***appropriate*** to protect the aquatic community otherwise attainable within the Upper Dresden Island pool,..." (emphasis added). IEPA did not charge the consultant with the task of determining what the appropriate thermal limits should be for the waterway, but they take it upon themselves to do so, without a sound basis of actual supporting data to justify this position. They have also provided "guidance" for the Agency and Midwest Generation on how to develop a standard that would "provide adequate protection to the potentially indigenous aquatic species that would reside in the Dresden Island pool.." and suggest that the General Use limits provide the baseline for limit development, based on the lethality data in Figures 2.44 and 2.45, which were previously noted as being misrepresented and inconsistent.	Midwest Generation submits that UAA Factors 3, 4 and/or 5 do apply to the entire lower Des Plaines River. Therefore, the waterbody cannot meet the definition of General Use and should have specific standards set which are appropriate for the unique conditions in the lower Des Plaines River. Midwest Generation has proposed a set of appropriate thermal standards, and have offered to continue to work with IEPA and the stakeholders to present these site-specific standards to the Board for review and approval.
2-102	The MWGEN/EA 2003 Report is referenced, but is not used in any way other than to misinterpret the fish lethality data found in Section XI	IEPA has subsequently distributed the MWGen report for review by the full workgroup. We have obtained comments from IEPA, USEPA and MWRD, which we have incorporated into our revised report (issued October, 2003). The information and data referenced in the MWGen report should be fully reviewed and considered by the Agency for use in the UAA decision-making process

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WATER BODY ASSESSMENT: Sediment--
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
3-5 footnote	Uses same FALSE assumption on main river temperature to negate conclusions reached by UIW toxicity testing, by stating that a temperature of 100 °F might have been maintained or exceeded in 1999 in the Upper Dresden Island Pool for a period of two months. Consultant independently concluded, based on qualified, in-vitro laboratory results by Burton, , that "the only reason for 100% mortality was temperature."	Directly below the information presented in the Burton report is a qualifying statement *"It should be noted that the acclimation period for these experiments was approximately 2 hours. This relatively short period may have induced stress in the test organisms and influenced their response."* As discussed in the MWGEN/EA 2003 report, acclimation time is important, and organisms residing in the river have substantially more acclimation time as the temperature of the water slowly changes in accordance with a seasonal cycle. In addition, an in-situ or in-vitro test does not afford the test organism the opportunity to move away from any potential stressors, unlike the real-world situation, where there are always refuge areas available. Dr. Burton's studies were <u>not</u> designed to establish what the appropriate temperature limits should be in the waterway.
3-19 bottom	Consultant wrongly compares sediment sampling results from different locations and different gear types to come to the conclusion that sediment quality has improved since the UIW studies were conducted. Comparing sediment from the navigational channel and depositional areas is not valid. Sediment is known to be heterogeneously distributed, so many samples in the same location are needed to make a valid, scientific evaluation of overall sediment contamination.	The navigational channel provides no habitat for aquatic organisms, while the depositional areas, side channels, etc. provide the only habitat available in the waterway. This is the reason why the Burton studies used sediment from these areas. The consultant's reasoning that the Brandon Road tail water presents a "worst-case" condition is in direct conflict with other statements made in the report that indicate this area is an "exceptional" habitat. Characteristics which define biological habitat quality include both physical and chemical criteria.
3-21	Consultant uses USEPA's 2001 sediment study results to determine that conditions have improved since the Burton studies were	Why has this data only been revealed in the context of the consultant's draft UAA Report? It is not fully referenced, so it is

	conducted, but again is INVALIDLY comparing locations, gear-types and level of effort.	impossible to go back to the data source to review methodology, sampling protocol, etc. This is true of many of the consultant's data sources--they are poorly referenced, or not referenced at all. As part of the UAA process, all data, reports and documentation used in the analysis should be made available to reviewers in the form of appendices. Will this be done to allow for independent confirmation of results/conclusions?

Midwest Generation Comments on Draft UAA Report

WATER BODY ASSESSMENT: Physical Assessment--
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
4-32--4-34	*"The physical habitat formed by the navigation system fall under reasons 4 and 5 for a change of the designated use outlined in Box 1.1."*	If any of the 6 reasons is invoked, this should allow for a lesser use to be applied. This is not the final conclusion of the report, even though individual chapters (Chapters 4, 5, 6) indicate this to be appropriate.
	Habitat assessment confirms that poor habitat in the lower Des Plaines River is the result of a lack of riffle/run habitat, limited hard substrates, channelization, poor riparian habitat, lack of stream cover and impounded water. This system does meet the optimum for warmwater use. These factors fall under Reasons 4 and 5 of the UAA. However, the consultant feels that improvements can result in QHEI scores above 60 in the Dresden Pool and 50 in the Brandon Pool.	Why is final conclusion not consistent with information provided within the body of the draft UAA report?

Additional Comments on Chapter 4 (Habitat)

4-16 (2nd para) QHEI measures both the "emergent" properties and the factors that shape them (3rd para) – Some changes can occur over a 9-10 year period . . . e.g. amount of macrophyte development, degree of sedimentation, etc.

4-17 The QHEI form shown is outdated 4-33 & 4-34 (Conclusions) – The authors acknowledge that habitat quality presently is poor within Upper Dresden Pool but suggest that it could be improved enough to meet the target score of 60. These improvements would come as the result of "placement of artificial in-stream . . . habitat" and expansion of the riparian corridor. Although such habitat manipulations are feasible for small streams, they are not feasible for a river the size of the Des Plaines. To our knowledge, habitat manipulation of this scale has never been attempted in the United States.

The costs of such efforts would almost certainly be in the 10's of millions of dollars. There is no regulatory basis by which IEPA or USEPA could force such an effort and neither agency has this kind of money to devote to such a project. The only realistic conclusion is that habitat, which is acknowledged to be limiting in Upper Dresden Pool, will continue to be so.

In tables 4.3 and 4.4, single QHEI scores are presented at each river mile. While some of these indeed are single values, others are based on the authors taking the mean of two or three QHEIs. For example, in Table 4.4, QHEI scores for RM 284.8 were calculated by three groups of investigations (EA, ESE, and LMS); who reported QHEIs of 42, 44, and 50.5 at RM 284.8. In the current report, the mean of these values was reported. Depending on how these multiple QHEIs are handled, the grand average at the bottom of the table may change and the standard deviation certainly will change.

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EXISTING AND POTENTIAL MACROINVERTEBRATE COMMUNITY--
CHAPTER COMMENTS:

Page Reference	Report Citation	General Comment
5-18	*"The results of the macroinvertebrate sampling were heavily influenced by lack of habitat and barge traffic. Results of the macroinverteberate analysis need to be viewed as only one component of the "weight of evidence" needed to draw conclusions about the current biological use of the Lower Des Plaines River."*	This chapter presents probably the most balanced and accurate assessment of the data provided for analysis. It does not take limited data and come to any broad, sweeping conclusions, and it rightly acknowledges that there are many different factors that need to be considered before determining the appropriate use of a waterway.

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EXISTING AND POTENTIAL FISHERY COMMUNITY--
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
6-25	Conclusion of the Fisheries assessment chapter indicate that *"part of the reason for the poor IBI values throughout the Lower Des Plaines River is the lack of adequate habitat".* *Based on reason No. 4, it is recommended the entire Lower Des Plaines River, including the Brandon and Dresden Island Pools be considered for a modified stream classification that would reflect the currently altered habitat of the waterway.*	If any of the 6 reasons is invoked, this should allow for a lesser use to be applied. This is not the final conclusion of the report, even though individual chapters indicate this to be appropriate.

Additional Comments on Chapter 6: Existing and Potential Fishery Community:

P 6-17 – last para

According to the authors "the large and significant difference in IBI between the impounded and free-flowing stations of the Fox River make a strong case that the habitat modifications resulting from pooling of water behind dams results in major declines in biotic integrity, independent of other interacting watershed factors."

Later in the chapter (p. 6-24) when discussing the results from the Fox River, the authors state that "the presence of and proximity to dams has significant effects on the fish biotic integrity."

And in the chapter summary of p. 6-25, they recommend "that the entire Lower Des Plaines River, including the Brandon Road and Dresden Island Pools be considered for a modified stream classification that would reflect the currently altered habitat of the waterway."

Given the acknowledgement of the deleterious effects caused by impounding rivers and their own recommendation as quoted above, the report's recommendation in Chapter 8 that Upper Dresden Pool be upgraded to General Use is totally unsupported by their own assessments and recommendations contained in Chapter 6. As such, the conclusion in Chapter 8 is not supported by the data and information in the body of the UAA report.

p. 6-20. The percentages shown for top carnivores in the Fox River (lower right graph) seem far too high. We request that the authors verify these percentages.

p. 6-22. The authors state "Mean IBI scores for Upper and Lower Dresden were not significantly different from each other following the removal of the effects of Habitat Type and Month, but both were still significantly higher than Brandon Pool."

Given the fact that scores are virtually indistinguishable (see Figure 6.12) after habitat effects are removed, there is no basis to conclude that the Secondary Use thermal standards are impacting Upper Dresden Pool. This also indicates that imposing General Use thermal limits on Upper Dresden Pool will not result in any measurable improvement to the fish community.

In summary, the analyses and conclusions in Chapter 6 fail to support the overall conclusions of the report. Instead, they support our contention that fish communities in the UAA Reach are limited by factors other than temperature.

Midwest Generation Comments on Draft UAA Report

PATHOGENS AND RECREATION-- CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
7-9---7-11	Consultant appears to be selectively interpreting published USEPA guidance regarding primary vs. secondary contact	Many of the factors which would prevent primary contact in the lower Des Plaines are present, and not able to be controlled by point source discharges. Safety concerns are significant, due to heavy barge traffic, channelization and lock and dam operations. MWGen's perspective, based on the Agency guidance, is that there is sufficient justification to retain the entire lower Des Plaines River as Secondary contact for recreational purposes.
7-19/20	Consultant acknowledges that even with effluent chlorination, the Illinois General Use Std. for primary contact recreation would not be met, yet goes on to suggest that primary contact use would be attainable.	This suggestion, without scientific support, would result in an unnecessary risk to the general population than maintaining the current Secondary Contact use designation Reference waterbodies also do not meet the criteria for primary contact.
7-22	Evidence presented suggests that the ambient ("natural") least impacted waterways in the state cannot meet the std. for primary contact recreation.	This factor alone should be sufficient to determine that the UAA waterway should retain its Secondary Contact use designation. Physical factors and safety concerns would further support the need to limit full body contact recreation.
7-24--7-27	Figures presented inaccurately depict the true nature of the waterway; there are no barges in any of the photographs, which leaves the reader with the impression that the waterway is not heavily used for navigational traffic and industrial activity	Another example of bias.
7-27	The channel cross-section figure implies that the "littoral zone" in the upper Dresden pool would be conducive to swimming and wading	In reality, these areas are those most heavily impacted by siltation. The bottom sediments are often several feet thick and would be a hazard for anyone attempting to walk on them. In addition, most of the shoreline property in the Dresden pool, especially along the shallower shoreline areas, is privately owned, which would prevent access by the general public.
7-34	Consultant acknowledges that the waterway is effluent dominated and there are other than point sources contributing to the bacterial load in the system	By suggesting further control of point sources, there is no guarantee that the ambient water quality will improve by requiring POTW chlorination/dechlor. In addition, chlorination itself and the by-products created imposes greater risks to the aquatic community. Additional safety would be afforded only if the primary source of bacterial

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		contamination is from point sources; this report, as well as data from IEPA, suggest that this is not the case.
7-37	Report states that "Navigation may not be impeding the recreational opportunities in the Dresden Island Pool and limited recreation is feasible in most sections."	Limited recreation can and does occur in the Dresden Pool, but primary contact recreation is incidental, at best. Recreational opportunities and uses are of a secondary contact nature, and should remain so for public safety reasons.
7-39 bottom	Swimming in the Dresden Island Pool is infrequent and occurs mostly in the section downstream of the I-55 Bridge. This type of use cannot be characterized as existing primary contact recreational use.	If this is the case, why has the consultant suggested that chlorination be required of point source dischargers? If primary contact is not an existing use, it does not need to be protected. There needs to be some minimum accepted threshold of individuals that take part in primary contact activities in order to for such a use to be acknowledged.
7-44	Report states that the lower Dresden Pool (downstream of I-55) does not have a General Use thermal standard	MWGen maintains an adjusted thermal standard only at the I-55 Bridge--General Use thermal water quality standards are in effect directly downstream of I-55. (There is no longer a "Five Mile Stretch" variance, which existed in the early to mid-1980's).
7-44, #2	Report states that "the biological character of the Brandon Pool was found as marginal, below the threshold for the general use, but not much different from the section of the Dresden Pool downstream of I-55. **These concerns doe not prevent designating the entire reach as General Use."** (emphasis added) (Reference to Chapter 7 puzzling, since this statement is found in Chapter 7)	According to USEPA guidance, a UAA must consider physical, chemical and biological factors when determining appropriate use designations. Biological integrity/potential cannot be ignored. Upgrading a waterway based solely on chemical integrity is not appropriate.
7-45 #5	"Downstream of RM 283 the river is surrounded by forests and natural lands valued by the citizens."	Where is the documentation and support for this statement? What citizens? Most "natural lands" in this area are privately owned and not open for public access.
7-45 #6	Report minimizes safety concerns brought about by barge traffic	There are several deaths each year on this waterway, due to barge-related accidents, and these are related to secondary contact uses only. Primary contact would likely increase the number of incidents/fatalities.
7-45	"Logically, the entire Dresden Island Pool should have the same standards and will have for most other parameters (see Chapter 7)".	It is the consultant's own opinion that General Use should be extended throughout the Dresden Pool. Careful consideration of the actual fisheries and habitat data would show that indeed, the whole Dresden Pool should have the same designation, BUT none of it is commensurate with full General Use criteria.

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		Also, this is in chapter 7, so the reference is incorrect.
7-47	Consultant offers Options I and II for classifying the waterway regarding recreation; Option I is recommended--extending primary contact to the entire Dresden Pool, even with the acknowledged safety concerns and uncertainties associated with being able to meet the required bacteriological standards.	Why doesn't the consultant mention the possibility of defining a new use designation for this reach (with restricted primary contact use), which would not need to be re-visited every 3 years and would take on full standing as a state WQ standard? This is allowed by the UAA regs, as long as at least one of the 6 factors is met.
Chapter 7 General		No where in this section is it mentioned that higher temperatures actually limit the amount of time that bacterial contamination is present within the waterway. Higher temperature water also increases the effectiveness of chlorination.

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MODIFIED WATER USE DESIGNATION FOR BRANDON ROAD D POOL AND CORRESPONDING STANDARDS--
CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
8-2	**Indiana**-Michigan Canal	Should be Illinois-Michigan Canal
8-7/8	The modified impounded use designation criteria described for Brandon Pool would also be applicable to the upper Dresden Pool.	Ohio's modified warmwater habitat (impounded) would be appropriate for the UAA Waterway.
8-8, bottom	"Ideally, the goal for a water body in this category (modified impounded) is supporting a balanced aquatic biota and limited contact recreation."	The data presented in the report indicates that there is not a balanced aquatic community in either the Brandon or Dresden Pools, as the result of Factors 4 and 5, therefore, this use should be appropriate for the entire UAA waterway.
8-13, Fig. 8.10	Figure description notes "good habitat conditions"	"good" habitat is not merely a function of the presence of shallow, main channel border areas. The substrate characteristics, current, amount of cover, etc (all QHEI criteria) must be taken in to account to determine the overall quality of a given habitat for target organisms.
8-14 figure	MWGEN (ComEd) data inappropriately used; comparison of data which groups different gear types, different locations and different levels of effort is NOT SCIENTIFICALLY DEFENSIBLE! Consultant also makes unsupported statements regarding the existence of early life stages in the Brandon Pool.	The data presented on early life stages from the UIW study (1993-1994) was not intended to quantify the extent or success of spawning activity. The graph is also incorrectly annotated, as this was data from a ComEd, not MWGen, study
8-15, top	The data presented do not acknowledge the fact that the physical features of the Brandon Road pool **prevent** development of early life.	Unsupported statement.
8-15/16	Report compares the Fox River to the lower Des Plaines and claims that this was the consensus of the biological subcommittee	Inappropriate comparison. Also, this was NOT agreed upon by the Biological Subcommittee.
8-16	Dresden ~~Dam~~ Pool paragraph; while the subcommittee did agree that Brandon Pool could not be considered General Use, it did not do so based on the absence of early life forms alone. Next Paragraph: Consultant puts forth reasoning why Dresden pool cannot be considered as "modified impounded" using flawed logic, versus relying on the data and analyses provided within the body of the report.	Both Brandon and Dresden Pools share many of the same characteristics which prevent the attainment of full aquatic life use and primary contact recreation.

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8-16	The consultant's suggest an IBI criterion of 30 for the modified category and 40 for the general use, impounded category.	First, the authors do not have nearly a large enough data set to allow development of biocriterion. Furthermore, the IBIs they calculated from the "reference" stream data sets appear to have been calculated using improperly scored metrics. You can not use metric scoring guidelines based on one set of classifications and then use a different set of classifications for assigning "proportional" scores and resultant use designations.
8-23	Data from MWGEN again misrepresented to try to demonstrate that summer temperatures in the Upper Dresden Pool typically exceed 100 °F , and ultimately affect D.O.	Data on lower Des Plaines temps. was misinterpreted by consultant. End of pipe temperatures are NOT equivalent to the temps. in the main body of the river, where the temp. standards are met.
8-32 bottom /8-33 top	Consultant recommends that the entire Dresden Pool be designated as General Use and that none of the 6 factors (save for #6) is applicable.	No substantive support is provided to negate either Factors 3, 4 and/or 5 from being applicable to the Dresden Pool. Consultant chooses to ignore analyses and conclusions present in other sections of the report to promote preconceived notion of full use attainment for the Dresden Pool. MWGen has provided real data and information to demonstrate that Factors 3, 4 and/or 5 are applicable, which allows for a more appropriate, modified use to be applied to this portion of the waterway.
8-33	Consultant asserts that a socio-economic impact study is the only means to obtain a less stringent thermal limit than General Use. Consultant states that the installation of closed cycle cooling is "common" and will not cause widespread socio-economic impact.	USEPA regulations state that if ANY of the 6 factors is met, a lesser use can be pursued, which would allow for a different set of chemical/physical limitations which are appropriate for the waterbody under consideration. EIA 767 data demonstrate that closed cycle cooling on large river systems in the Midwest is NOT common. Again, the bias which the consultant showed at the outset of the UAA process has prevailed in the conclusions, without the support of actual data or factual information.
8-34 / 8-35	Consultant recommends that socio-economic impact study be performed by MWGen and other thermal dischargers to waterway and states that if the burden of proof is not met, General Use standards should be applied.	UAA regs. allow for different limitations if any one of the 6 factors are met. MWGen asserts that Factors 3, 4 and/or 5 are met for the entire UAA waterway, therefore, a socio-economic impact study is NOT required.

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SUGGESTED ACTION PLAN--CHAPTER COMMENTS:

Page Reference	Incorrect/Incomplete/Misleading Information in Draft UAA Report	Response/Rebuttal/Revisions Indicated
9-2	Consultant states that General Use thermal limits are met in the Brandon Pool	Monitoring data show that General Use thermal limits are NOT met in the Brandon Pool; ambient, upstream temperatures, especially during the winter months, are often higher than the allowable General use limits, due to the dominance of the MWRD discharge in establishing the "ambient" conditions in the waterway.
9-2 bottom	"...an excellent but impaired by pollution habitat zone at the confluence of the river and Hickory Creek." Consultant assumes that the habitat conditions in the Dresden pool may *someday* be able to meet the Ohio WWH criteria.	grammatical improvements to this report are necessary throughout No scientific support is given for this statement, as it is purely opinion. Since the river will remain impounded and affected by barge traffic and artificial flow modifications, it will not ever meet the higher criteria assigned as WWH by Ohio.
9-3	Secondary Contact thermal limits again referred to as lethal to the indigenous community	MWGen fisheries monitoring shows that indigenous community is doing well under existing thermal regime.
9-6	#7--top: Secondary contact alleged as not being protective of the existing or proposed use and should be changed to the General Use standard	No basis for this statement, other than the false assumption that the fully mixed river temp. is at the limit for extended periods of time (MWGen demonstrated, with data, that this is not true and that fish community is not negatively impacted by existing thermal limits)
9-8 top	Consultant refers to "problem" with temperature in the Upper Dresden Pool	Based on mis-used/misinterpreted information from MWGen; river is NOT at 100 deg. F for any period of time. Current thermal limits are consistently met.
9-8 Middle	Consultant overrides the results of Burton's studies and assumes that USEPA proves that there is less contamination present in the waterway	USEPA data is not presented in a manner conducive to comparison with Burrton's results. Locations, sampling protocol etc. are not summarized in the report. Also, since sediment contamination is extremely heterogeneous, it is possible that one sample taken directly adjacent to another may have significantly different results. As such, it is not appropriate to state that contamination has lessen as there is insufficient data on which to base this conclusion. Contaminated or not, the quality/physical nature of the sediment is the most limiting factor preventing the establishment of a more diverse assemblage of fish in the waterway.

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General Comments:

The chapters of the draft UAA report that were submitted to the Biological Subcommittee and Workgroup for prior review have changed little, if at all, from the original drafts. Significant comments had been prepared and submitted by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), Illinois EPA's biologists, the Three Rivers Manufacturing Association (TRMA), as well as Midwest Generation, but have apparently been ignored or dismissed in the preparation of the draft UAA report.

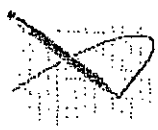
In addition, the draft report contains several chapters, as well as associated conclusions, which were not discussed among the Biological Subcommittee members prior to publication. This especially true for the assessment made for the Dresden Pool. It appears, based on review of the actual data presented during the course of the UAA process, that many of the report's conclusions are unsupported by genuine, field-collected data and are, rather, the opinion of IEPA's consultants.

Misspellings and poor grammar are common throughout the report, with little effort made in corrections which would have been caught if a spell-checker had been employed. Statements scattered through the report, such as "scientific judgment", "one may speculate", "reasonable to assume", "by a great margin", etc. have no place in a technical report.

In addition, the IEPA consultants appear to selectively use the U.S. EPA guidance provided regarding both UAAs and water quality criteria in general.

ATTACHMENT 10

November 18, 2003
Midwest Generation E-mail to Dr. Vladimir Novotny
Regarding Draft Lower Des Plaines River UAA Report



Julia
Wozniak/Chicago/MWGEN
Sent by: Julia Wozniak

11/18/2003 03:46 PM

To "Vladi Novotny" <v.novotny@comcast.net>

cc "Timothy J. Ehlinger" <ehlinger@uwm.edu>, "Neal O'Reilly" <noreilly@heyassoc.com>, "Scott Twait" <Scott.Twait@epa.state.il.us>, "Toby Frevert"

bcc Bill Constantelos/Chicago/MWGEN@EME; szf@sonnenschein.com

Subject Re: temperature plot

Dr. Novotny:

I appreciate your sending the revised information for review prior to the UAA meeting. I do have several comments for your consideration related to your e:mail.

In the text, under the *Existing Use-Compliance With the General Use Standard* section, 6th line, it states that "(MWRD93 grab sampling location is the only monitoring point in this stretch)." This is not the case, as EA Engineering, Science and Technology also takes grab measurements in the waterway between Brandon Road and I-55 as part of the routine fisheries monitoring program. I believe that this is the data that you have used to develop Figure 2.47. That being said, Midwest Generation has several concerns with the presentation of this data as it stands now:

(1) The EA data is from grab measurements of water temperature taken only once every 2 weeks from May through September at specific fish monitoring locations. It does not represent continuous measurements, nor does necessarily characterize the temperature in the main body of the river, since the fish monitoring locations cover main channel border, tailwater, side channel and tributary mouth areas only. These "snap-shot" temperature measurements also do not necessarily capture the "worst-case" temperatures which may be present during the course of a warm summer. (The relevance of using 95% confidence limit in comparison to standards which are absolute is also of questionable value).

(2) Figure 2.47 should be annotated to indicate the locations from which the data was taken. Specifically, it is important to note that the two locations that show the highest temperatures are both locations within the allowable 26 acre mixing zone and are therefore not subject to the Secondary Contact limits at these points. The location at approximately RM 284.8 (approx) is actually within the discharge canals of the Joliet plants and the one at RM 283.8 (approx) is the main channel border area directly downstream of the discharge canals.

A related correction is needed in the last sentence of the revised text: "The highest temperatures near 37.8 °C (100 °F) were measured in ~~the zone near~~ the discharge canal." To be completely accurate, the statement should actually read: "The highest temp measured in conjunction with the fish studies was 37.8 °C (100 °F). It should be noted, however, that this value was measured within the Joliet 29 discharge canal, which is not the point at which water temperature limits apply."

(3) EA has 7 fish monitoring locations between Brandon Road Lock and Dam and I-55; however, Figure 2.47 only shows 5 of the 7. Review of the complete EA data record shows that water temperatures at the remaining fish locations were all well within the Secondary Contact thermal limits.

(4) The data in this figure does not address General Use temperature attainment issues which exist from October through April.

In summary, we believe that the EA data you have used in Figure 2.47 should be more fully characterized so as to not allow a misinterpretation of what it actually represents. In addition, we do not believe that the use of such selective grab measurements is relevant to any type of water quality standards setting process. We would be glad to discuss this in more detail at Thursday's meeting, if necessary.

Julia Wozniak
Senior Biologist

Midwest Generation
Environmental Health & Safety

Office: (312) 583-6080
Cell: (312) 925-3184
e:mail FAX: (312) 788-5274
"Vladi Novotny" <v.novotny@comcast.net>

"Vladi Novotny" <v.novotny@comcast.net>

11/15/03 06:47 AM

To: <jwozniak@mwgen.com>
cc: "Timothy J. Ehlinger" <ehlinger@uwm.edu>, "Neal O'Reilly" <noreilly@heyassoc.com>, "Toby Frevert" <Toby.Frevert@epa.state.il.us>, "Scott Twait" <Scott.Twait@epa.state.il.us>
Subject: temperature plot

Dear Ms. Wozinak:
During our June 6 meeting we requested temperature data for the river which you graciously provided. We informed Midwest Generation representatives that our intention was to include a representative (warm year) into our report. Meanwhile, a major another stakeholder in their comments on the report also insisted that we provide such data. We have, year by year, statistically analyzed the river temperature data you provided and plotted the results vs. river mile. The plot is tentatively identified as Fig 2.47 and will be included with the commentary in red into the report and, most likely, into the power point presentation on Thursday.

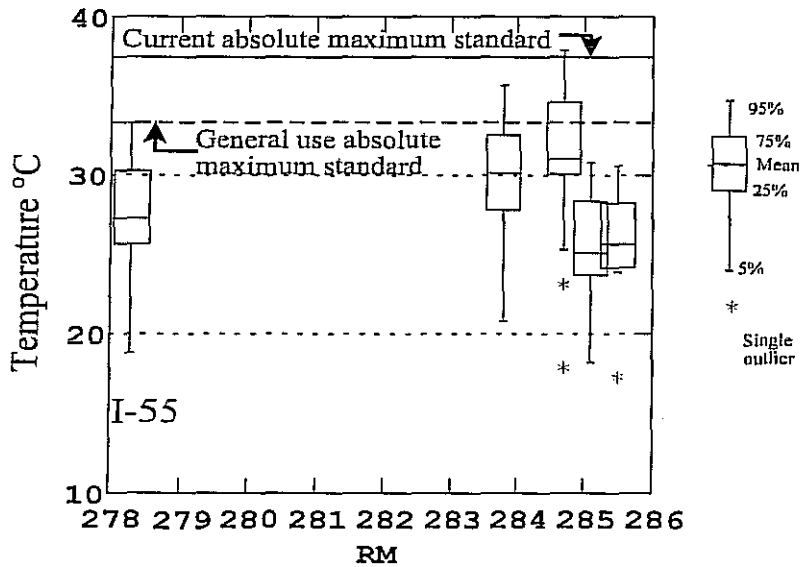
As a matter of courtesy we are informing you about this inclusion in advance. Please, let me know if you have any corrections to the wording in the report. We obviously appreciate your cooperation now and in the past.

Vladimir Novotny

 - Fig27 add.pdf

Existing Use - Compliance With the General Use Standard

Figure 2.46 presents the temperature chart replotted from the Midwest Generation's presentation to the biological subcommittee for the period 1999-2000. The plot contains measurements at the I-55 bridge and at the two discharge channels, Station 29 located on the right bank and Station 9 on the left bank. No continuous measurements of temperature are carried out in the about 7-mile stretch of the river itself between the cooling water discharge outlets and the I-55 bridge (MWRD93 grab sampling location is the only monitoring point in this stretch). At the meeting on June 6, 2003 between the consultants, IEPA and Midwest Generation, it was revealed that the high temperatures in the discharge canal of Station 29 exceeding 100°F were measured at the condenser discharge location. The flow in the canal was then cooled down by the operation side stream cooling towers on the canal; however, no measurements were made at the canal outlet into the river. Midwest Generation calculated the discharge canal temperature at the confluence with the river based on the number of towers in operation, reported condensed circulation water flow and 14°F delta T across the cooling tower. These calculated maximum daily temperatures for the period July - August 1999 ranged between 93 and 98°F. A violation of the maximum Secondary Use and Indigenous Aquatic Life maximum temperature standard cannot be alleged. Midwest Generation consultants periodically conduct survey of the river. Figure 2.47 shows a plot of ranges of the temperatures in the Lower Des Plaines River in 2001 (a warm year)



2001

Figure 2.47 Temperatures measured in the Upper Dresden Island Pool during surveys by the Midwest Generation consultants. Data courtesy of Midwest Generation and EA Engineering Science and Technology

measured by the EA Engineering, Science and Technology in the river. Data were provided after the request made at the June 6th, 2003 meeting between the consultants and Midwest Generation. The highest temperatures near 37.8 °C (100 °F) were measured in the zone near the discharge canal.

ATTACHMENT 11

March 24, 2004
Midwest Generation Letter to IEPA
Comments on Final Lower Des Plaines UAA Report

MIDWEST
GENERATION EME, LLC
An EDISON INTERNATIONAL™ Company

Basil G. Constantelos
Director, Environmental,
Health & Safety

March 24, 2004

Mr. Toby Frevert
Great Lakes Coordinator
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, IL 62794-9276

Subject: Lower Des Plaines River Use Attainability Analysis Final Report

Dear Toby:

Thank you for sending us the "Lower Des Plaines River Use Attainability Analysis Final Report" (the "Final UAA Report") prepared by IEPA's consultants AquaNova International, Ltd, and Hey and Associates, Inc. ("the Consultants"). We read the UAA Final Report and were disappointed to see that many of the significant comments and corrections made by Midwest Generation and other members of the Lower Des Plaines UAA Task Force on prior drafts of the Final UAA Report had not been incorporated. We want to alert you to the fact that the Final UAA Report still contains several scientific inaccuracies and misinterpretations of relevant data concerning the conditions in the Lower Des Plaines River, specifically the Upper Dresden and Brandon Pools. It should be noted that many of these remaining inaccuracies had been previously acknowledged by both the Agency and the Consultants as requiring revision. We recognize that limitations on the resources that the Agency has available to devote to this UAA may have prevented it from authorizing the time and cost involved in rectifying the factual errors and other problems in the Final UAA Report that were identified in the many comments submitted on the prior draft UAA Report. We know from our own extensive efforts to review the UAA issues and data, including enlisting the assistance of both locally and nationally respected consultants to assist us in that review process, that the necessary resources to complete this undertaking can be substantial.

Midwest Generation wants to help improve the accuracy and completeness of the scientific and technical record here, as well as continue our prior cooperation in this UAA effort with the Agency. With all the time that so many have invested, we do not want the deficiencies in the Final UAA Report to prejudice the credibility of this UAA process. It is critically important to ensure that as the Agency moves forward, the relevant information currently missing from the Final UAA Report, as well as the corrected data,

Midwest Generation EME, LLC
One Financial Place
440 South LaSalle Street
Suite 3500
Chicago, IL 60605
Tel: 312 583 6029
Fax: 312 583 6111

is properly taken into account so that the goal of reaching a sound and scientifically-defensible basis for the final use classification decision on the Lower Des Plaines River is achieved. For that purpose and ease of reference, we have highlighted below many of the significant areas of information, data and findings that were not incorporated into the Final UAA Report so that we can try to preserve this important information for consideration by the Task Force and the Agency in these last stages of the UAA process.

Much of the information contained in the summary presented below comes directly out of the previously submitted Midwest Generation report entitled "Appropriate Thermal Water Quality Standards for the Lower Des Plaines River" and Dr. G. Allen Burton's October 14, 2003 report to the UAA Task Force. In addition, we had provided written, detailed comments on the entire draft UAA report, which were submitted in accordance with IEPA's October 15, 2003 deadline. We did note that all of these documents are included in Appendix G and appreciate their inclusion. However, there are many different documents included in Appendix G and the file index to it is so general, that we are concerned that much of the information contained in this appendix is going to be lost to most reviewers, as it is not readily identified as to source or content. We also noted that other significant commenters, including Howard Essig of the Water Division, as well as the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) and the Three Rivers Manufacturing Association (TRMA), had extensive and well-taken comments on the prior version of the UAA Report that did not get incorporated into, or acknowledged by, the Final UAA Report but are included in Appendix G. We also noted that there were several documents in Appendix G that were not previously submitted to the UAA stakeholders for review. These factors make it even more important to provide more complete information describing all the comment files contained in this appendix. We tried to include at least some of these significant comments from other Task Force members in the summary below so that they also are highlighted and preserved for further consideration as the UAA process moves ahead. It is critical that these comments not get lost in the shuffle because without them, the Final UAA Report does not form a legally sufficient or sound basis for any changes to be made to the existing use classification designations on the Lower Des Plaines River.

Examples of Comments/Corrections Not Incorporated into, or Referenced by the Final UAA Report:

Page 2-9, Table 2.1:

MWRDGC pointed out that the nitrate limitation in the table only applies to drinking water, and that the Nitrate water quality standard is 45 mg/l. This is not indicated anywhere in the Final UAA Report, although it is important to allow appropriate comparisons to be made.

In MWRDGC's comments dated November 7, 2001, they proposed language to properly characterize the statutory and regulatory framework for the UAA. As MWRDGC noted:

> "The IEPA is attempting to determine the potential to achieve and maintain higher valued uses, such as, a diverse and balanced self-supporting aquatic community and primary contact recreation, consistent with the goals and objectives of the Clean Water Act (CWA) and the intent of the Illinois General Use Water classification. The CWA at 33 USC Sec. 1251(a)(2) sets forth the "...national goal that wherever attainable...water quality...provides for the protection and propagation of fish...and wildlife and provides for recreation in and on the water be achieved by July 1, 1983."
>
> Designated as a Secondary Contact Water since the 1970s, the lower Des Plaines River does not meet this goal. However, the purpose of water quality standards, as defined at 40 CFR Part 131.2, is to achieve the aforementioned goal. Consequently, the USEPA Region 5 has requested the IEPA to re-examine the SCW use classification. A UAA, as defined at 40 CFR Part 131.3(g) "...is a structured scientific assessment of the factors affecting the attainment of the use..." Further, in compliance with 40 CFR Part 131.10(j)(1), the IEPA is performing this UAA because the Secondary Contact and Indigenous Aquatic Life Waters classification does not include the uses set forth in the national goal cited above. UAAs are also to be used per 40 CFR Part 131.10(g), when a state wishes to remove a designated use, which is not an existing use, or to establish sub-categories of a use if it can be demonstrated that attaining the designated use is not feasible for any of six specific factors. The UAA will identify the conditions necessary for the higher valued uses and test the feasibility of these conditions against the six specific factors identified in Box 1."

This has not been incorporated or acknowledged in the Final UAA Report, which still contains the Consultant's incorrect legal interpretation of the UAA requirements. IEPA needs to rely on firm regulatory ground in order to make the appropriate decisions regarding the current and potential new use designations which may be developed for the Lower Des Plaines River. As currently written, the UAA Report includes a conclusion that none of the 5 UAA criteria evaluated are satisfied in either pool. Consequently, the UAA Report does not support the additional findings that certain parameters (e.g. DO, ammonia, fecal coliform) should be set at levels lower than current Illinois General Use standards and that a use classification other than General Use should be adopted for the Brandon Pool. The UAA Report is inherently contradictory on this crucial and fundamental point. If none of the 5 criteria are satisfied here, then why are any changes to the General Use water quality standards being recommended and how can they be defended as authorized under the UAA regulations? Similarly, because the UAA Report continues to misidentify the thermal levels in the Lower Des Plaines River as a significant cause of the low DO levels, albeit without showing a connection between the two based on the actual river data, then where is the legal basis (or logic) for the

recommendation that DO standards should be lowered while apparently simultaneously advocating that thermal standards should be stricter? If the thermal levels are the cause of the low DOs, as the authors contend, then if they are made stricter, it follows that the General Use DO standards also should be attainable. However, the UAA Report concludes otherwise without explanation for this inherent contradiction in its findings. By raising these points, we certainly do not intend to show support for the consultants' contradictory conclusions but rather to underscore by way of these examples why the UAA Report, if not corrected in this record, will not withstand the further scrutiny that will occur if a rule-making proceeding relies upon these findings.

Elsewhere in MWRDGC's comments, they accurately point out, as Midwest Generation has, that no reference location for the Lower Des Plaines River was agreed to by the UAA workgroup, although the consultants have implied in the Final UAA Report that there are appropriate reference locations for the UAA study area. Howard Essig of IEPA also raised questions with regard to both the attributes of certain cited reference reaches used by the consultants, as well as the use of data from the consultants' selected reference reaches and its applicability to the available data for the UAA reach. These comments are very important, as they underscore the lack of adequate support for the consultant's conclusion that there are appropriate reference locations for this particular waterway and that none of the first 5 UAA criteria can be applied.

The consultant creates reference locations in an unsubstantiated effort to support its conclusion that the alleged similarities between them and the Lower Des Plaines shows that the Lower Des Plaines can attain both the fishable and swimmable uses that are necessary for a General Use classification. The problem is that the comments show it is only the consultant who believes that the Lower Des Plaines and these reference locations are sufficiently similar to allow such a comparison to be made.

MWRDGC had also stated that several of the IEPA and MWRDGC monitoring locations (GI-02 and MWRDGC 92) in Table 2.4 of the Final UAA Report are outside of the UAA study reach and should not have been included in any statistical analysis of chemical water quality compliance. However, these locations are still included in the final report. Their inclusion makes the validity of the consultants' statistical data analysis, on which so many of their findings are based, questionable due to the bias introduced by using the more favorable water quality data generated from these non-UAA reach sampling locations. Why include them? How are they relevant to identifying the water quality in theUAA reach? The consultants do not answer these key questions.

Page 2-70, Last Paragraph:

"**The maximum temperatures in the upper part of the Dresden Island pool during summer reach 35 to 37°C (100°F) (Wozniak, 2002)** during which the oxygen saturation concentration is smaller". (Emphasis added). This statement is not accurate. It was corrected in the Temperature section of Chapter 2 but not elsewhere in the UAA Report.

Similar corrections are required throughout the Final UAA Report, as indicated in our written comments submittal dated October 22, 2003.

Page 2-71, Third Paragraph:

"Actually, oxygen in excess of 6 mg/L delivered by photosynthesis and aeration of the Brandon Pool dam during lower temperatures upstream of the power plants is being lost from the river due to the higher temperature". This statement is based on the false assumption discussed directly above and needs to be corrected. There are other statements in the dissolved oxygen discussion in the Final UAA Report that also reference the alleged "100°F" temperatures in the Dresden Pool. The persistence of this misinterpretation of Midwest Generation's maximum condenser discharge values appears to be a means by which the consultant, whether intentional or not, attempts to elevate the importance of temperature issues in the waterway above other, more permanent limitations of the system.

The suggestion that Joliet Station was not in compliance with the existing thermal mixing zone or zone of passage temperature limits in effect for the station is false but persists due to the repeated references to the nonexistent "100°F" temperatures in the Dresden Pool.

Page 2-80, Third Bullet:

"The saturation value is related to the temperature. Consequently, by increasing the Temperature by heated discharges, part of DO gain at the Brandon Road Dam spillway may be lost. Because the saturation DO value at the 37°C (100°F) temperature is about 6 mg/L, meeting the 6 mg/L limit may not be possible during times **when the temperature in the pool is near the standing Secondary Use and Indigenous Aquatic Life temperature maximum standard of 100°F."** (emphasis added). The consultants fail to acknowledge that Midwest Generation provided extensive documentation and explanation to demonstrate that water temperatures in the main body of the river do not reach the maximum Secondary Contact thermal limit of 100 °F. This was corrected, as agreed to by both the consultants and IEPA, in the Temperature section of Chapter 2, but the original error and the resulting misinterpretations based thereon are still present in other sections of the Final UAA Report. Each of these errors was pointed out, in detail, by Midwest Generation in our submitted detailed comments on the entire report, but it appears that they have not been incorporated into the text of the Final UAA Report, thereby propagating the perception that the entire river in the Dresden Pool reaches 100 °F, which is absolutely untrue. However, their retention does allow the consultant to conveniently, if not accurately, explain away low DO levels caused by irreversible river conditions without having to acknowledge that they are evidence to support that at least one or more of the 5 UAA criteria are satisfied here.

Page 2-89, Figure 2.42.

As indicated in our original comments, this graph is "replotted" from the US Army Corps of Engineers website, which depicts 6 am values only, so this graph is NOT

representative of continuous flow data for the entire time period and only represents a one hour "snap-snot" of each day. The consultant improperly implies that this graph depicts a continuous flow record. [The U.S. Army Corps. of Engineers measures flow on a 2-hour basis, and this data, which is available real-time and upon request for historical data, shows that the river flow fluctuates by orders of magnitude on any given day, regardless of precipitation events or not. Midwest Generation relies upon this 2-hour data to make unit derating decisions to remain in compliance with the applicable thermal limits]. In addition, it was acknowledged that the flow is supplemented by diversion flow during the summer period. Both of these factors would indicate that there is no "constant" low flow which would be necessary to create the adverse conditions that the consultant presumes to occur in the lower Des Plaines River. This is only one example of where the consultant has manipulated data to infer that thermal conditions are negatively impacting the biological integrity of the waterway rather than objectively evaluating the data showing that other factors are causing these negative impacts. Of course, if such an evaluation were done, it would contradict the consultants' ultimate conclusion that none of the 5 UAA criteria evaluated are satisfied.

Page 2-91 and 2-92, List of effects and impacts of increased temperature and thermal pollution:

Dr. G. Allen Burton provided a very comprehensive review of the UAA report draft, and this section in particular, in which he stated "*The "Selection of the Temperature Standard" and "Critique of the Current Secondary Contact and Indigenous Aquatic Life Standard" sections have inaccurate statements regarding temperature effects on riverine species and ecosystem processes. High and low temperatures may or may not be detrimental to aquatic life that resides in the UIW. There is not a simple relationship, as noted from many past studies (e.g., Cairns et al. 1973; Cairns et al. 1978; review by Burton and Brown 1995). Both low and high temperatures can increase and decrease toxicity due to exposures from other chemical stressors, such as found in the UIW, and is both species and toxicant type and concentration dependent. The UAA report's over-simplification that high temperatures increase toxicity is simply incorrect. Nitrification is also inhibited by cold temperatures and ammonia is not always consumed in the upper sediment layers. Nitrification is very sensitive to toxicants, which abound in the UIW's depositional sediments. The authors incorrectly imply that high temperatures are always detrimental by focusing on negative impacts and over generalizing. Blue green algae are not a concern on the UIW due to its flow conditions. Toxic cyanobacterial blooms are common to pond, lake and reservoir ecosystems. So, many of the "Negative" examples used on p. 2-93 do not apply to the UIW, yet their presentation implies that they do.*" (See October 14, 2003 Comments submitted by Dr. G. Allen Burton, contained in Appendix G of the UAA report).

The consultants have included a statement after the list that acts as a "disclaimer" that these statements "may not reflect the current situation of the Des Plaines River." If the statements do not reflect the current situation, then why have they been retained? Their continued presence only serves to mislead the reader on the thermal issues. This is particularly true when elsewhere in the UAA Report, at page 2-93 (see further discussion

below) a passing reference is made to the fact that data has been provided by MWGen to show that the system is not dominated by blue-green algae. Apparently however, actual data is not enough to dissuade this consultant from retaining the erroneous reference to blue-green algae blooms elsewhere in the report. Further, the consultant chose not to include the important fact that the waterway is, in fact, populated by the same species assemblage as other similar river-reservoir navigation channels. Phytoplankton density at Joliet was comparable to the density observed in Pool 19 of the Mississippi River, which is not thermally impacted. Again, there appears to be a purposeful effort to ignore the data that shows thermal condition in the river are not the cause of adverse conditions.

Page 2-92, Item #9 and Page 2-93, Figure 2.43:

#9 continues the erroneous conclusion that there is a proliferation of blue-green algae in the waterway. Similarly, Figure 2.43 continues to inaccurately depict the "Range of summer temperatures in the Upper Dresden Island Pool" as being between 33 and 38 °C. The UAA Report continues to retain the erroneously derived assumption that a single monthly maximum condenser outlet temperature equates to a fully mixed river temperature for an entire month. We were told that this error would be corrected after the several meetings in which we identified it and through the submittals of our documentation showing the accurate basis and interpretation of this MWGen data. This error still persists in several different sections of the Final UAA Report (see also, pages 3-5, 8-24). These errors are even retained in Chapter 2 where we went to the added effort of denoting each place where they needed to be corrected. But the consultants either failed to read those corrections or simply decided not to take the time to make them.

It should also be noted that MWRDGC provided similar comments in their October 14, 2003 submittal regarding the summer temperature range in the Upper Dresden Pool depicted in Figure 2.43. These comments were also not addressed by the consultants in their final UAA Report.

Page 2-94: Critique of the Current Secondary Contact and Indigenous Aquatic Life Standard

In this section, as well as throughout the Final UAA Report, the consultants refer to the Secondary Contact temperature standards as being above the lethal limit for fish. This bias against the Secondary Contact thermal limits is not supported by the fisheries monitoring data that MWGen has been collecting for the past 20+ years.

MWGen has provided actual long-term field monitoring data which clearly demonstrates that the very fish species that the consultant claims cannot survive in the lower Des Plaines because of the "lethal" Secondary Contact thermal standard are, in fact, found in abundance and are doing well (based on scientifically defensible field data, rather than reliance on out-dated laboratory-derived lethal end-points that have no relation to actual waterway conditions).

Why isn't this direct evidence of aquatic life conditions even addressed by the consultant? We believe the only plausible answer is that it would directly refute the repeated references to the theoretical basis for the conclusion that the Secondary Contact standards are lethal. It appears that the consultant has no more than a "theory" to explain to the Board why there have not been dead fish repeatedly showing up in these prevalent but lethal thermal conditions of the UAA reach of the river.

Page 2-98: Third paragraph beginning Figures 2.44 and 2.45

The first sentence states that "...the Secondary Contact Indigenous Aquatic Life standard is above the lethal temperature of several warmwater fish species." The consultant goes on to say that adult fish would vacate the river during the hotter months of the year to escape the "lethal" temperatures allowed in the waterway.

If this were truly the case, Midwest Generation's routine fisheries monitoring program, as well as the programs run by the Illinois Department of Natural Resources, would pick up such a drastic change. In reality, there has been, and continues to be a healthy assemblage of resident warmwater fish species in the waterway, despite the continued operations of the Joliet units. Avoidance of the immediate discharge canal has been documented during the hottest times of the year, but fish continue to be found both upstream and downstream of these areas at these times. And, thankfully, they are alive, not dead. There is no data to suggest a "mass migration" of fish to the Kankakee River during the summer period. Nor is there any evidence to support the consultant's supposition that younger fish are killed by higher temperatures. To the contrary, the Midwest Generation fisheries monitoring program continues to collect both adult and young fish throughout the expanse of the Dresden Pool.

Page 3-5, footnote 2: Although we have spent considerable time to explain to the consultant how to properly interpret the data provided by MWGen as part of the UAA, he persists in the incorrect assumption that the condenser discharge temperature from the Joliet plants is equivalent to the temperature in the entire Dresden Pool:

> *"...see Figure 2.46 that indicates that temperature of 37.8 ^{O}C (100 ^{O}F) might have been maintained or exceeded in 1999 in the Upper Dresden Island pool for a period of two months."*

Page 7-37, Conflict Between Recreation and Navigation, Third Paragraph:

The Final UAA Report states that "*Navigation may not be impeding the recreational opportunities in the Dresden Island Pool and limited recreation is feasible in most sections. Therein navigation is restricted to the deep central channel and the navigation channel is marked by buoys.*" However, the report fails to acknowledge the important facts about barge traffic that were brought out repeatedly in the TRMA comment letters dated June 11, 2002, July 18, 2002 and June 6, 2003, especially as it relates to the Dresden Pool.

In the June 11, 2002 TRMA letter, it was pointed out that "(T)he data presented by the consultant for the upper Dresden Pool segment, where the greater concentration of barge movement takes place, is understated in both the amount of barge traffic movement as well as the greater overall dimensions of the individual barge tows. This makes the available waterway for recreational craft considerably smaller than depicted by the consultant and considerably less safe". It is also overly simplistic to assume that the monthly barge traffic figures provided by the U.S. Army Corps of Engineers can be divided equally across all dates to come up with a figure of only "about 7-8 per day", as the consultant had done in the response letter dated November 12, 2003 (a document which is included in Appendix G, but was never previously submitted to the workgroup for review). There is not the assumed uniformity of barge traffic through this waterway, as the consultant suggests. Barge traffic on the lower Des Plaines River cannot be compared to barge traffic on other larger rivers in the country. The Final UAA Report does not provide a true representation of the impacts of barge traffic on this particular waterway and its' significance as an on-going impact on future potential of the waterway to support a higher use designation which includes waterborne recreation.

Please note that the above is only a small subset of the errors and misrepresentations which are still contained in body of the Final UAA Report. A complete listing is found in all of our originally submitted comments, as well as those of other UAA workgroup participants, and should be carefully reviewed by IEPA and other interested stakeholders in order to ensure that they are aware that the Final UAA Report, in its current form, does not necessarily contain fully accurate information and/or have the full endorsement of IEPA as a complete and factually correct document.

We also have tried to help the Agency in its efforts to move forward by providing a detailed list of all of the submittals Midwest Generation or its outside experts have made to the Lower Des Plaines Task Force (see attachment). We hope you will find this index helpful as you consider further the relevant use classification and water quality standards issues in this UAA. We also suggest that all of the documents listed in Appendix G of the Final UAA Report be more completely referenced in the Table of Contents, with clearly informative file names, to allow interested readers to find these documents more readily.

As it currently stands, we do not believe that IEPA has adequately fulfilled their commitment to consider stakeholder comments. Placing comments in an obscurely labeled appendix of the Final UAA Report is not consideration of them. It is simply a collection of them without due consideration. We sincerely hope that both our comments and supporting data, as well as those of others who have taken the time to prepare detailed comments, will be reviewed and considered carefully by the Agency in their decision-making process, whether or not these comments have been incorporated, discounted or ignored by the consultants in their preparation of the Final UAA Report.

We are, as we have been, willing to continue cooperating with the Agency towards producing objective and scientifically defensible findings for this UAA effort. Please let us know how else we can assist in this regard.

Sincerely,

Basil G. Constantelos
Director, Environmental, Health and Safety

Previously Submitted Documents and Comments Submitted by
Midwest Generation and Its Consultants as Part of the
Lower Des Plaines River Use Attainability Analysis

(Listed in reverse chronological order)

(1) MWGEN UAA COMMENTS 101403—Rev.pdf

These are detailed comments on the entire draft UAA report prepared by AquaNova International, Ltd. and Hey and Associates

(2) DesPlaines UAA MWG THERMAL SECTION COMMENTS.pdf

These are the detailed comments on the thermal section of the draft UAA report prepared by AquaNova International, Ltd. and Hey and Associates

(3) DesPlaines UAA MWGEN COMMENTS—Revised Temp. and Ch. 8.pdf

These are comments on the most recently revised version of the thermal chapter of the draft UAA report (sent out by Scott Twait via e:mail on October 10, 2003, as well as the supplemental material included in Chapter 8 (sent out via e:mail on October 7, 2003)

(4) MWGEN Thermal Report 101303.pdf and Des Plaines UAA Table of Contents 10-13-03.pdf

This is the extensively revised Midwest Generation/EA Engineering, Science and Technology, Inc. report entitled "Appropriate Thermal Water Quality Standards for the Lower Des Plaines River". It incorporates changes and additional information based on comments received from Illinois EPA, U.S. EPA Region 5 and MWRDGC personnel.

(5) Midwest Gen Review 101403.pdf

This is a summary of the draft UAA report prepared by Dr. G. Allen Burton, a highly respected scientist who is an internationally recognized expert in the field of sediment contamination and urban effects on waterways. Dr. Burton was requested to provide this review in response to the mis-use/mis-interpretation of his previously done studies on the lower Des Plaines River by the UAA consultants. Dr. Burton's comments confirm much of what Midwest Generation had suspected was wrong and misleading in the data presentation and findings in the draft UAA Report.

(6) Des Plaines UAA Region 5 Response 8-26-03.pdf

This file contains Midwest Generation's response to Region 5's comments.

(7) Des Planes UAA USEPA Comment 6-3-03.tif

These are U.S. EPA Region 5's comments on our original report.

Previously Submitted Documents and Comments Submitted by
Midwest Generation and Its Consultants as Part of the
Lower Des Plaines River Use Attainability Analysis

(Listed in reverse chronological order)

(8) Appropriate Thermal Water Quality Standards for the Lower Des Plaines River—Summary Report prepared by Midwest Generation and EA Engineering, Science and Technology, Inc (dated January 24, 2003)

This is Midwest Generation's original thermal report, which was submitted as a hard copy to Mr. Toby Frevert (cover letter dated January 27, 2003) and was subsequently distributed to the workgroup by mail.

(9) Des Plaines UAA MWG letter—3-26-02.doc

This is the original letter that Midwest Generation sent to the Agency during the UAA process, raising various issues which ultimately lead to the need to submit detailed comments (as described above).

ATTACHMENT 12

March 29, 2005
Midwest Generation Comments on
Draft CAW UAA Report

MIDWEST GENERATION

An EDISON INTERNATIONAL Company

March 29, 2004/5

Via E:Mail

Mr. Scott Twait
Illinois Environmental Protection Agency
Bureau of Water—Permit Section #15
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Subject: Midwest Generation Comments on the Draft Chicago Area Waterways (CAW) Use Attainability Analysis Report

Dear Mr. Twait:

Midwest Generation ("MWGen") has completed our preliminary review of the subject report and offers the following comments. The report was both well written and well organized, and presented assessments and conclusions which are consistent with the available information regarding the waterways' past and present influences, as well as future potential. Overall, we believe that Camp, Dresser and McKee ("CDM") provided a generally balanced summary of all the available physical, biological and recreational information and developed accurate and supportable conclusions regarding the overall potential of the Chicago Area Waterways ("CAW"). CDM is also to be commended for a very thorough review of conditions where one or more of the six UAA factors have been met, thereby allowing for the development of site-specific use designations and standards for applicable sections of the waterway. The report accurately points out the huge combined sewer overflow ("CSO") problem in the waterway, as well as significant habitat limitations and flow alterations, which will continue for the foreseeable future. MWGen was also encouraged to see that CDM also used one of our photos of Crawford's impingement collection, which gives a very graphic depiction of the continuing problems with floatables and other urban debris in the waterway system.

The UAA process cannot erase the past or current uses of the waterway, nor the fact that a large portion of it is either entirely man-made and/or subject to human-induced conditions which are not reflective of a typical, natural waterway. The purpose of the UAA is to provide the information necessary to make informed decisions regarding what can and cannot be accomplished to allow the subject waterway (or segments thereof) to

downgrading a waterway's current status, if the available data indicate that the current designated use cannot be supported.

The proposal for three separate use designations for the CAW, based on existing and future potential for improvement, is a long-awaited and well-designed approach for dealing with the site-specific issues affecting these waters. Illinois has maintained only two major use designations, General Use and Secondary Contact, for too long and these are not necessarily appropriate for all waterways. This is especially true of the CAW, which are heavily impacted by urbanization, flow alternations, channelization and other human-induced conditions. As such, MWGen is in full agreement with the proposed designations, as well as their proposed application to specific portions of the CAW.

The conclusion of the report indicates that conditions in the CAW might possibly be improved, but only by adopting a workable strategy to address continuing constraints, the largest among these being habitat limitations, urban runoff and CSO's. The impact of these limitations is apparent in the low biological diversity, low dissolved oxygen and high bacterial counts, all characteristics of a highly altered, urbanized waterway.

For the CAW, the absence of appropriate physical habitat is the most far-reaching biological limitation of the system. Even if water quality standards are made more stringent, the biological community of the waterway will not significantly improve if no adequate habitat exists. From a health and aesthetic basis, CSO control presents the greatest challenge in the CAW. The CAW Strategic Plan proposes the means by which these challenges might be dealt with in the future. This plan is essential to realizing the long-term vision for the waterway, and should be considered as a necessary and appropriate extension of the UAA process.

In addition, the term "potential" needs to better defined, in the context of this strategic plan. If the ultimate goal for all of the CAW segments cannot be full body contact recreation, given the permanent physical constraints and health risks of the system (e.g. concrete walls, barge traffic, no public access, high bacterial counts), thought should be given to those improvements that can be made to improve the aesthetic qualities of the system, especially within those areas that are frequently seen by the public. This may be able to be accomplished in a much shorter timeframe than any large scale physical modifications or costly treatment technologies. These types of aesthetic improvements (e.g. shoreline beautification, etc), would further enhance the visual appeal of the waterways, as well as their overall value/perception to the City and its residents.

It must be understood by all stakeholders that control of the major factors which are negatively affecting the CAW may take years to accomplish, if even achievable at all, so it is unclear how quickly Illinois EPA ("IEPA") will go to the Illinois Pollution Control Board with the proposed new use designations and associated standards. Since the draft report did not provide any use designation-specific water quality standards, other than deferring to the existing General Use limits, it appears that there is still much work to be done in order to develop such standards, which would be both protective of the present and expected biological communities, as well as acknowledge the long-term limitations in the system which will prevent significant improvements from occurring. Should the

Agency decide that it needs to create a plan to upgrade the entire river system to General Use, it must estimate the cost of correcting all existing habitat limitations, which include concrete walls/pilings, channelization, run-off, etc, as well as providing a water source of equivalent quality to the present Lake Michigan diversion.

MWGen strongly believes that the standards setting process should not be rushed by either political pressure or the influence of those that would seek broad, sweeping changes in the regulations that cannot be supported by both existing technology and economic feasibility. The process should continue to be by guided by knowledge of existing uses of the waterway segments, unbiased data on the current biological, physical and chemical status of these waterways, and the understanding of what can and cannot be accomplished in the near term to improve those existing conditions which do the most to limit these waterways from meeting their full potential.

Each specific use designation should have its own set of standards, which are customized to the particular use and recognize the fact that tighter limits, in the face of permanent alternations and anthropogenic influences, may not result in significant improvements to the biological community and therefore may not be needed or appropriate at this time. Granted, those water quality parameters which consistently meet the existing General Use limits can and should be incorporated, unchanged, into these new uses, but imposing General Use across the board does not acknowledge that these three separate use designations cover waterway segments with differing influences, physical characteristics and biological assemblages.

MWGen believes that the Agency should develop individual sets of use designation-specific limits that would apply equally to all dischargers within a given CAW segment. Until such time as needed improvements to physical habitat and flow regime are made to the waterway, MWGen believes that Secondary Contact thermal and dissolved oxygen limitations remain appropriate to protect the Limited Warmwater Aquatic Life Use designation.

MWGen looks forward to the opportunity to continue to work with the Agency, as well as the Stakeholders Advisory Committee (SAC), in order to implement practical and appropriate standards for each of the proposed use designations recommended for the CAW. Please contact Julia Wozniak or myself if you have any questions or wish to discuss these comments further.

Sincerely,

Basil G. Constantelos
Director, Environmental Services

Attachment: Detailed Comments on CAW UAA Draft Report

Detailed Comments on Draft CAW UAA Report:

Page Reference	Comment
1.2 2nd line from bottom:	"...technology as required..."
1.6 last sentence in 1st para.: (also 3-3, 1st para.)	The 70% figure may be reflective of an annual average, but we believe that wastewater effluent makes up an even larger percentage of the total flow during the winter months (up to 90%, in some cases). This should be discussed with Metropolitan Water Reclamation District of Greater Chicago ("MWRDGC") and clarified in the report.
1.7 last sentence in 1st para.:	The water quality screening criteria is mentioned in several places in the report, but is never fully defined. Is it a strict comparison with General Use numeric limits, or does it take into account any allowable exceedance factors, (e.g. 95% level, etc)? This is important to be able to fully understand what the various percent exceedance numbers mean.
1.8 2nd sentence from top:	This statement implies that most General Use water quality constituents are met in the CAW, however, this is solely based on the monitoring data provided by MWRDGC. MWGen has data which demonstrates that General Use thermal limits would be exceeded in the CAW a far greater percentage of the time than indicated by the MWRDGC data. (This data will be provided to IEPA under separate cover). This data shows that General Use thermal standards are not being met within the South Branch of the Chicago River and Chicago Sanitary and Ship Canal ("CSSC"). Therefore, for MWGen to comply with the General Use thermal water quality standards would be far more difficult than the report seems to suggest.
1-8 bottom, 1-9 top:	As stated above, MWGen has data to show that temperatures in the CSSC directly below MWGen's Crawford and Will County Station discharges would exceed a General Use thermal limit a much greater percentage of the time than is indicated by the report. Also, are the stated percentages in the report annual values? If so, what is the difference between the summer and winter periods?

Page Reference	Comment
1-8 bottom, 19, top:	MWRDGC's Stickney plant discharge also contributes greatly to the ambient water temperature in the CSSC during the winter months, due to its large flow contribution (up to 90%, according to a presentation made by Dick Lanyon of MWRDGC to the SAC). This must be taken into consideration as part of the development of any appropriate seasonal thermal limits for this waterway. The normal seasonal temperature fluctuations which would exist in a natural waterway are not found anywhere in the CAW due to many anthropogenic influences apart from power plant discharges.
1-11 last sentence in last para.	The entire paragraph discusses the man-made nature of a majority of the CAW, along with its lack of habitat to support a diverse aquatic community. However, the last sentence suggests that modifications to improve habitat would result in the achievement of "high" uses. While we agree that some areas of the CAW might benefit from improved habitat conditions, there are others for which this may not be possible (e.g. Ship Canal, where sheet pile or concrete walls, as well as barge traffic, effectively limit improvement potential). In addition, habitat modifications, at best, can result in incremental improvements, not a drastic leap from Limited Warmwater Aquatic Life to General Warmwater Aquatic Life. There are many other limitations in the CAW beyond physical habitat, and this needs to be fully understood by all stakeholders. Therefore, we suggest that this sentence be modified as follows: *"However, this does not preclude the potential **for some portions of** these waterways to achieve higher uses if modifications can be made to improve fish and macroinvertebrate habitat."*

Page Reference	Comment
1-14 LWAL section, last sentence:	MWGen believes that the Agency should develop a set of use-designation specific limits that would apply equally to all dischargers within a given CAW segment, and should not be handled through an individual variance process. While some of the individual parameters for each new use designation would be equivalent to current General Use values, for those already meeting these criteria, others should either be left as is or adjusted to reflect the continuing long-term limitations which prevent full attainment of a higher use. (Ohio's water quality standards provide use designation-specific sets of limits, which are tailored to protect each use).
1-14 LWAL section, last sentence:	As stated earlier in these comments, MWGen strongly believes that use-designation specific standards should be developed which are protective of the existing and expected biological assemblage and also acknowledge the level of permanent impairments/alternations to the waterway. These standards should not directly or indirectly reference the General Use criteria in Sections 302.201-302.213, but should be stand-alone, incorporating those General Use criteria that are already being met, but tailoring them, as necessary, in order to be protective of the individual designated uses and the corresponding biological communities within them. Serious consideration should be given to retaining the existing Secondary Contact criteria for those parameters which cannot currently meet General Use limits, at least until such time as the proposed remedial actions outlined in the Strategic Plan are fully implemented. More stringent limitations on these parameters (specifically temperature and dissolved oxygen) will not result in any measurable improvements in the CAW unless both habitat limitations and CSO problems are resolved.
1-20 Item (c):	MWGen has already provided a high-level summary of potential economic impacts to IEPA for review (letter dated 1/3/2005 to Rob Sulski). This matter was also discussed during our meeting on 2/23/2005. MWGen requests that all references to the economic study be revised to reflect our current understanding of this matter and the fact that additional economic studies will not be completed until specifically requested by IEPA.

Page Reference	Comment
1-20 Item (f):	Again, the term "high aquatic life use" is found. This should be changed to "**higher**", to indicate that improvements may not be able to raise the existing use to the highest possible level. MWGen does not agree with a set of water quality standards which are all General Use and require variances on a parameter-specific basis. For parameters which have not attained General Use, use designation-specific standards should apply.
1-22, LWAL Goal:	The goal should be to ensure that whatever D.O. and temperature criteria are adopted for this use designation are adequately protective of that use, not that they necessarily have to be identical to the General Use standards for these parameters. Meeting one or more of the six UAA factors allows for less stringent standards to be imposed for those parameters which are not already meeting General Use, especially if it can be shown that more stringent limits will not have a significant beneficial impact on the waterway.
1-22, LWAL section (c):	Similar to the comment above, will the site-specific water quality standards for D.O. and temperature, as proposed, take the form of a set of limits which are specific to the use designation as a whole, or only to specific dischargers? MWGen maintains that the existing Secondary Contact thermal and dissolved oxygen limits are adequately protective of the proposed Limited Warmwater Aquatic Life use designation. Other standards may be appropriate for the other proposed use designations which are indicative of higher quality aquatic life. MWGen would welcome the opportunity to work with IEPA to develop thermal limits which are biologically protective of each proposed use designation.

Page Reference	Comment
3-3, last para.	General Comment: The 2004 303(b) Report does not list temperature as either a cause or source of impairment to any of the CAW. Thus it would appear, based on IEPA's findings, that the existing Secondary Contact thermal limits are not considered to be a limiting factor to this system. Therefore, MWGen's proposal to retain the existing Secondary Contact thermal limits for LWAL waters, until needed improvements are made to improve habitat conditions, flow regime and CSO inputs (some of the many factors listed in the 303(d) report as sources of impairment), is a reasonable approach.
3-4, last para.	The MWRDGC's Stickney Treatment plant design flow is stated, but not the average discharge flow into the CSSC. This should also be included to give a feel for the magnitude of its contribution to the waterway.
3-5, 2nd para.	The beneficial effects of our use of cooling water from the CSSC are well-noted in the report. However, just as a point of clarification, it should be noted that our withdrawal and discharge water from the CSSC is for non-contact cooling purposes. The statement that "Other facilities along the CSSC contribute cooling water and some stormwater runoff." is somewhat misleading. If these facility's cooling source water is the CSSC, then they are not *contributing* this water, they are merely using it for cooling purposes and putting it back into the system. Perhaps a better way to phrase this would be: *"Other facilities along the CSSC utilize it for cooling purposes and also contribute some stormwater runoff."* or something similar.
3-5, 3rd sentence from bottom.:	MWGen is on the Aquatic Nuisance Species Advisory Panel, and therefore has substantial knowledge of the electric barrier project. The actual intent of the electric barrier is to deter movement of invasive species between Lake Michigan and the Mississippi River Basin, in both directions. Since the barrier is located within the CSSC, it does not prevent invasive species from entering the canal system, as stated in the report. It does however, as correctly stated in the report, prevent the movement of native and/or non-invasive fish species between the CAW and downstream reaches.

Page Reference	Comment
3-5, 3rd sentence from bottom:	Fish passage is one requirement of the proposed LWAL use designation; however, the aquatic invasive species electric barriers in place at Romeoville, IL effectively prevent any fish passage. (This is approx. 3.5 River Miles upstream of Lockport). This barrier system has been developed and funded by the Federal Government and is supported by many governmental agencies, including the International Joint Commission, U.S. EPA, U.S. Fish and Wildlife Service and others. The barrier has also been strongly endorsed by the mayor of the City of Chicago and will be in place for the foreseeable future. Therefore, MWGen believes that the entire segment in the vicinity of the electric barrier should be exempt from the fish passage requirement. Caption of photo should read: "Floatable material collected on the intakes screens of ...".
3-16, Section 3.1.6:	Do the values reported by USGS on average annual discharge downstream of the three Lake Michigan diversion structures also include MWRDGC's discretionary diversion for water quality enhancement of the CAW? Also, why do the values referenced in the third sentence of this section not correspond to the data listed in Table 3.1 on page 3-16, when both are supposed to be covering the same locations and same year? (For example, the flows from WPS are listed as zero for the entire year in the table, while the text references an average annual flow of 80 cfs).
3-17, Section 3.1.8:	Is it true that all CSOs in the CAW currently transport their wastewater to one of MWRDGC's water reclamation plants during dry weather periods, or only those CSOs directly associated with MWRDGC? The ultimate goal of TARP is to include every CSO, but our understanding was that many of the City of Chicago's CSOs are not currently directly tied to any MWRDGC treatment system.

Page Reference	Comment
3-18, 1st para. 5th sentence:	While it is true that TARP has resulted in significant benefits to the CAW, another important contributing factor in increasing the fish population and diversity of species present was the cessation of chlorination of POTW effluents, which actually happened a few years before TARP start-up. MWRDGC (Sam Dennison) has fisheries data which shows dramatic improvements in fish populations downstream of POTW outfalls after the cessation of chlorination practices. While resuming chlorination may decrease bacterial contamination in the CAW, the impact on the existing fish community could be detrimental (even if dechlorination was required, since it would add additional chemicals and chemical breakdown products to the waterway).
3-18, Section 3.1.9, Industrial Sources:	The information in this section requires greater clarification so that it is not misinterpreted. Once through, non-contact cooling water, which all of these facilities (including MWGen's) use, should not, in itself, be considered in the same context as a conventional pollutant wastestream. Non-contact cooling water is used as a heat-transfer medium, and therefore, while it does add a thermal contribution as it is discharged back to the source water, temperature is not a conservative pollutant and dissipates as it moves downstream. [That being said, MWGen has data to demonstrate that General Use thermal standards cannot be consistently met in the CAW].
3-21, 1st para.:	It should also be noted that in 2019, the discretionary diversion directly into the CAW is mandated to be eliminated, according to the Memorandum of Understanding (July 26, 1996). Once this has happened, there will be no flows into the CAW except for occasional lockage and leakage, stormwater runoff and POTW effluent. This will have a profound impact on the water quality of the system and must be considered when developing plans for long-term improvements. The CAW cannot maintain even its current use status without sufficient flow. While it is understood that this UAA is only considering the next 10 years, it is important to look further out into the future to determine whether such mandates (as discussed above) will effectively limit the overall level of improvement possible in the waterway.

Page Reference	Comment
3-22, Section 3.3:	In Section 3.1.9 of the report, three major private industrial NPDES permit holders are referenced as discharging 10 MGD or more to the CAW. Why were the industries singled out in this section, when they are covered in Section 3.3? MWGen believes that if NPDES dischargers are to be listed in the report, then all of them should be listed. In Section 3.3, a total of 12 facilities are noted; however, when you look at Table 3-4 on page 3-23, there are only 10 listed. MWGen's Will County Station is missing from the Table. Is there another facility missing, or are there only 11 and not 12 total? The actual issue date for Fisk Station's permit is **4/4/2000**, not 4/24/2000.
3-22, Section 3.3:	Also, the second sentence in Section 3.3 states that compliance violations for the listed facilities were also included in Table 3-4, but they are not. Will they be included? If so, and if EPA's PCS system is used as the source of this information, the violation records must be reviewed carefully to ensure that they are correct. (There have been many instances of resolved issues that continue to show up as violations in this system). Again, for all the industrial flows listed in Table 3-4, it should be noted what proportion consists of non-contact cooling water, versus conventional wastewater outfalls.
3-27, Section B):	First line on page references "subsection (e) of this Section" but there is no subsection (e). This should be footnoted or otherwise referenced in the text. Strike-out section should be deleted from text. Also, since this section deals with the issue of whether or not early life stages are present in the waterway, it would be useful to discuss somewhere in the report what IEPA's/CDM's perspective is of this matter as it relates to the CAW. Do you consider early life stages to be absent for these waterways?

Page Reference	Comment
4-18, Table 4-11:	Footnote c: Special low end scoring should be used when the relative numbers are less than **200 / 1 km**, not 200 / 0.3 km, as stated in the text. It is unknown whether this is just a typo, or if the calculations were actually done using the 0.3 value. If it is the latter, then the information in the table may not be correct. It should also be clarified that when low-end scoring is used, tolerant species are included.
4-21, 1st sentence:	"Ed Rankin from CABB, ~~to~~ conducted...."
4-21, bottom right, Table 4-13:	It was noted that QHEI ranges were not specified in the report for each proposed use designation. We understand that these would only be relative and not absolute ranges, and would need to be considered in conjunction with other information regarding a particular waterway; we are in agreement that it is probably best to leave the specific numeric ranges out of the definition of each designation, since doing otherwise might lead to misinterpretation. Nonetheless, we would be interested in seeing what ranges were considered for each use designation.
4-35, Table 4-22:	The fact that there were some exceedances of the General Use thermal standard in both the Upper and Lower North Shore Channel, which have no known thermal inputs other than POTW effluents, would indicate that ambient temperature conditions in the waterway are elevated from what would be true of completely "natural" conditions to which General Use thermal standards are best suited.
4-36, bottom:	Sheridan Road in Wilmette is considerably influenced by Lake Michigan, and as such, is not truly representative of river conditions, or the CAW as a whole.

Page Reference	Comment
4-39, Figure 4-15:	The IBI scores for the Sheridan Road site are reflective of Lake influence, and should not be used as a "reference" site for the rest of the CAW. In addition, it is difficult to understand exactly what the individual values in the figure are supposed to be representing. Are they monthly averages, single sample results, etc? This should be clarified either in the text or a footnote. The text formatting around the photograph at the bottom of the page should be revised, since it is difficult to read.
4-48, 1st para., last sentence:	Why are General Use water quality criteria recommended for all proposed use designations? Designation-specific criteria, similar to what Ohio has developed for their various use designations, should be applied. The benefit of having additional, more appropriate use designations for the CAW, as allowed by the UAA process, is lost if General Use numeric limits are applied to all of them. As stated earlier, those parameters which already meet current General Use standards should be adopted into the new use designations. For the Limited Warmwater Aquatic Life Use designation, the parameters that do not currently meet General Use standards should remain at Secondary Contact limits until such time as further improvements to the existing physical habitat/flow regime constraints are implemented.
4-49, Section 4.3.2.2:	MWRDGC's temperature monitoring data is from a point well downstream of MWGen's Fisk Station discharge. The actual compliance monitoring point for temperature is at the edge of a 26-acre mixing zone from end-of-pipe. Measurements from this location would demonstrate a much greater percentage of exceedance of the General Use thermal standards for all of MWGen's CAW generating stations.

Page Reference	Comment
4-49, Section 4.3.2.2:	The solution would seem to be either: (1) Develop in-stream temperature standards that are measured at a significant distance away from major heat sources in the waterway; or, (2) Allow for higher end-of-pipe limits, since it has been demonstrated by the MWRDGC data that heat dissipates as the water moves downstream. (Note that heat dissipation is considerably influenced by flow conditions in the waterway, as well as weather—both of which cannot often be accurately predicted).
4-53, Table 4-31:	Again, the exceedance percentages in the table for MWGen plants are not accurate, in that they are based on temperature data collected well downstream of the generating station discharges and not at the NPDES compliance points. Thermal plume studies conducted at MWGen's Crawford and Will County Stations over the past several years have shown much greater temperatures, at times well in excess of the General Use thermal limits, at the edge of the allowable 26 acre mixing zone. This data demonstrates that the Chicago Sanitary and Ship Canal does not meet General Use thermal standards.
4-53, Table 4-31:	The fact that the CSSC is dominated by POTW and CSO effluent, and flow is frequently manipulated, makes it extremely difficult to obtain sufficient mixing to meet a lower temperature standard. The only alternative, closed cycle cooling, is unlikely to provide either a technologically, economically or regulatorily feasible solution. In addition, lower temperatures in the waterway will not result in any significant improvements in the fish community until other, more pervasive limitations are addressed, including lack of appropriate habitat, abnormal flow regime and the inherent effects of urbanization, including runoff and CSOs.
4-54, bottom:	The Inner Harbor location is just that, an embayment of Lake Michigan, and is therefore not representative of river conditions. It is not appropriate to use it, along with other sites heavily influenced by Lake Michigan, as reference sites to determine overall potential of the CAW.

Page Reference	Comment
4-57, middle of page:	The reference to Table 4-36 says *"Abundant game species included: rock bass, largemouth bass and bluegill."* However, when you look at the table itself on page 4-58, the data is presented as Relative Abundance (%). Therefore, you cannot say that the actual number of species found is "abundant" unless you know what the baseline numbers were which were used to establish the relative abundance numbers. (For example, If only 10 fish were collected in a given sample, then 2 largemouth bass would represent a relative abundance of 20%; however, 2 smallmouth bass would not be considered an "abundant" amount, in absolute terms). Care must be taken in making these types of comparisons, as they tend to make things look better than they actually are to the casual reader.
4-66 (bottom) and 4-69 (top):	Referring to the North Branch, *"Rankin (2004) characterized this section of the North Branch similar to Ohio's* ***Limited Resource Water*** *aquatic life use (lowest quality)."* -- (emphasis added). However, on the top of page 4-69, Regarding the South Branch, the sentence *"The South Branch was not analyzed for habitat conditions, however, the South Branch is very similar to the lower reaches of the North Branch and would carry the same aquatic life potential (i.e.* ***modified warmwater-channelized).***"—(emphasis added) If both of these reaches were considered the same by Rankin, then they should both reference the same comparable Ohio use designation, not two different ones. They should both rightly be considered as comparable to Ohio's Limited Warmwater aquatic life use.
4.71	MWGen commends CDM on their finding that wet weather impacts and resultant CSO contributions have more influence on D.O. levels in the waterway than temperature. We have made similar findings in our long-term studies of the lower Des Plaines River.

Page Reference	Comment
4.71, bottom:	Without evidence, it is unfair to single out Will County Station as contributing to D.O. loss at Romeoville. The observation that D.O. conditions get slightly "worse" downstream at Romeoville might also be due, in part, to the effluent contributions from smaller POTWs located in this area. "Worse" should also be better quantified. Does this mean that more D.O. measurements fall short of the General Use limits, or that D.O. concentrations are just slightly lower than those measured directly downstream from the SEPA station? (The latter would be expected, since D.O. is likely over the saturation level at this point and would naturally dissipate). This sentence should be rephrased so as not to attribute lower D.O. values to Will County Station's operations without sufficient proof.
4.72, Section 4.4.2.2:	As stated above, the MWRDGC temperatures used in the UAA analysis are not measured at the compliance points for MWGen generating stations. The percentages of exceedance derived therefore underestimate the true potential for temperatures over the General Use thermal limits. Our discharge temperature data, combined with knowledge of the flow fluctuations in the waterway, would suggest an exceedance level of close to 50% or more, depending on flow, weather and power demand conditions.
4.73, Figure 4-29:	These temperatures are NOT indicative of near-field compliance measurements at MWGen generating stations. As stated in the report, Cicero Ave. is approximately 1 mile downstream of our Crawford Station. Lockport is 3 miles downstream from our Will County Station. MWGen data shows that General Use thermal standards are not being met in this reach. The MWRDGC data are useful in that they show how temperature dissipates in the waterway. This means that the overall effect of higher discharge temperatures does not have a significant impact on downstream sections. This is an important consideration when determining appropriate temperature limits for the waterway. The numeric limits, as well as where compliance should practically be monitored, are both important considerations which need to be looked at concurrently.

Page Reference	Comment
4.73, Figure 4-29:	The figure suggests that temperature control in the system to meet the General Use limits would be relatively simple. This is NOT the case for MWGen's CAW stations, as explained previously. MWGen's thermal plume monitoring data for Crawford and Will County demonstrate that water temperatures in closer proximity to the stations is much higher than that measured by MWRDGC. This means that it would be even more difficult for MWGen to consistently meet a General Use thermal limit than would be suggested by the information contained in the report.
4.73, Figure 4-29:	Winter temperatures of 60 ° F or more are not uncommon in the waterway, even upstream of our discharges, due to the huge influence of MWRDGC's effluents, which essentially set the ambient water temperature of the waterway. Since water temperature is largely a surface phenomenon, there is still a zone of passage for fish maintained at our thermal discharges, even when the surface temperature approaches the Secondary Contact maximum. This has been documented in our recent field surveys. Our NPDES permits allow for thermal water quality standards to be met at the edge of a 26 acre mixing zone from our discharge point. Temperature limits must be met in the main body of canal at the 26 acre point, which means that a monitor would need to be placed in the middle of the canal, 3 feet below the surface, to get a representative measurement). Since it is impractical to monitor this temperature on a continuous basis, due to barge traffic and fouling concerns, MWGen is allowed to report actual discharge temperature as a "worst-case" indicator of temperature contribution to the waterway. Thermal plume measurements are performed on an as-needed basis to ensure that our discharges are in compliance with the Secondary Contact limits. The data collected shows that we would definitely <u>not</u> be able to meet a General Use thermal limit.

Page Reference	Comment
4-73, Section 4.4.2.3, 1st para. last sentence:	It should also be noted that elevated temperatures may actually increase the die-off rate of bacteria, as well as assist in the breakdown of many other chemical constituents present in the water column. As such, they could actually have a beneficial impact for this particular waterway as well as the waters downstream.
4-76, Table 4-45:	As stated previously, the percentages in this table grossly underestimate the actual exceedance potential for MWGen's thermal discharges to meet General Use thermal water quality limits. In addition to the numeric limits, the other provisions of General Use (Section 302. 211 b-e), including not being 5 °F above "natural" temperature, maintaining normal seasonal and diurnal fluctuations, etc, are all extremely difficult to apply to an artificially controlled, man-made waterway. All refer back to a "natural" temperature, which does not exist in the CAW.
4-77, Section 4.4.4, last para.:	Since the highest MWRDGC temperatures were measured at the same location containing the highest species diversity in the CSSC, this would further suggest that temperature is not having an adverse impact on the waterway, even with the current Secondary Contact thermal limits in place.
4-80, Figure 4-33:	The range on this graph is truncated, which is highly misleading. The actual range for IBI scores goes from **12 to 60**, with 12 being the minimum possible score. By choosing 30 as the highest number on the graph, it makes it appear as though the IBI values presented are within an "average" range, especially to the uninformed reader. In reality, such scores are all indicative of a highly disturbed, modified system. For clarity, the graph should either be revised to include the full IBI range, or a footnote discussing this matter should be included.
4-80, second sentence above figure:	The following sentence is not complete: *"The EPT taxa richness of three at the Lockport sampling station." ???*

Page Reference	Comment
5-1, Section 5:	MWGen commends CDM's comprehensive assessment of the six UAA factors and their applicability to the CAW. When one or more factors are met for a particular waterway, this allows for the development of site-specific criteria. These site-specific criteria may be less stringent than General Use, provided that they still are protective of the designated use of the waterway. (Parameters which already meet General Use limits would be upgraded accordingly). Ohio's aquatic use designations have designation-specific criteria that are not necessarily linked back to the highest use category.
5-4, middle:	While CDM provides an excellent overview of the man-made modifications to the waterways to accommodate commercial navigation, and how they preclude the attainment of higher aquatic life uses. However, it is equally important to discuss the fact that the CAW, as a whole, does not have the necessary physical factors in place, regardless of navigation activities, which would allow for the development of more diverse, higher quality aquatic communities. As stated in Factor 4, there is no proper substrate, cover, flow, depth, pools, riffles, etc. needed for such biological development. This is true of the entire CAW, possibly with some very minor exceptions in a few of the upper reaches.
5-4, bottom:	IEPA also must consider the costs necessary for pollution controls to meet the proposed limits for industrial dischargers, not just POTWs and CSOs. (MWGen is not a publicly-owned utility, although by grouping us with MWRDGC in the discussion on the top of page 5-5, it would appear so to the uninformed reader. We cannot pass our costs along to the rate payers, as MWRDGC does).
5-7, bottom, center:	There were no QHEI score ranges discussed regarding the proposed use designations. However, seeing that these values provide only one part of the information necessary for a full assessment of biological potential, much in the same way as IBI scores, we agree that it would be best not to include them in any regulatory definition of the use designations.

Page Reference	Comment
5-9, Figure 5-2:	The great divergence between the QHEI and IBI scores for the Inner Harbor location clearly show the influence of Lake Michigan on the aquatic assemblage. As stated earlier, this means that this location should not be used as an indicator of the biological potential of the rest of the CAW.
5-10, top:	It states that *"Sheridan Road in the North Shore Channel had the best overall IBI and QHEI scores for all sites in the CAWS and was used to set the upper boundary for Modified Warmwater Aquatic Life."* This site, as stated before, is not appropriate for use as a reference for the CAW, as it is heavily influenced by Lake Michigan. It is not even a "true" river location, because of this Lake influence, in which case the IBI scoring methodology would not even be applicable.
5-12, Aquatic Life Use Designations:	As stated elsewhere in these comments, why is each proposed ALU, by default, tied to the existing General Use water quality standards? Since one or more of the 6 UAA factors is met for these waterways, this affords the opportunity to develop site-specific standards for each use designation. These standards should, for some parameters, be identical to the existing General Use limits, but they should also stand on their own as part of the new use designation. Limits should be set to support the designated use, which means that in some instances, standards less stringent than the current General Use standards would be appropriate.
5-12, GWAL Section:	The list of expected fish species for this designation would be appropriate if applied state-wide, however, some of the species are not appropriate for the CAW. In particular, brook stickleback, longnose dace and hornyhead chub are all small stream specialists, and would not be expected to be found in abundance in any of the CAW, since the proper habitat does not exist for them there.

Page Reference	Comment
5-13, LWAL Section:	Similar to the comment above, central mudminnow is not representative of CAW waters. There are also few, if any, white suckers found in the proposed LWAL reaches. For this use designation, why was common carp and/or goldfish not included, since they are both tolerant and well-represented species in the waterway? We understand that these are considered exotics, but nonetheless, they are permanent residents of the CAW and this should be acknowledged.
5-14:	MWGen fully agrees with all of the aquatic life use designations proposed, as well as their assignment to individual CAW reaches. We look forward to working with the Agency and the rest of the stakeholders to develop numeric standards which are supportive of these uses and also reflective of the multiple uses of the waterway for commerce, industry, wastewater control and recreational uses.
6-1:	How does IEPA intend to implement the strategic plan initiatives listed in the report? Will this be done prior to the development of use-designation specific standards, or as part of an iterative process by which standards may be incrementally made more stringent as improvements to the system are realized?

ATTACHMENT 13

June 28, 2005
Midwest Generation Supplemental Comments and Information Regarding Draft CAW UAA Report

MIDWEST
GENERATION EME, LLC
An *EDISON INTERNATIONAL*™ Company

Basil G. Constantelos
Director, Environmental Services

June 28, 2005

Mr. Scott Twait
Illinois Environmental Protection Agency
Bureau of Water—Permit Section #15
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Subject: Midwest Generation Supplemental Comments and Information Regarding the Draft Chicago Area Waterways ("CAW") Use Attainability Analysis ("UAA") Report Prepared by CDM

Dear Mr. Twait:

Midwest Generation ("MWGen") has gathered additional information to supplement our original March 29, 2005 comments on the subject CAW UAA Report ("Draft CAW UAA Report"). We are providing additional information to support our prior comment advocating a revision to the Draft CAW UAA Report to find that thermal water quality standards in the CAW are not currently, nor are they close to, meeting General Use criteria. General Use thermal water quality standards are neither attainable nor are they necessary to protect the uses covered by the proposed use classification for the South Branch of the Chicago River, as well as the Chicago Sanitary and Ship Canal. Based on the proposed use designations, the Secondary Contact thermal standards will continue to be adequately protective of the existing and expected aquatic species assemblage in the waterway. For this reason, they should be retained as part of any new use designation proposed for the South Branch of the Chicago River, as well as the Chicago Sanitary and Ship Canal.

We also are supplementing our prior comments with information showing that the differences between human and aquatic life uses of a waterbody, as well as differences among the aquatic life species that are present in different classifications of rivers, streams and lakes, provide further support for the need to adopt water quality standards that are based on the specific use designation to be adopted for the portions of the CAW.

We also are concerned that the Draft CAW UAA Report does not provide for the development of water quality standards that are based on the uses recognized by the proposed use classifications. The Report instead seems to imply or assume that General Use water quality standards would be applied by default across all of the CAW proposed use designations. We do not believe that such an approach is consistent with the Clean Water Act or its implementing regulations.

Midwest Generation EME, LLC
One Financial Place
440 South LaSalle Street
Suite 3500
Chicago, IL 60605
Tel: 312 583 6029
Fax: 312 788 5529

Finally, we have reviewed and take issue with certain of the comments submitted by the United States Environmental Protection Agency Region 5 (U.S. EPA) regarding the consideration of economic impacts as part of the UAA. In particular, we believe that the U.S. EPA comments misrepresent the purpose and nature of the previous economic information supplied by MWGen to the Illinois EPA at the its request. We are taking this opportunity to respond to and correct the U.S. EPA's apparent misunderstanding of the nature and purpose of the economic information previously supplied by MWGen.

I. DIFFERENT USE CLASSIFICATIONS REQUIRE DIFFERENT WATER QUALITY STANDARDS

The proposed Modified and Limited Use designations recognize that only certain uses are attainable in certain portions of the CAW. Therefore, the water quality standards should be set as necessary to protect those attainable uses. The proposed use by default of General Use standards, which were previously developed to protect higher uses that are non-attainable for the CAW, will result in setting unnecessarily and overly stringent water quality standards for these lower use designations. For example, the biological and physical habitat data summarized in the Draft CAW UAA report show that General Use temperature criteria are not necessary or appropriate for those portions of the waterway which are severely and permanently limited by the lack of necessary physical habitat, human-induced flow alterations, and commercial navigation. These limiting factors, which are the basis for the proposed new use classifications in the Draft CAW UAA Report, also should form the basis for the development of use classification-specific water quality limitations for applicable reaches of the CAW.

The CDM report provides an excellent overview of the man-made modifications to the waterways that accommodate commercial navigation, and how these modifications preclude the attainment of higher aquatic life uses. However, it is equally important to discuss the fact that the CAW, as a whole, does not have the necessary physical factors in place, regardless of navigation activities, which would allow for the development of more diverse, higher quality aquatic communities. As stated in the discussion of the UAA Factor 4, there is not the proper substrate, cover, velocity, pools, riffles, etc. needed for such biological development. This is true of the entire CAW, possibly with some very minor exceptions in a few of the upper reaches.

Because this UAA has proposed three new use classifications for the CAW, based on analysis of the six UAA factors, it follows that each new use should have its own set of water quality criteria, including thermal criteria, that are protective of the existing and potential uses identified under each of those classifications. While some parameters may be equivalent to those that are part of the existing General Use water quality standards, General Use criteria should not dictate the baseline for all of these proposed new designated use categories. Different designated uses can and should have use-specific limits which are protective of the biological community expected for each respective use designation.

A. Water Quality Standards Should Be Protective of Designated Uses

As CDM and the Agency are aware, water quality standards consist of two parts, designated uses and water quality criteria to protect those uses. If, as proposed in the Draft CAW UAA Report, the same General Use water quality criteria apply to all uses, then the benefits of establishing separate uses are negated. MWGen recognizes that some basic level of protection is necessary for all Illinois waters. This "floor" would apply to the lowest established use and would protect against acutely toxic conditions, prevent the accumulation of bioaccumulative pollutants, and be protective of the tolerant aquatic communities that should be present. As the designated attainable uses "improve," so too does the protection of these uses through more stringent water quality standards. MWGen recognizes that the limits on certain constituents (*e.g.*, most priority pollutants) would be similar, if not identical, across the various uses. However, even among priority pollutants, a "one size fits all" approach is not necessarily appropriate. For example, some pollutants are toxic to both humans and aquatic life (*e.g.*, some forms of lead, silver, etc.), some are relatively non-toxic to both groups (*e.g.*, iron [though taste may be an issue] and manganese), and others may be toxic to aquatic life at concentrations well below those they would be toxic or even injurious to public health (*e.g.*, copper, cadmium). Water quality standards should be established that protect the "groups" using the waters in question based on the risks to those groups.

The differences between the groups to be protected are most significant when addressing non-conventional pollutants (*e.g.*, DO, temperature, ammonia) and nutrients. These constituents pose no human health risk and therefore should be evaluated based solely on the aquatic communities to be protected. Other states have systems of tiered aquatic life uses, which establish DO, ammonia, and temperature limits that vary according to the designated use and, in the case of temperature, that vary according to river basin. USEPA is actively promoting this Tiered Aquatic Life Use (TALU) approach in published guidance and policy statements. MWGen encourages Illinois EPA to take the next logical step and acknowledge that water quality criteria can and should vary according to the use being considered.

MWGen recognizes that for some uses, the water quality criteria may be the same for many constituents. However, criteria for at least some constituents should vary in response to differences in the community that needs to be protected. It is clearly justified and reasonable to adopt levels of protection that vary depending on whether the community to be protected is a balanced, warmwater community, in which game species like smallmouth bass and a diversity of non-game species are present, or it is a limited aquatic life community dominated by common carp, bluntnose minnow, and green sunfish. Similarly, the presence of increasing numbers of invasive species (e.g. round goby) in these waterways, which natural resource agencies would prefer to see destroyed, rather than protected, may also need to be considered in setting appropriate water quality standards. It is also unclear from the Draft CAW UAA Report whether the intent is to establish use classifications that also may be applied to other non-CAW Illinois waters or which will be applicable only to the CAW. If the new use classifications are intended to be available for potential application to other Illinois waters, then it is even more

important that the water quality standards adopted for each use classification reflect the generic nature of the attainable uses to be protected under each such classification. In this regard, CDM's approach of relying on whether or not a specific General Use water quality standard is or is not consistently attained as the "barometer" for whether the General Use standard should be retained in each of the proposed use classifications for the CAW is unworkable if these lower use designations are going to be applied to other waters. In other Illinois waters, although the attainable uses may be the same, the current level of attainment of the General Use standard may significantly differ. Following the CDM approach would require re-evaluating the Modified Warm Water and Limited Warm Water water quality standards each time a specific water body is under UAA scrutiny in order to customize the water quality standards to that particular water body's current conditions. We do not believe such an approach to setting use designations and corresponding water quality standards is intended under the Clean Water Act. It is certainly a far more labor-intensive effort that will make future UAA studies more protracted as the IEPA must not only determine the appropriate use designation but also proceed to customize water quality standards by reference to the particular water body under consideration.

B. Expected Species for Each Proposed Aquatic Life Use

On pages 5-12 and 5-13 of the Draft CAW UAA Report, definitions are provided for the three proposed aquatic life uses along with suggested species that are characteristic of each use. MWGen generally agrees with the narrative descriptions of these uses, but is concerned about the species indicated as being characteristic of each use.

The General Warm-Water Aquatic Life (GWAL) category is described as *"capable of supporting a year-round balanced, diverse warm-water fish and macroinvertebrate community."* MWGen agrees with this narrative description of the community and that such a community should be protected by the current General Use water quality criteria. However, the report goes on to indicate that *"the fish community is characterized by the presence of a significant proportion of native species, including mimic shiner, spotfin shiner, brook stickleback, longnose dace, hornyhead chub, smallmouth buffalo, rock bass and smallmouth bass."* The GWAL category includes fishes from a variety of habitats, each of which supports a different assemblage. The Draft CAW UAA Report does not recognize these differences. For example, the Chicago Wilderness Society recently convened a panel of fish experts to develop a "scorecard" regarding streams in the Chicago Region. The panel of experts looked at four basic warmwater habitat types, small to medium streams, rivers, lakes, and wetlands. They then developed a list of representative species for each habitat and evaluated how waterbodies representing each habitat type were doing. Similarly, Ohio EPA has separate biological evaluation criteria for wadeable vs. non-wadeable streams (*i.e.*, streams vs. rivers). These criteria recognize that streams have species or groups that are important in them (*e.g.*, darters), but which are not well represented in rivers. Conversely, so-called round-bodied suckers (mostly redhorse) are important in rivers but absent or greatly reduced in streams. The various river IBI's developed by Dr. Thomas P. Simon even include a metric "% of large river species" to measure differences between stream and river fish communities.

The GWAL includes a mix of species that certainly is not appropriate for the Chicago Area Waterways, including the Chicago River and the Chicago Sanitary and Ship Canal, which would be considered large rivers due to their physical make-up (e.g. depth, lack of shallows, preponderance of pools and large drainage area). Of the species listed, only spotfin shiner, smallmouth buffalo, and smallmouth bass are characteristic of large rivers. Hornyhead chub occasionally occurs in large rivers, but is more indicative of medium sized streams. Rock bass occur in large rivers, but is not really indicative of them since it is as much a lake as it is a river species (Smith 1979). In this region, mimic shiner occurs regularly only in the Kankakee River (ref.: EA collecting data). In much of the state, the mimic shiner is replaced in large rivers by the very similar channel shiner. Longnose dace occur only in a few direct tributaries to the Mississippi River in far NW Illinois and in the "surf" zone along Lake Michigan (Smith 1979). It is unknown elsewhere in the state and therefore is not representative of warmwater conditions statewide. Brook stickleback occurs only in very small, coolwater streams, a description that certainly does not fit the area in question.

Rather than recommending specific species that are representative of each proposed aquatic life use, it may be more appropriate now to develop only the narrative descriptions for each use and leave assignment of representative species to a panel of experts, much like the Chicago Wilderness Society did. Again, it should be understood that water quality limits for conventional pollutants that would be protective of small stream fishes might be overly protective of riverine species, which naturally are exposed to higher temperatures and somewhat lower DOs because of the lack of a shoreline canopy to provide shading and the absence of riffle/run habitat to provide natural re-aeration.

Turning to the remaining proposed use categories, the Draft CAW UAA Report defines Modified Warm-water Aquatic Life (MWAL) as:

> *"Waters that are presently not capable of supporting and maintaining a balanced, integrated, adaptive community of a warm-water fish and macroinvertebrate community due to significant modifications of the channel morphology, hydrology, and physical habitat that may be recoverable. These waters are capable of supporting and maintaining communities of native fish and macroinvertebrates that are moderately tolerant, and may include desired sport fish species such as channel catfish, largemouth bass, bluegill, and black crappie."*

Except for black crappie, these are all reasonable choices. Again, however, the water quality criteria applicable to this use designation should take into account the fact that the species typical of this use are generally more tolerant than those in the GWAL category. Therefore, General Use limits should not be applied by default.

The lowest use category proposed is Limited Warm-water Aquatic Life (LWAL), which is defined in the Draft CAW UAA Report as follows.

> *"These surface waters are not presently capable of sustaining a balanced and diverse warm-water fish and macroinvertebrate community due to irreversible modifications that result in poor physical habitat and stream hydrology. Such physical modifications are of long-duration (i.e., twenty years or longer) and may include artificially constructed channels consisting of vertical sheet-pile, concrete and rip-rap walls designed to support commercial navigation and the conveyance of stormwater and wastewater. Hydrological modifications include locks and dams that artificially control water discharges and levels."*

The Report further provides that *"the fish community is comprised of tolerant species, including central mudminnow, golden shiner, white sucker, bluntnose minnow, yellow bullhead, and green sunfish."* Central mudminnow is a tolerant species, but is a small stream, coolwater form that is not representative of medium to large warmwater rivers. Similarly, white sucker is not representative of large rivers at this latitude. Alternatively, common carp, though an exotic, clearly is representative of streams within this area and should be included. Bluegill and largemouth bass, though both popular sport species, are both quite tolerant and probably also should be considered as representative of this use category.

Because there is a wide divergence between the tolerances of the species representative of this category (LWAL) and the species representative of the GWAL category, water quality standards less stringent than those for the General Use category certainly should be applied to the LWAL. Further, given the similarity between the proposed LAWL use designation and the current Secondary Use classification, the current thermal water quality limits for Secondary Use also may be appropriate for this category.[1]

In summary, MWGen recommends that the Draft CAW UAA Report should not establish lists of representative species for each proposed use category. The establishment of representative species should instead be developed by the Agency with the necessary review and comment by recognized experts in this field. Alternatively, the language of the Draft CAW UAA Report should be modified to propose a list of representative species for further consideration and comment prior to the establishment of a final list. If this approach is selected, then the currently included lists should be modified to be representative of large river conditions, excluding small stream fishes (*e.g.*, brook stickleback) and other inappropriate species (*e.g.*, longnose dace), as discussed above.

[1] It is both interesting and enlightening to note that in the Draft CAW UAA Report (page 4-77, Section 4.4.4, last paragraph), the highest MWRDGC temperatures were measured at the same location containing the highest species diversity in the Chicago Sanitary and Ship Canal. This further suggests that temperature is not having any adverse impact on the waterway, even with the current Secondary Contact thermal limits in place.

II. GENERAL USE THERMAL STANDARDS ARE NOT ATTAINED NOR ARE THEY CLOSE TO BEING ATTAINED IN THE CAW.

A. Existing Temperatures in the CAW

At several places within the Draft CAW UAA report (as referenced in MWGen's previously submitted comments), there are statements which imply that most General Use water quality standards are met in the CAW, or are close to being met, as is the stated case for temperature. However, this conclusion is solely based on the monitoring data provided by the Metropolitan Water Reclamation District of Greater Chicago ("MWRDGC"). MWGen's temperature monitoring data was not considered. The MWRDGC and MWGen thermal monitoring data are drawn from different locations within the CAW. Both sets of data need to be considered in order to have a more complete and reliable basis for evaluating the extent to which the CAW is attaining, or may attain, General Use thermal standards. The MWGen temperature monitoring data shows that the General Use thermal standards are not close to being attained in the CAW.

The MWRDGC temperature data, though extensive, does not monitor various portions of the CAW. In particular, the MWRDGC monitoring locations are not located in close proximity to the MWGen generating stations. As an example, one of MWRDGC's monitoring locations is Cicero Ave. This is approximately 1 mile downstream of the MWGen Crawford Station. Lockport, another of MWRDGC's monitoring locations, is 3 miles downstream from the MWGen Will County Station. Thus, these MWRDGC monitoring locations do not reflect the in-stream thermal conditions in closer proximity to the MWGen Stations. Consequently, the percentages of temperature exceedances derived from the MWRDGC data in the Draft CAW UAA Report seriously underestimate the true potential for in-stream temperatures over the General Use thermal water quality standards.

B. MWGen Discharge Temperature Data:

MWGen does not continuously monitor in-stream temperatures in portions of the CAW. However, under its NPDES Permits, it does continuously monitor the actual end-of-pipe discharge temperatures from its generating stations. A continuous record of end-of-pipe discharge temperatures is maintained at each of the MWGen CAW generating stations: Fisk, Crawford and Will County. Also, thermal plume measurements are performed periodically to ensure that the MWGen discharges remain in compliance with the in-stream Secondary Contact thermal water quality standards.

Clearly, the end-of-pipe discharge temperatures do not equate to the thermal water quality standards. These discharge temperatures do not reflect actual in-stream thermal levels because the end-of-pipe data does not take into account any mixing in the receiving stream. Thus, a direct comparison of the MWGen discharge temperatures to the General Use thermal water quality standards would in turn overstate the degree to which current conditions are not meeting General Use thermal standards. By presenting this data, we do not intend to make such a comparison. We know, as does the Agency, that the

Secondary Contact thermal limitations are applicable in the main body of the waterway at the edge of the allowed mixing zone. However, these end-of-pipe discharge temperatures are nevertheless a helpful piece of information to assess in-stream thermal conditions, particularly when combined with the knowledge of significant and frequent flow fluctuations in the waterway. When this additional information is considered, it indicates an exceedance level of close to 50% or more of the General Use thermal water quality standards, especially during the winter months. This is a much greater percentage than the exceedance percentages stated in the Draft CAW UAA report.

As a starting point for this analysis, the past three years (2002-2004) of hourly average end-of-pipe discharge temperatures from MWGen's three CAW power plants were subjected to a frequency analysis to determine what percentage of time each would be in excess of the General Use standards if those standards hypothetically were applied as end-of-pipe effluent standards without any consideration of in-stream mixing. The results are summarized in Table 1 below:

Table 1:
Summary of Percentage of Hourly Average Discharge Temperatures Greater Than Numeric General Use Thermal Water Quality Standards[#] for Years 2002-2004

MWGen Station	Summer Temps >90 deg. F	Winter Temps >60 deg. F
Fisk	min: 8.04%	min: 45.66%
	max: 11.71%	max: 66.74%
Crawford	min: 22.06%	min: 79.79%
	max: 37.62%	max: 94.55%
Will County*	min: 8.67%	min: 29.55%
	max: 31.1%	max: 60.47%

* (Only two of the four Will County Units were operating during this period)

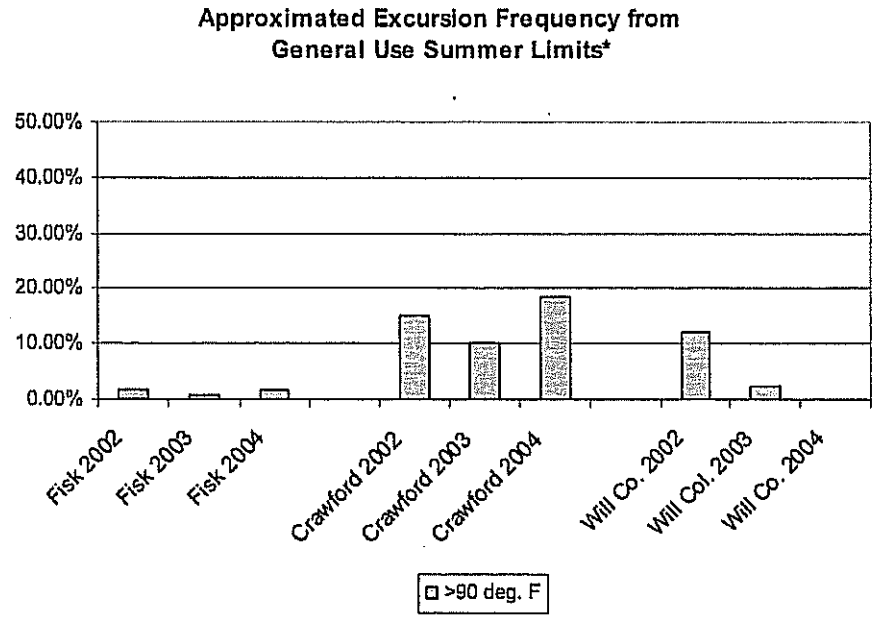
(The General Use thermal standards are seasonal. The "Summer Period" for thermal standards is from April through November. The "Winter Period" is from December through March).

While the end-of-pipe discharge temperatures discussed above cannot be directly compared to the General Use thermal water quality standards for purposes of determining the frequency of attainment of those standards, they can be adjusted using in-stream thermal plume study results, which are discussed further below, to account for heat dissipation (*i.e.*, mixing) in the receiving water. These derived, in-stream values are indicative of what the actual temperature levels would be in the CAW after allowed mixing has occurred. Conservatively, an approximate 5 °F decrease from discharge point to the edge of the mixing zone (the compliance point for General Use thermal standards)

has been applied in Figures 1 and 2. (This value was estimated from the recent thermal plume monitoring work done at Crawford Station, as referenced later in this submittal).

It is important to note that this estimated 5 °F decrease does not always occur and can vary in either direction, depending on weather and waterway conditions. However, even if a less conservative estimated temperature decline after mixing is used, this data still demonstrates that temperatures within the South Branch of the Chicago River, as well as in the Chicago Sanitary and Ship Canal, certainly exceed the General Use thermal water quality standards by a greater percentage than indicated in the CDM Report, particularly during the winter months.

Figure 1: Summer Conditions



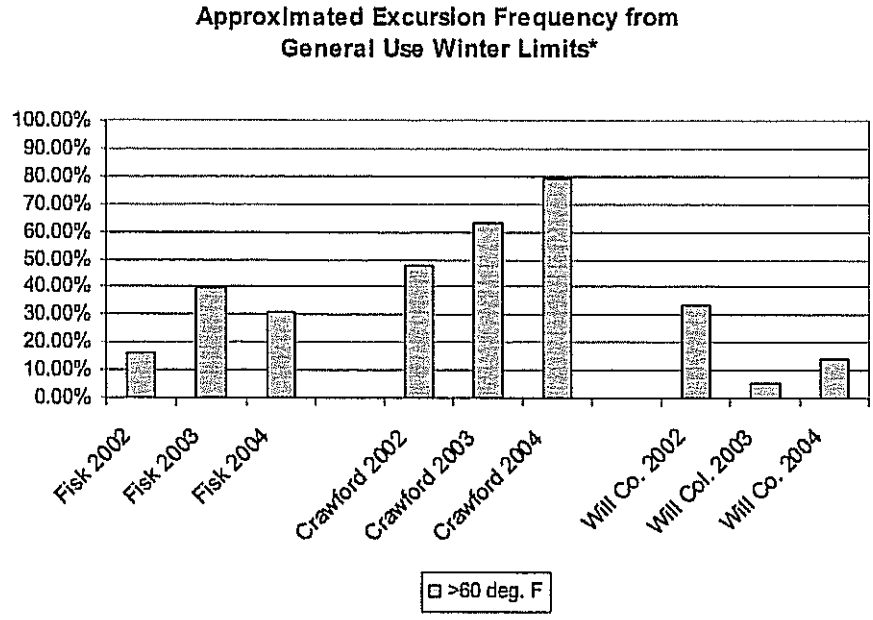
*(assuming a 5 °F decrease from end-of-pipe to edge of mixing zone)

While on the surface it may appear that summer temperatures are close to meeting the existing General Use limits, this frequency analysis alone does not tell the complete story. The summer period (in accordance with the General Use limit criteria) extends from April through November. However, the vast majority of the estimated exceedances actually would occur only during the hottest months of the year, typically July and August. Thus, while the percentage of the exceedances over the "summer period" is lower than in winter, the timing and magnitude of these exceedances are the factors that need to be carefully considered when evaluating the degree of current attainment of General Use water quality standards. (Factors that do not appear to have been considered in the Draft CAW UAA Report.) The peak General Use water quality standard exceedance temperatures during the July – August time period may be as high as 100 °F (the current Secondary Contact Standard limit). If MWGen had to comply with General

Use thermal limits during these hot weather time periods of critical energy demand, it would be required to reduce load (i.e. derate) at these CAW stations to such an extent that the power supply in Northern Illinois could be severely jeopardized.

The highest demand for Midwest Generation's product ("electricity") comes concurrently with the highest ambient air and water temperatures and lowest river flows. The critical summer period of July and August is typically when the need for electricity is the greatest. Air conditioning all of the commercial businesses and residential buildings in northern Illinois requires a tremendous amount of power. This is in addition to the normal demands on the system: lighting, computer systems, health care equipment, routine conveniences, etc. During the hottest times of the year, the ambient river temperatures are also increased, due to higher air temperatures and solar inputs. The discharges from our power plants also contribute to this temperature rise. This creates a situation in which thermal stress is exerted on the waterway from both natural and man-made sources, in response to ambient weather conditions.

Figure 2: Winter Conditions



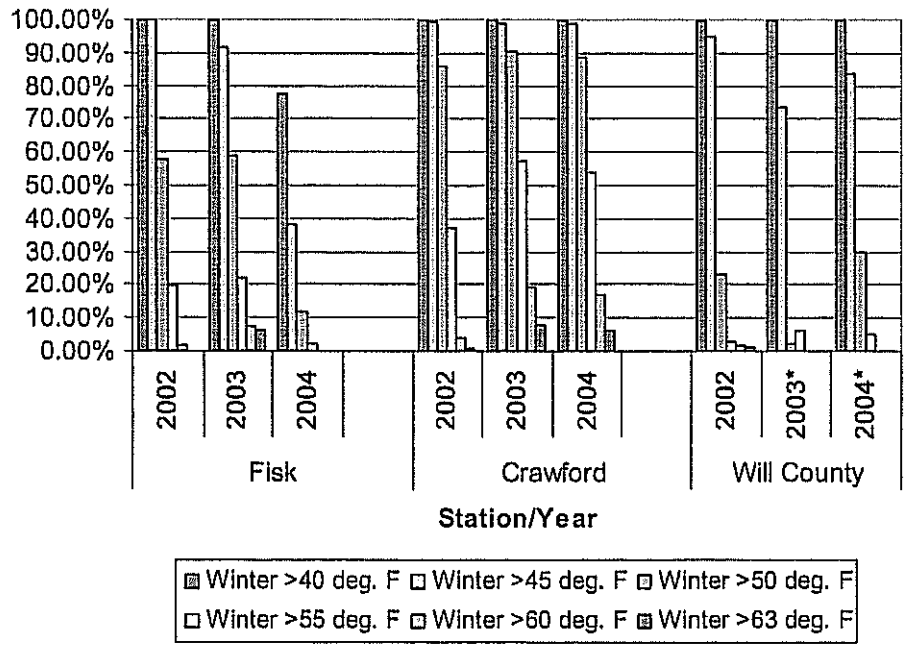
*(assuming a 5 °F decrease from end-of-pipe to edge of mixing zone)

As suggested in the Draft CAW UAA Report, attaining the General Use numeric thermal limits would be even more difficult during the winter period, as the temperature regime of the waterway remains elevated from that which would be found in a "natural" stream. The ambient winter temperature condition in the CAW, even in the absence of power plant discharges, is approximately 10 °F to 20 °F warmer than the temperatures typically found in a "natural" waterway in this region. The higher winter temperatures regime in the CAW is clearly shown in Figure 3 below. Figure 3 charts the frequency of

occurrence of hourly average winter intake temperatures measured at each of MWGen's CAW generating stations. Intake temperature is commonly taken as an indicator of "ambient" conditions in a waterway. For Northern Illinois, ambient winter water temperatures for natural waterways of comparable size would be in the range of 33 °F to 41 °F. The elevated temperatures seen in the CAW, especially during the winter period, are due primarily to the constant influx of treated (and at times untreated) POTW effluents, urban run-off, as well as frequent commercial barge traffic, all of which contribute to an abnormally high "background" temperature condition. Due to these influences, winter temperatures of 55 °F or more are not uncommon in the waterway, even upstream of MWGen's discharges. In particular, POTW effluents contribute the bulk of the overall flow to the system during the winter months, when there is no Lake Michigan diversion. While the source(s) of these ambient winter temperatures are not "natural", they are an inherent part of the CAW and will remain so for the foreseeable future (20 years or longer). As such, they must be considered as a fundamental element of the entire CAW. If the ambient temperature condition in a given waterway is already above what would be considered necessary for the protection and propagation of higher quality forms of aquatic life, then this factor should be used as a baseline in establishing appropriate thermal water quality limits for this waterway.

Figure 3:

Frequency of Occurrence of Hourly Average Winter# Intake Temperatures Greater than 40 deg. F at Each of Midwest Generation's CAW Stations



(The Winter Period analyzed goes from December through March, in accordance with the seasonal General Use Thermal Water Quality Standards)

The above graph shows that the South Branch of the Chicago River, as well as the Chicago Sanitary and Ship Canal, do not have the winter thermal regime of a "natural" waterbody in this region. This is the case, whether or not MWGen's plants discharge into this system. In fact, this unnaturally elevated temperature condition is detrimental to our power plant operations, in that efficiency is lost because of lower heat transfer rates caused by the higher temperature intake water. Illinois EPA must either use the existing temperature regime of the waterway as a baseline for establishing protective thermal limitations, or take on the monumental task of trying to control all the factors which contribute to this "unnatural" condition.

C. MWGen's Thermal Plume Monitoring Data for the CAW

Several thermal plume studies have been performed in the CAW for MWGen over the years to demonstrate continuing compliance with the Secondary Contact thermal water quality standards at the edge of the allowed mixing zone. We present here the results of the most recent thermal plume study. It was performed at the MWGen Crawford Station in September 2004, a time when weather conditions were both hot and dry. The ambient water temperature 3200 ft. upstream of the Crawford Station intake, as measured at a 3 ft. depth in the center of the canal, was 93.2 °F during the study, while the corresponding temperature 3750 ft. downstream of the station discharge (roughly equivalent to the edge of the allowed mixing zone) was 100.0 °F (the maximum temperature allowed under the existing Secondary Contact standards). The canal flow measured at this time by the field crew was 507 cfs. The recently updated 7Q10 flow for the Chicago Sanitary and Ship Canal in this vicinity is 311 cfs (ISWS, 2003); therefore, this particular study is very representative of the type of recurrent low flow condition which is common during dry summer periods, as well as during winter periods when there is no diversion flow from Lake Michigan.

The plume study results show that while Secondary Contact thermal water quality standards were being attained, General Use thermal standards (of either 90 °F or 93 °F using excursion hours) clearly could not be attained under similar summer CAW conditions.

Exceedance frequency is dependent on flow, weather and power demand conditions. The abnormal flow regime in the CAW, which has been recognized by the draft CAW UAA Report as one of the permanent alterations which prevent the waterway from being able to attain a higher use, is also an additional, confounding influence which affects how heat is dissipated in the system and ultimately affects the ability to comply with more stringent thermal limitations.

D. Level of Attainment, or Lack Thereof, of General Use Thermal Water Quality Narrative Standards

In addition to the numeric limits portion of the thermal water quality standards addressed above, the narrative provisions of the General Use water quality standards (35 Ill.Adm.Code Section 302. 211 (b) through (e)) are not being, or cannot be, consistently

attained in the CAW. The narrative standards were developed for "natural" waterways and are therefore extremely difficult to apply to an artificially controlled, man-made system of canals and channelized reaches like those found in the CAW. For example, the General Use thermal water quality standards prohibit temperatures that are 5 °F above the "natural" temperature for the waterbody. A "natural" temperature does not exist in the CAW, due to the influences of POTW effluents, stormwater runoff, continuous flow fluctuations, as well as power plant inputs. The Draft CAW UAA Report only briefly mentions the narrative standards component of the thermal water quality standards in its discussion of the extent of the exceedances of the General Use standards. This discussion should be expanded to acknowledge that the thermal General Use narrative standards are not applicable to the proposed Modified and Limited Use designations for the CAW.

III. ECONOMIC INFORMATION - RESPONSE TO U.S. EPA REGION 5 COMMENT

As stated in MWGen's original comments, as part of any UAA evaluation of the economic and social costs of elevating the existing use designation of the CAW, IEPA also must consider the costs necessary for pollution controls to meet the proposed limits for industrial dischargers, not just publicly owned treatment works ("POTW"s) and combined sewer overflows ("CSO")s. MWGen is not a publicly-owned utility and we cannot pass our costs along to the rate payers, as MWRDGC does. At the Agency's request, MWGen provided a brief overview of the economic considerations involved in trying to meet a more stringent thermal standard at our CAW generating stations. This submittal, dated January 3, 2005, was not intended to be a full economic analysis, but only an indicator of the overwhelmingly adverse economic impact on MWGen if existing General Use thermal standards applied to the discharges from our CAW facilities. The additional information provided in this current submittal further confirms the significant economic implications for MWGen, if it is even physically or technically possible to achieve General Use standards at all, without imposing unacceptable limitations on our ability to produce power for the citizens of Northern Illinois and beyond.

In its comment letter, the U.S. EPA Region 5 criticizes the January 2005 MWGen economic impacts summary as lacking in the necessary detail for purposes of a UAA economic impacts analysis. The U.S. EPA wrongly assumed or misunderstood the purpose of that submission. The IEPA had not requested a UAA detailed economic impact analysis from MWGen. IEPA requested a general overview of the potential economic impacts from the application of General Use thermal standards to MWGen's generating stations. The U.S. EPA obviously misconstrued the intended scope and purpose of the IEPA's request and MWGen's response. Thus, we believe any implication in the U.S. EPA Region 5 comment letter that MWGen either is unwilling or unable to provide detailed cost estimate information is unjustified. MWGen's response to the IEPA was not intended to be, nor was it represented as, a full economic analysis of the type necessary to address the economic and social impact factor under the UAA regulation.

Moreover, any analysis of the economic impacts of applying General Use thermal standard would need to extend far beyond the impacts of MWGen's power plant operations. As indicated in our comments above, the entire thermal regime of the CAW is altered from what would be expected for a natural waterway, especially during the winter months, and this occurs even upstream of the first of MWGen's power plant discharge points. Therefore, a comprehensive economic analysis would by necessity have to include all significant thermal contributors to the system. If or when IEPA determines that this type of analysis is warranted, MWGen will provide the necessary economic information for our affected power plants.

In addition, in order to fully assess the full economic impact of upgrading the CAW to meet General Use criteria, IEPA will need to account for all costs necessary to control the present CSO discharges, return the waterway to a more natural state by controlling flow fluctuations and improving habitat, which would include removing pilings and concrete walls, as well as providing a continuous influx of Lake Michigan water. Until such time as these issues are addressed, the CAW will remain limited in its overall potential to meet significantly higher uses, such as those represented by the full complement of General Use criteria.

The larger issue here is that economics alone does not dictate whether or not the regulatory grounds are present to retain existing use designations in the CAW or to designate uses that are not General Use. The UAA regulation provides for six different factors. If any of those factors are applicable to one or more portions of the CAW, then the IEPA is authorized to designate those portions of the CAW as non-General Uses waters. The IEPA is not compelled by regulation or law to conduct the economic and social impacts analysis that is set forth in only the sixth UAA factor. It may choose to do so as part of the UAA. If the results of such an analysis satisfy this sixth factor, then it would become additional but not required grounds for designating any portion of the CAW as non-General Use water. The Draft CAW UAA report lists several other of the six UAA factors which are clearly met in many portions of the CAW. Until and unless there is a way to remove these limiting factors, the applicable waterways will be unable to support higher aquatic and recreational uses, no matter what the economic impacts would be of trying to do so.

IV. CONCLUSION

MWGen believes that the information provided in this submittal, along with our previous comments and information provided during the course of the CAW UAA stakeholder's work group meetings, provides additional support for the Draft UAA CAW Report's fundamental finding that both the South Branch of the Chicago River, as well as the entire Chicago Sanitary and Ship Canal, are not presently capable of sustaining a balanced and diverse warm-water fish and macroinvertebrate community. We concur in the Report's finding that General Use is not an attainable use designation in these areas due to irreversible modifications that result in poor physical habitat and stream hydrology. The fish community present is reflective of these conditions. We also submit that the Report's proposed use of General Use water quality standards for these

segments is not consistent with the Clean Water Act's provisions, including but not limited to the apparent reliance for such an approach on the degree of current attainment of those standards. The water quality standards instead should be dependent upon the uses to be protected under the proposed use designation. Further, we suggest that the representative species list in the Draft CAW UAA Report should be revised to recognize the large river status of this water body and to allow for expert review and input to such a list.

We ask the Agency to consider the additional information provided herein on the extent of the water body's non-attainment of General Use thermal standards. We strongly believe that the Draft CAW UAA Report understates the degree to which such thermal standards are not being, and can not be, attained, absent significant consequences not only to MWGen but also to those who depend on the electricity we supply. Temperature is not a major factor influencing the quality or character of this waterway, and as such, there is no basis for applying more stringent thermal water quality standards until such time as the other more far-reaching limitations of the system are corrected. Finally, if the IEPA decides that it will be conducting the extensive but optional economic and social impacts analysis described in the UAA factors, MWGen is willing to contribute the necessary economic impacts information for its generating stations to that effort.

Please contact me if you wish to discuss these comments further.

Basil G. Constantelos
Director, Environmental Services