

**EXHIBIT K**

**OCTOBER 8, 2010 JULIA  
WOZNIAK PRE-FILED  
TESTIMONY  
UAA RULEMAKING R08-9(C)**

**BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**

IN THE MATTER OF:	)	
	)	
WATER QUALITY STANDARDS AND	)	
EFFLUENT LIMITATIONS FOR THE	)	R08-9 Subdocket C
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	)	

NOTICE OF FILING

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

PLEASE TAKE NOTICE that I have today filed with the Illinois Pollution Control Board Pre-Filed Testimony of Julia Wozniak, Midwest Generation, Regarding Asian Carp Issues, copy of which is herewith served upon you.

Dated: October 8, 2010

MIDWEST GENERATION, L.L.C.

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**CERTIFICATE OF SERVICE**

The undersigned, an attorney, certifies that a true copy of the foregoing Notice of Filing and Pre-Filed Testimony of Julia Wozniak, Midwest Generation, Regarding Asian Carp Issues were filed electronically on October 8, 2010 with the following:

John Therriault, Assistant Clerk  
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James R. Thompson Center  
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and that true copies were mailed by First Class Mail, postage prepaid, on October 8, 2010 to the parties listed on the foregoing Service List.

/s/ Susan M. Franzetti

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EFFLUENT LIMITATIONS FOR THE	)	R08-9
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**PRE-FILED TESTIMONY OF JULIA WOZNIAK, MIDWEST GENERATION,  
REGARDING ASIAN CARP ISSUES**

**I. INTRODUCTION**

My name is Julia Wozniak and I am currently employed as an Environmental Project Manager with Midwest Generation (“MWGen” or “Midwest Generation”). I have previously provided pre-filed testimony in this proceeding which describes my employment and educational background, so I will not repeat all of that information here. (See Board Exhibit 364, Docket No. R08-9; “Pre-filed Testimony of Julia Wozniak” dated August 4, 2008). As part of my job responsibilities for the past 26 years (10 years with MWGen and 16 years with ComEd), I have actively participated in state and federal efforts related to policy matters and rulemakings. Midwest Generation has been actively involved as a primary stakeholder in the control efforts to prevent the migration of Asian carp to Lake Michigan.

My testimony will focus on the following areas: (1) the electric barriers installed in the Chicago Area Waterway System (CAWS) to prevent the migration of Asian carp and events regarding their operation which are relevant to this UAA rule-making proceeding; and (2) other on-going efforts by federal and state agencies to stop the spread of invasive aquatic species into and/or out of the Great Lakes.

My testimony presents a brief review of the history and operation of the electric barrier project in the Chicago Sanitary and Ship Canal (CSSC), including the public safety and commercial navigational issues that have arisen from the operation of the electric barriers. This is followed by a discussion of Midwest Generation's role in working cooperatively with government entities to monitor and report on the presence of invasive species in the vicinity of the five MWGen electrical power generating stations along the CSSC and the Lower Des Plaines River, as well as more recent efforts to help government agencies implement additional Asian carp deterrents in the waterway. My testimony also provides a review of events in 2009 and 2010 that have elevated the concern about the migration of Asian carp species through the CSSC and into the Great Lakes. These events include the discovery of Asian carp in closer proximity to, as well as beyond the CSSC electric barriers, and the closing of the CSSC in the area of the electric barriers to all but commercial barge traffic and other large vessels. Midwest Generation's own discovery of the presence of six Asian carp in the Lower Des Plaines River during fish collection efforts in May, 2010 has also resulted in an increased effort on the part of natural resources agencies to capture additional Asian carp downstream of the electric barrier. These more recent developments are particularly relevant to the Board's consideration of the use classification for the CSSC and the Upper Dresden Island Pool (UDIP).

## **II. OVERVIEW OF PARTICIPATION IN ASIAN CARP CONTROL EFFORTS**

Since the late 1990's, initially on behalf of ComEd and thereafter as a MWGen employee, I personally have devoted an extensive amount of time to matters related to the migration of Asian carp in the UAA waterway and the government-led efforts to deter their migration. On behalf of Midwest Generation, I have represented the company as an active member of the Aquatic Nuisance Species Dispersal Barrier Panel (the "Barrier Advisory Panel").



The Barrier Advisory Panel was originally organized by the U.S. Army Corps of Engineers' (USACE) Chicago District in 1996 to guide the construction, operation and maintenance of the first electric barrier in the CSSC, known as the "Aquatic Nuisance Species Dispersal Barrier" or "Barrier I," to prevent the migration of Asian carp and other invasive species. Since the "Barrier I" project's initiation, through its installation and commencement of operations, and continuing thereafter, I have been an active participant in the activities of the Barrier Advisory Panel. Since Barrier I began full operation in 2002, the work of the Barrier Advisory Panel has expanded over the years to also include review of the planning, installation and operation of an additional electric barrier in the CSSC, known as "Barrier IIA," in 2009, and continuing to-date with the development and construction of Barrier IIB. Midwest Generation continues to participate on the Barrier Advisory Panel, which has now been designated as an official advisory/outreach group of the Asian Carp Regional Coordinating Committee ("ACRCC"). The ACRCC was officially established under the authority of section 118 of the Clean Water Act and Executive Order 13340. (See "Asian Carp Control Strategy Framework," dated May, 2010, pp. 7 and 41: <http://www.asiancarp.org/Documents/AsianCarpControlStrategyFrameworkMay2010.pdf> (last accessed, October 7, 2010))

At the invitation of the U.S. Coast Guard (USCG), Midwest Generation also has been an active participant in the USCG's Safety Work Group. The Safety Work Group was established in early 2008 to try to address the identified safety concerns related to barrier operations. I have and continue to be an active participant in the Safety Work Group on behalf of MWGen.<sup>1</sup> Due to the close proximity of the electric barrier to MWGen's Will County Generating Station, our

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<sup>1</sup> The Safety Work Group is regularly attended by eleven stakeholders, including Midwest Generation. Other key partners include the American Waterways Operators, Illinois River Carriers Association, USACE Chicago District, USCG Marine Safety Unit Chicago, USCG Sector Lake Michigan/Captain of the Port Lake Michigan, and the Ninth Coast Guard District.

station personnel and contractors have worked closely with the USACE, the USCG and Illinois Department of Natural Resources (IDNR) to ensure that efforts to deter the migration of Asian carp do not adversely impact MWGen Will County Station operations and that the Station's operations do not in turn interfere with those efforts.

In May 2009, the USACE initiated testing for Asian carp using a relatively new method of sampling the water column for the presence of Environmental DNA or "eDNA", which is species-specific and purportedly can detect the presence of Asian carp in a given waterbody. When positive eDNA samples began to be found in close downstream proximity to the electric barrier zone in July, 2009, it sent up a warning flag that Asian carp were moving upstream more rapidly than expected. When Asian carp eDNA was detected above the existing barriers in October, 2009, it served as the trigger for the planning and implementation of the first of several deliberate efforts by natural resources agencies to actively try to minimize the number of Asian carp in the waterways.

The first planned fish kill effort on the CSSC, termed operation "Silver Screen" by the IDNR, took place in early December, 2009. (For further information, see [http://www.asiancarp.org/documents/GLC\(2\).ppt](http://www.asiancarp.org/documents/GLC(2).ppt) (last accessed, October 7, 2010)) This action was taken in response to Asian carp eDNA detection both close to as well as upstream of the electric barriers, and was also spurred by the need to bring Barrier IIA down for required maintenance. Midwest Generation was one of the first industries requested by the U.S. EPA and the IDNR to actively participate in the operation Silver Screen planning effort as a full partner in the original, ad-hoc Rapid Response Workgroup. I personally participated in numerous conference calls, logistics meetings and site walk-downs from approximately September, 2009 through November, 2009, with representatives of U.S. EPA, IDNR and their contractor

personnel, in order to help formulate the final treatment plan strategy. Due to the MWGen Will County Station's proximity to both the electric barrier and the planned rotenone treatment zone, Midwest Generation's participation and cooperation were vital in helping IDNR implement their rotenone application and fish recovery effort. Midwest Generation provided on-site access and 24/7 support for the team assigned to one of the five rotenone injection points along the CSSC. At the request of the supervising authorities, Will County Station also altered normal plant operations during the rotenone application period to help facilitate the effective application and dispersal of rotenone in the waterway. In turn, IDNR and its contractors helped to ensure that the resultant fish kill had no adverse impact on generating station operations.

More recently, Midwest Generation has been working cooperatively with the USACE concerning its plans for the installation of a hybrid bio-acoustic barrier in the vicinity of the Midwest Generation Joliet 29 Station at the downstream side of Brandon Road Lock and Dam. As further discussed below, this work is part of the on-going effort by the USACE to implement additional methods to help deter the migration of Asian carp to the Great Lakes.<sup>2</sup>

Primarily through its long-term (over 25 years) fisheries monitoring program on the waterway, as well as individual MWGen station inspections, Midwest Generation continues to provide state and federal resource agencies with more detailed information regarding the presence of aquatic nuisance species than they would otherwise be able to obtain, due to personnel and budgetary constraints.

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<sup>2</sup> Interim Report IIIA—full title: Dispersal Barrier Efficacy Study INTERIM IIIA – Fish Dispersal Deterrents, Illinois & Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment: [http://www.lrc.usace.army.mil/pao/02June2010\\_InterimIIIA.pdf](http://www.lrc.usace.army.mil/pao/02June2010_InterimIIIA.pdf) (last accessed, October 7, 2010).

### **III. The Aquatic Nuisance Species Barrier Project – Its Purpose and Effects**

#### **A. Background - The Invasive Species Threat to the Great Lakes**

“Asian carp” is the term used for a group of invasive species of fish that can grow up to four feet long, weigh over 100 pounds and leap out of the water. A photo of an Asian carp is attached as Attachment 1 along with a copy of a Fact Sheet on Asian carp. These fish, which are native to the large rivers of eastern China, were inadvertently introduced into the wild in the U.S. in the early 1980’s from aquaculture facilities. They are capable of causing significant damage to the native food chain, as well as the recreational sport fish industry in the Midwest.

Of particular concern to the Midwest region are two species, the bighead carp (*Hypophthalmichthys nobilis*) and the silver carp (*Hypophthalmichthys molitrix*), both of which are plankton feeders. (*See Attachments 1 & 2*) As such, they are in direct competition for food with native paddlefish, bigmouth buffalo and gizzard shad, as well as with all species of juvenile fish and mussels. Because of their plankton feeding habits, they are not subject to fishing pressure by anglers and due to their size, they have no natural predators (except when they are very young). If these species are allowed to enter the Great Lakes, scientists are concerned they will devastate the Great Lakes commercial and sport fishing industries, as well as the delicate ecological balance of this unparalleled natural resource.

In July, 2002, the threat of invasion of Lake Michigan by Asian carp officially became an international issue. The International Joint Commission (IJC) for the Great Lakes sent letters to both Colin Powell (U.S. Secretary of State) and Bill Graham (Canadian Minister of Foreign Affairs) requesting “immediate action by the governments to prevent the imminent introduction of Asian carp into the Great Lakes.” The IJC letter stated that: “Scientific consensus indicates that the introduction of Asian carp may result in economic and ecological damages to the Great

Lakes ecosystem that far exceed those brought about by the previous introduction of the sea lamprey and the zebra mussel.” (See Attachment 3, IJC Letter dated July 5, 2002)

**B. The Aquatic Nuisance Species Dispersal Barrier Panel**

As I have previously stated, the Barrier Advisory Panel was initially created by the USACE to provide guidance and direction for the construction, operation and maintenance of Barrier I. The Panel’s work has expanded to include monitoring the construction and activation of the second, more powerful CSSC electric barrier, known as “Barrier IIA.” Barrier IIA was originally designed as one part of a parallel system of two more powerful barrier arrays located directly downstream of the original Barrier I. The Barrier Advisory Panel was also directly involved in helping to obtain approval and appropriations for the construction of “Barrier IIB” (the second component of the more powerful barrier system). Barrier IIB is expected to be completed within the next few months. A list of the Barrier Advisory Panel participants is attached to this testimony as Attachment 4.

The Barrier Advisory Panel meets with the USACE, U.S. Fish and Wildlife Service (USFWS), IDNR and other regulatory and natural resources agencies on a semi-annual basis to discuss barrier issues. The primary role of the Barrier Advisory Panel has been to provide input to the USACE on barrier needs and concerns, assist in identifying acceptable barrier operational parameters, provide expertise on project planning and design, identify and utilize multiple funding sources for barrier-related needs and to advance the planning, construction and safety testing of the barriers. Additionally, the Panel reviews the results of on-going research related to invasive species monitoring and detection and explores additional physical, acoustical, and other methods to deter the movement of invasive species into or out of Lake Michigan. The USACE continues to meet regularly with the Barrier Advisory Panel to obtain its input on the design, safe

operation and monitoring of the barriers and to identify other potential means of stopping the spread of aquatic nuisance species through the CSSC. Panel members represent more than 50 international, federal, state, regional, municipal, industrial, academic and environmental groups or agencies. A wide array of expertise is represented by the panel, whose members include field and research biologists, academic specialists, engineers, regulators, barge operators and commercial water users.

**C. 2002: The CSSC Electric Barrier I Begins Operation**

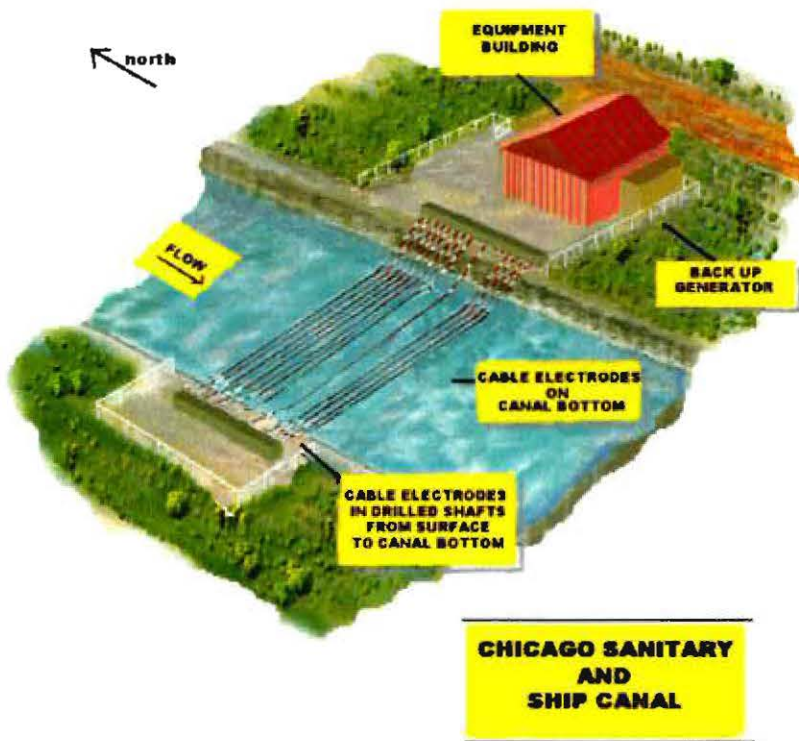
The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended by the National Invasive Species Act of 1996, 16 U.S.C. §§ 4701 *et seq.*, authorized the USACE to conduct a demonstration project to identify an environmentally sound method for preventing and reducing the dispersal of nonindigenous aquatic nuisance species through the CSSC between the Mississippi and Great Lakes watersheds. The USACE, with the support of the then ad-hoc Barrier Advisory Panel, selected an electric barrier because it was a non-lethal deterrent with a proven history, which would not overtly interfere with navigation in the canal.

With the help of other state and federal agencies, the USACE initiated an electrical barrier demonstration project in the CSSC. The first barrier (called "Barrier I") was energized in April, 2002 and has been in operation since that time. As shown in Figure 1 below, it is located approximately thirty miles from Lake Michigan at River Mile 296.5 in Romeoville, IL. It is less than 1 mile upstream of Midwest Generation's Will County Generating Station.



Figure 1: Aerial view of the Chicago Sanitary and Ship Canal Aquatic Nuisance Species Dispersal Barrier (“Barrier I”), located in Romeoville, IL (Source: U. S. Army Corps of Engineers, Chicago District)

As illustrated in Figure 2 below, Barrier I uses a low-charge electrical current (a maximum of approximately one-volt per inch) to create an electric field in the water across the CSSC by pulsing low voltage DC current through steel cables secured to the bottom of the canal. Because Barrier I was intended to be a demonstration project, it was designed and built with materials that were not intended for long-term use. In 2007, Congress authorized the USACE to (i) complete a new electric barrier, called Barrier II; (ii) upgrade Barrier I to make it permanent; and (iii) to operate the barrier system at full federal funding.



**Figure 2: Plan view of how barrier electrodes are placed in canal bottom.**

(Source: [http://images.suite101static.com/792724\\_com\\_dbl.jpg](http://images.suite101static.com/792724_com_dbl.jpg) (last accessed, October 7, 2010))

**D. 2006 – August 2009: The Construction and Operation of CSSC Electric Barrier IIA**

In 2006, the USACE completed construction of the first phase of the second barrier, called “Barrier IIA,” in the CSSC. It is approximately 500 feet long and is located 800 to 1300 feet downstream of Barrier I. Barrier IIA was designed to operate continuously at one-volt per inch, but is capable of operating at higher electrical voltage levels of up to four-volts per inch. Because of its design, Barrier IIA can generate a more powerful electric field, over a larger area within the CSSC, than Barrier I. After a temporary safety plan was put in place to address safety concerns expressed by commercial navigational users of the CSSC, Barrier IIA was successfully operated at one volt/inch for the first time for approximately seven weeks in September and October 2008, while Barrier I was taken down for maintenance. However, Barrier IIA’s



temporary operation resulted in heightened safety concerns regarding the potential for electrical arcing between barges from the electrical field generated by Barrier IIA under certain conditions.<sup>3</sup> This “sparking” between barges transiting the barrier creates a risk to all barge workers, especially those with flammable cargoes. Due to these safety concerns, it was decided that Barrier IIA operation should be limited to one volt/mch until such time as safety testing results determined that higher voltage operation would not pose a significant risk to human activity within the barrier zone. From April 2009 until August 2009, both Barriers I and IIA were in operation simultaneously at the one-volt per inch level

**E. August – December 2009: The Discovery of Asian Carp in the CSSC, the Rotenone Fish Kill “Operation Silver Screen”, and Plans for Barrier IIB**

On August 11, 2009, I attended a Barrier Safety Committee meeting at which the USACE informed the primary stakeholders of its intention to increase the strength of the barrier electrical field in response to the increased threat of Asian carp moving upstream. The USCG was present and re-emphasized its continuing goal to protect the health and safety of all waterborne transit, with the highest priority being to ensure that commercial navigation would be protected to the greatest extent possible.

At an August 12, 2009 press conference, the USACE issued notice that it planned to increase the voltage of Barrier IIA to two-volts/inch on a full time basis, beginning on August 17, 2009. (A copy of the USACE August 12, 2009 Press Release is attached as Attachment 5). This action was taken based on eDNA testing results indicating that Asian carp were present above the electric barriers and much closer to the Great Lakes waterway system than previously

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<sup>3</sup> Safety concerns from electrical arcing had begun as early as 2005. During USACE safety testing of Barrier I in January 2005 at the one-volt per inch operating level, sparking was observed at points where metal-to-metal contact occurred between two barges in the barrier field. Operating Barrier IIA at higher voltages, up to four-volts per inch (the maximum capacity), presents an even higher risk of electrical arcing; however, there is no data yet to indicate the magnitude of this increased risk. (See Attachment 5 for USACE Safety Notice)

thought. (See 2009 and 2010 eDNA results summaries issued by the ACRC in Attachment 6). The new genetic water testing results also indicated that Asian carp were closer to the electric barrier than previously thought based on standard physical sampling methods. Environmental or “eDNA” testing is a surveillance tool that tests for the genetic presence of a specific species of fish in the water. This testing protocol was developed by researchers at the University of Notre Dame. The USACE has stated that “eDNA is a strong indicator of Asian carp presence.” Positive eDNA results for Asian carp were obtained from samples taken within five miles downstream<sup>4</sup> of the barrier location during the July-August, 2009 timeframe.

In response to these developments, the USCG implemented a Regulated Navigation Area (RNA) which limited access to the barrier area to only those commercial vessels which meet specific criteria and follow pre-established protocols when traversing the barrier area while Barrier IIA was in operation. Terms of the RNA were discussed with and approved by important stakeholders, including Midwest Generation, prior to implementation. Since mid-August, 2009, Barrier IIA has been operating at two volts per inch. (A copy of the August 18, 2009 RNA is available at: <http://www.piersystem.com/go/doc/1295/312782/> (Issued 8/18/2009) (last accessed, October 7, 2010)

Shortly thereafter, in September, 2009, Asian carp eDNA was detected approximately only one mile downstream of the barrier, even closer than the eDNA testing performed in the preceding months. (See September 18, 2009 USACE Press Release in Attachment 7). This unexpected discovery spurred an even more heightened sense of urgency among all involved governmental and natural resources agencies to ensure that the existing invasive species

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<sup>4</sup> “Downstream” is the term used to describe the portion of the waterway that leads south toward the Mississippi River.

deterrents remain in place to protect the Great Lakes. Then, in October, 2009, Asian carp eDNA was detected in the Cal-Sag Channel and Calumet River, which is upstream of the barrier zone.

In December, 2009, an approximately 6 mile section of the CSSC was closed during scheduled maintenance of Barrier IIA. Due to concerns that Barrier I's voltage alone would not be effective in deterring juvenile Asian carp, and the recent eDNA testing results indicating the presence of Asian carp in the immediate vicinity of the barriers, a fish toxin known as rotenone was applied to the canal between Barrier I and the Lockport Lock and Dam as part of "Operation Silver Screen." At least 450 people from 20 agencies from the Great Lakes states and Canada assisted in this effort, along with all of the primary industries on the canal system, including Midwest Generation. A total of approximately 500,000 pounds of fish were collected during Operation Silver Screen. One bighead Asian carp was collected, although it is suspected that more dead Asian carp were present on the canal bottom but could not be retrieved.

#### **F. 2010: Construction of the CSSC Electric Barrier IIB**

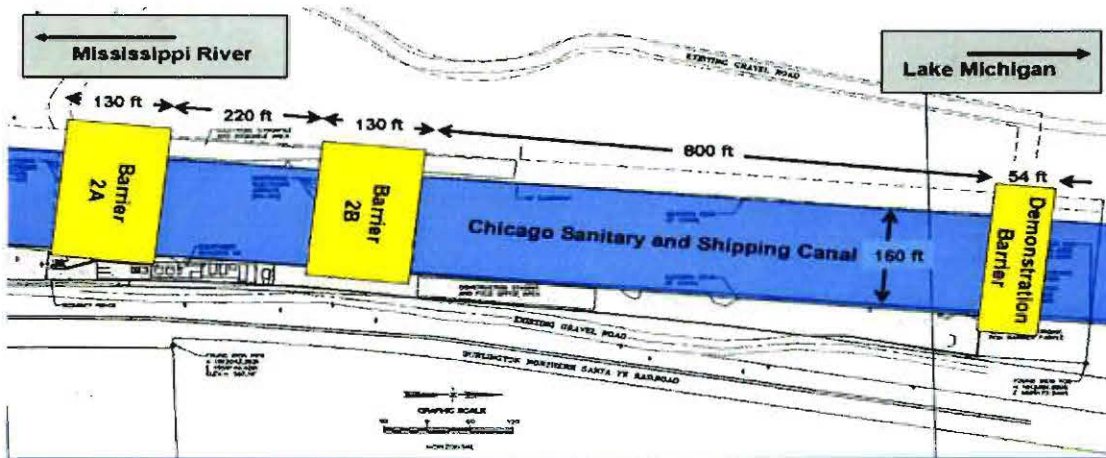
Construction on a third electric barrier ("Barrier IIB") is underway at this time. Barrier IIB will augment the capabilities of Barriers I and IIA. The location of Barrier IIB is in the CSSC, approximately 220 feet upstream of Barrier IIA, as shown in Figure 3 below. The intention is for all three electric barriers (Barriers I, IIA and IIB) to work together to deter the migration of invasive species through the canal system (although it is currently more effective in preventing upstream migration than downstream).<sup>5</sup> The estimated total project cost through

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<sup>5</sup> While there is an electric current generated both upstream and downstream of the barrier, there are two reasons why the barrier system is less effective in preventing invasive species from moving in the downstream direction:

- (1) The way the electric field is configured provides a stronger current on the downstream side, thereby increasing the repelling effect towards those species on their way upstream; and
- (2) Any high flow situation in the canal system (which happens frequently during wet weather events) would serve to "push" invasives through the barrier, whether they like it or not. Since the barriers are not designed to kill, they would then resume their downstream journey, undeterred.

completion of Barrier IIB and upgrade of Barrier I to make it a permanent fixture in the CSSC is \$29.6 million. A map showing the location of Barriers I, IIA and IIB is included in Figure 3 below. Additional background information on the electrical barrier project may be obtained at: <http://uscg.fishbarrierinfo.com/go/doctype/1295/16324> (last accessed, October 7, 2010).



**Figure 3: Illustration of the Chicago Sanitary and Ship Canal Aquatic Nuisance Species Dispersal Barriers in Romeoville, IL.**

**G. Other Changes in the CSSC Arising from the Electric Barrier Project**

In addition to the installation of the electric barriers themselves, other changes have occurred in the CSSC as a result of the operation of the barriers. The USACE has also installed blasting mats at the bottom of the CSSC to draw down the effects of the extended electrical field generated by the barrier. This measure was shown to be relatively effective based on subsequent USACE-conducted safety tests.

In 2010, the USACE proposed the installation of additional parasitic structures in the canal bottom to help further draw down the stray current being emitted by the barrier arrays outside of the barrier zone (*See* copy of July 19, 2010 IDNR Public Notice in Attachment 8).

This is being done in advance of the start-up of Barrier IIB (expected in mid-to-late October, 2010).

There also have been changes made that affect navigation (both recreational and commercial) in the electric barrier areas, as well as in other areas affected or potentially to be affected by governmental efforts to prevent the migration of Asian carp. Based on its outreach efforts to primary stakeholders, the USCG and the USACE developed regulations and safety guidelines, with input from stakeholders (including Midwest Generation), to address the risks and hazards associated with operating the electric barriers. The USCG has issued a series of Temporary Interim and Final Rules to help ensure the continued safety of persons and/or equipment in the vicinity of the electric barriers. These regulations have been published in the Federal Register in a series of final and temporary final rules. *See, e.g.*, 33 CFR 165.923, 70 Fed. Reg. 76692 (December 28, 2005); 71 Fed. Reg. 4488 (January 27, 2006); 71 Fed. Reg. 19648 (April 17, 2006); 73 Fed. Reg. 33337 (June 12, 2008); 73 Fed. Reg. 37810 (July 2, 2008); 73 Fed. Reg. 45875 (August 7, 2008); 73 Fed. Reg. 63633 (October 27, 2008); 74 Fed. Reg. 6352 (February 9, 2009); 74 Fed. Reg. 24722 (May 26, 2009); 75 Fed. Reg. 759 (January 6, 2010); and 75 Fed. Reg. 36288 (June 25, 2010). These rules, in relevant part, include the establishment of a Regulated Navigation Area on the CSSC near Romeoville, Illinois and a "Super" Safety Zone covering 77 navigational miles from the Brandon Road Lock and Dam to Lake Michigan (including the Des Plaines River, CSSC, Chicago River and Cal-Sag Channel).

The RNA encompasses an area approximately 2.5 miles long (located between mile markers 295 and 297.5 in the CSSC, approximately 1.1 miles south of the Romeo Road Bridge to approximately 1.3 miles northeast of the Romeo Road Bridge). *See*

<http://www.piersystem.com/go/doc/1295/431975/> (last accessed, October 7, 2010). Transit

through the RNA requires compliance with various measures, including the prohibition of any commercial vessel meeting, passing or overtaking another; tow boat assistance for barge tows containing one or more red flag barges; and a complete barring of all vessels of less than 20 feet from entering or traversing the RNA. In certain parts of the RNA, additional restrictions apply. The boundaries of the RNA are marked by the following permanent signage posted at both ends, along with other visible warning indicators to alert canal users of the inherent dangers within the electric barrier zone:



The safety rules place navigational, environmental and operational restrictions in the prescribed area(s) to protect vessels and persons from the hazards associated with any federal and state efforts to control aquatic nuisance species.<sup>6</sup> The safety rules have been carefully crafted in order to minimize the potential for adverse significant regional economic impacts, given that statistics show that 17.7 million tons of cargo pass through the waterway annually, the

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<sup>6</sup> Because the protection of Midwest Generation's electric generating operations is one of the USACE's primary concerns, Midwest Generation has participated with the USACE in identifying additional measures to protect commercial navigation against safety hazards caused by the electric barriers' operations. A coal transfer facility at MWGen's Will County Station, where barges are loaded and sent upstream to Crawford and Fisk Stations, is located less than one mile downstream of the electric barrier zone. These barges were part of the USACE barge safety tests at the higher electric barrier voltage operation conducted from August 17-19, 2009 within the barrier zone. Midwest Generation worked with the USACE to conduct this barge configuration testing in an attempt to minimize the potential for electric arcing to occur. Based on this testing, recommended practices were implemented by coal barge operators to ensure the continued safety of barge crews, equipment and cargo.

equivalent of 162,000 rail cars or 708,000 semi trucks. (See "Coast Guard Discusses its Role in U.S. Army Corps of Engineers Aquatic Nuisance Species Dispersal Barrier Project," Coast Guard's Ninth District Public Affairs Website at:

<http://www.d9publicaffairs.com/go/doc/443/246215/> (last accessed, October 4, 2010)

Most recently, the USCG implemented what it refers to as a "Super Safety Zone" that creates a temporary safety zone, which may be enforced in segments, in a 77-mile area from Brandon Road Lock and Dam to Lake Michigan. This temporary interim rule is intended to restrict vessels from entering certain segments of the navigable waters of the Des Plaines River, the CSSC, branches of the Chicago River, and the Calumet-Saganashkee Channel (Cal-Sag Channel) during the implementation of Asian carp control efforts. (See 75 FR 26094 (May 11, 2010))

#### **IV. MIDWEST GENERATION'S ROLE IN THE ELECTRIC BARRIER PROJECT AND DISCOVERY OF ASIAN CARP IN UPPER DRESDEN ISLAND POOL ("UDIP")**

Midwest Generation has five electric generating stations (Fisk, Crawford, Will County Joliet 9 and Joliet 29) located on the CSSC and lower Des Plaines River, the hydraulic link between Lake Michigan and the Mississippi River watershed. As such, these stations are strategically located for purposes of monitoring the progression of aquatic nuisance species both upstream towards the Great Lakes and downstream towards the Mississippi River basin. The Midwest Generation Will County Station is less than one River Mile downstream of Barrier I. (See Attachment 9). At the IDNR's request, Will County Station personnel continuously monitor for signs of Asian carp. Midwest Generation continues to sponsor seasonal fisheries monitoring of the lower Des Plaines River from just downstream of Barriers I and IIA in the CSSC down to the confluence with the Kankakee River. Midwest Generation's sampling crew conducts twice monthly monitoring at 21 locations in the waterway annually from May through

September. Any sightings of Asian carp (or other known invasive species) are immediately reported to both IDNR and the USFWS. These organizations rely on Midwest Generation's sampling program to augment their own monitoring programs that are done on a less frequent basis due to resource constraints.

In early 2002, as part of its long-term fish monitoring program in the Lower Des Plaines River, Midwest Generation contractors collected a five-pound Asian carp upstream of Dresden Lock and Dam – the furthest upstream point that the species had been found at that time. Midwest Generation's 2002 Asian carp finding was a trigger for expedited work by regulatory and natural resource management agencies to improve the invasive species electric barrier. Midwest Generation station personnel also currently monitor for the presence of the round goby, another exotic nuisance species, at the request of the IDNR and the USFWS.

In May 2003, Midwest Generation was invited to participate in the Aquatic Invasive Species Summit, co-sponsored by the City of Chicago and USFWS. Representatives of Midwest Generation were asked to attend due to our familiarity with both the configuration and biology of the waterway, as well as the placement of our generating stations along the canal/river system. The 2003 Aquatic Invasive Species Summit identified various Asian carp control strategies for further consideration; many of these strategies have been included in the 2010 Asian Carp Control Strategy Framework. The executive summary of the 2003 Aquatic Invasive Species Summit findings is found at the following link:

[http://egov.cityofchicago.org/webportal/COCWebPortal/COC\\_ATTACH/Aquatic\\_Invasive\\_Species\\_Summary.pdf](http://egov.cityofchicago.org/webportal/COCWebPortal/COC_ATTACH/Aquatic_Invasive_Species_Summary.pdf) (last accessed, October 7, 2010).

In May, 2010, Midwest Generation's fisheries monitoring consultants, EA Engineering, Science and Technology, captured six bighead Asian carp, including a female in full breeding condition, in the Lower Des Plaines River, just upstream of the I-55 Bridge, in the area known as



the UDIP in this proceeding. The captured Asian carp ranged in size from 27” to 42” in length and 15 to 32 pounds in weight. This development, the largest single Asian carp collection in any of the prior MWGen fisheries monitoring events, was immediately shared with IDNR personnel. Midwest Generation also made the EA field crew available to the Asian Carp Response Team authorities to provide further assistance and information regarding this discovery. Further details of the capture of these adult bighead carp and the implications for the UDIP are discussed in the pre-filed testimony of Greg Seegert of EA Engineering, Science and Technology regarding Asian carp issues. (*See* Testimony of Greg Seegert, R08-9, Subdocket C, filed October 8, 2010). Since May 2010, IDNR and USFWS have significantly increased their efforts to capture Asian carp in the CAWS and downstream of the CAWS to attempt to confirm the positive eDNA findings and to determine the standing population of Asian carp in the waterway. (*See* <http://www.piersystem.com/go/doc/1295/539735/> (last accessed, October 7, 2010) Midwest Generation also continues to assist IDNR with its plans to deter invasive species, as well as develop emergency measures to deal with these species, should they breach the in-place defenses currently in place.

In 2010, Midwest Generation began working with the USACE regarding its investigation for the proposed installation and operation of a bio-acoustic bubble barrier (or “ABS system,” as it is called) in the UDIP. The USACE was performing this work pursuant to the Water Resources Development Act 2007, which directed it to perform a study of a range of options or technologies for reducing impacts of hazards that may reduce the efficacy of the electrical barriers.<sup>7</sup> In an April 2010 report, entitled “Interim IIIA, Fish Deterrent Barriers, Illinois and

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<sup>7</sup> To expedite the efficacy evaluation, USACE divided the study into several phases. These phases are outlined in the ACRCC Framework ( May, 2010): <http://www.asiancarp.org/Documents/AsianCarpControlStrategyFrameworkMay2010.pdf> (last accessed October 7, 2010).

Chicago Area Waterways Risk Reduction Study and Integrated Environmental Assessment” (dated April 2010), the USACE and its partner agencies in the ACRCC considered how technologies such as air bubble curtains, lights and sounds can be used to deter Asian carp movement. (Full report available at:

[http://www.lrc.usace.army.mil/pao/02June2010\\_InterimIIIA.pdf](http://www.lrc.usace.army.mil/pao/02June2010_InterimIIIA.pdf) (last accessed, October 7, 2010)

Air bubble curtains consist of pumped compressed air through a diffuser to create a continuous dense curtain of bubbles, which can cause an avoidance response in fish. Sounds are currently used in one of two ways to deter fish: underwater loudspeakers or sound projectors to produce a diffuse omni-directional field of sound that can block fish movement or coupling sound sources to a bubble curtain to produce a discrete “wall of sound” (known as an “evanescent” or rapidly decaying field). Similarly, lights can be used in combination with bubble curtains to enhance the effectiveness of both and strobe lights can repel fish by eliciting an avoidance response. As discussed in the Interim IIIA report, combining an acoustic deterrent with an air bubble curtain and strobe lights was judged to be the best available Interim Risk Reduction Measure (IRRM) that has the potential to reduce the risk related to Asian carp migration in the CAWS when fully functional. (*See Interim IIIA Report, p. 32 et seq.*)

The USACE is working with the IDNR and the USFWS to identify data needed to effectively operate this system and measure its efficacy, as well as to assess the possibilities of using the ABS fish deterrent measure in conjunction with other technologies such as the use of attractants (*i.e.* pheromones, plankton, lights, etc.) that could help guide fish into certain control zones. As part of the deterrent site screening process, locations were assessed both above and below the electric barrier zone. Downstream sites were generally favored, as they would be able to prevent upward movement of Asian carp before they are able to reach the electric barrier zone.

Other criteria were included in the process to identify potential locations for fish deterrents. These criteria included physical site characteristics, real estate requirements, construction access, availability of utilities, the presence of an upstream pool or adjacent diversion area for fish, as well as proximity to outlets into Lake Michigan. The USACE utilized aerial mapping to locate potential sites, and then followed up with site visits to further evaluate the acceptability of the sites. Eight locations were chosen as good candidate sites for placement of the recommended ABS fish deterrent measure. Three of these sites were downstream of the Electrical Dispersal Barrier and five were upstream of the current barrier in the CAWS and closer to Lake Michigan.

Among the eight potential candidate sites for placement of the acoustical barrier, the USACE considered Dresden Island Lock and Dam, the Des Plaines River at Brandon Road Lock and Dam, and the CSSC at Lockport Lock and Dam sites as potential demonstration/downstream sites. However, because Asian carp have been observed and tagged in the Dresden Island Pool, the Dresden Island Lock and Dam was quickly eliminated as an appropriate site. The two remaining sites, the Brandon Road Lock and Dam and the Lockport Lock and Dam sites both include a number of features that appear to be conducive for a demonstration project location. While both sites have a large pool on the downstream side of the Lock and Dam, there are a number of physical bypass opportunities at the Lockport Lock and Dam that might allow the Asian carp to bypass a bio-acoustical barrier. These bypasses include parallel streams or canals that allow passage past the lock and dam to upstream locations. Because of the existence of these bypasses, the Lockport Lock and Dam site was eliminated from further consideration as an appropriate site for the demonstration project.

The Brandon Road Lock and Dam facility is located at the northern (*i.e.* upstream) end of the Dresden Island pool upstream of locations where Asian carp have been recovered. While one

bighead carp was recovered during rotenone application in the Lockport Pool in December 2009, additional individuals of the target species have not been recovered in the Lockport Pool. The presence of the target species is needed to calibrate elements of the demonstration ABS fish deterrent to the target species. Fisheries biologists can tag and release Asian carp downstream of the demonstration ABS fish deterrent and the electric dispersal barrier, and then track their movements to determine the effectiveness of the ABS and to adjust its operation, as necessary, to obtain the maximum deterrent possible. The pool on the downstream side of the Brandon Road Dam provides a suitable location for Asian carp that are deterred by the ABS barrier to congregate and be effectively collected by fisheries biologists by various means, including broad-scale rotenoning and/or intensive commercial netting. Further, because the electric barrier is located upstream of the Brandon Road Lock and Dam, that barrier can provide redundancy to the ABS barrier while its operation is being optimized.

In summary, based on an extensive review of the eight potential installation sites, the USACE ultimately determined and recommended to the Aquatic Nuisance Species Barrier Panel that the most suitable location for the installation of a “hybrid ABS fish deterrent system” (*i.e.*, an acoustic bubble curtain with strobe lights) is at the Des Plaines River near the Brandon Road Lock and Dam, which is part of the UDIP – the term used in this rule-making. (*See* June 15, 2010 Minutes of the Aquatic Nuisance Species Barrier Panel Meeting, 2<sup>nd</sup> page, a copy of which is attached as Attachment 10).

The proposed Brandon Road ABS barrier deterrent system site consists of a cross section in the Des Plaines River at the downstream entrance to the Brandon Road Lock (Attachment 11). The ABS barrier system would be placed between riprap revetments on each wall of the lock entrance channel. Its placement, combined with intensive sampling efforts led by IDNR, would

direct dispersing fish to the dam spillway area to the northeast where Hickory Creek flows into the Des Plaines River, where they will be effectively removed from the system by various means, including the application of rotenone and/or other physical removal methods. The feature width would be approximately 400 feet, spanning the entire navigational channel and shoreline area immediately downstream of the approach to the Brandon Road Lock and Dam.

The real estate needed to be acquired for the Brandon Road ABS barrier system installation is currently owned by Midwest Generation. The controlling structure for this barrier would be placed on Midwest Generation Joliet Station #29 property, just east of the plant. The USACE first approached Midwest Generation about this project in April, 2010. Since that time, both real estate right-of-access and environmental background work has been done to support this effort.

As explained by Col. Quarles of the USACE during the June 15, 2010 meeting of the Aquatic Nuisance Species Barrier Panel meeting that I attended, this combination of acoustic, bubble and strobe light deterrents located at a strategic point in the waterway system is intended to guide Asian carp into a geographically isolated location (*i.e.*, the Brandon Road tailwater) in order to allow partner agencies to conduct control and eradication efforts in that smaller and contained area. According to Col. Quarles, the Brandon Tailwater area would serve as the best possible location to stage a controlled "killing ground" for Asian carp herded in by the ABS barrier system. (It is also important to note that this strategy is not species-specific and will impact any fish which find themselves in this area when intensive Asian carp removal efforts are underway). The entire Brandon Tailwater area would be able to be isolated from the rest of the Lower Des Plaines River in this location. Due to its shallowness, as well as the means to control the flow (being that it is directly downstream from the Corps' lock and dam tainter gate system),

this location would afford both cost effective and comprehensive application of piscicides (*e.g.*, rotenone) to kill the fish herded into this area by the ABS barrier, and would also allow for the efficient and effective collection of these fish by IDNR and other natural resources agencies. The ABS barrier system will allow the USACE to calibrate the components system to the most effective settings for Asian carp because it will be located in an area where Asian carp are known to exist and where it has the potential to reduce the population of Asian carp challenging the electric dispersal barrier. The system will be used in conjunction with other control measures such as intensified monitoring, commercial fishing and implementation of more extensive monitoring and rapid response programs. It is believed that this adaptive management strategy offers the best means currently available to rapidly and substantially reduce the risk of Asian carp establishing a self-sustaining population in the Great Lakes via the Illinois Waterway System.

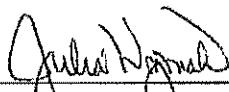
## V. CONCLUSION

While there are many competing scientific views on how best to prevent the spread of aquatic nuisance species, both the USACE, USCG and IDNR have accepted the need to sacrifice the full use of the CAWS, as well as the UDIP, in order to better protect the Great Lakes and Mississippi River ecosystems. They also have recently reiterated their commitment to ensure the protection of commercial navigation, even at the expense of secondary contact recreational uses in the CAWs. The series of electric barriers, especially at higher operating voltages, are in effect eliminating the zone of passage through the CSSC for all independently motile (free-swimming) forms of aquatic life. It is also inadvertently presenting threats to the safety of those who traverse the area, either by water or by land, such that even secondary recreational use in the CSSC Safety Zone has been totally prohibited. Clearly, the electric barriers' operation will

continue to be an inherent part of the CSSC well into the future, or at least until such time as a more permanent, impenetrable solution is found to stop invasive species transfer between the Great Lakes and Mississippi River Basin. As such, any attempt to upgrade the existing uses of the canal system to enhance the ability of aquatic life to use the CSSC as a "highway" between areas of better habitat appear to be in direct conflict with recent federal government decisions and directives that are aimed at preventing aquatic migration through the CSSC and limiting recreational use due to the risks presented.

Similarly, there are also significant changes planned for the UDIP based on the progress to date on the proposed installation of an ABS deterrent system that will also change the current aquatic community in the UDIP. The Brandon Road tailwater would be isolated from the rest of the Lower Des Plaines River as it becomes a dedicated location for Asian carp control measures, including intensive sampling measures and ultimate eradication through chemical or physical means, actions which will impact both Asian carp and native fish. These control strategies need to be considered in assessing the ability of the UDIP to attain the Clean Water Act goals for aquatic life. When taken together with the other evidence that has been introduced in this proceeding regarding the lack of good habitat, contaminated sediments, flow issues, CSOs, and other urban impacts, they clearly support a determination that the UDIP is not capable of attaining these goals at this time.

Respectfully submitted

  
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Julia Wozniak

## ATTACHMENTS

### Pre-Filed Testimony of Julia Wozniak Regarding Asian Carp Issues

- Attachment 1 Asian Carp Photos and Fact Sheet
- Attachment 2 Information from USFWS on Asian Carp Identification
- Attachment 3 International Joint Commission (IJC) Letter dated July 5, 2002
- Attachment 4 Chicago Sanitary and Ship Canal Aquatic Nuisance Species Dispersal Barrier Advisory Panel
- Attachment 5 USACE Press Release dated August 12, 2009
- Attachment 6 2009 and 2010 eDNA Testing Results
- Attachment 7 USACE Press Release dated September 18, 2009
- Attachment 8 USACE Parasitic Structures Information
- Attachment 9 Location of Barrier Zone in Relation to Midwest Generation's Will County Station
- Attachment 10 ANS Barrier Advisory Panel Meeting Minutes from June 15, 2010
- Attachment 11 ABS Barrier Plan for Brandon Road Lock and Dam



**Attachment 1  
Asian Carp Photos and Fact Sheet**



sites, likely the result of escapement from aquaculture facilities. The silver carp's history and use in Arkansas are closely intertwined with that of the bighead carp; and due to its feeding habits, the silver carp is also a direct competitor with all native fish larvae and juveniles; with adult paddlefish, bigmouth buffalo and gizzard shad; and with native mussels. The silver carp is presently spreading rapidly throughout the large rivers of the Mississippi River Basin, with huge numbers and significant natural reproduction being documented by biologists in off-channel and backwater habitats.

**Black carp (*Mylopharyngodon piceus*):** The black carp is native to most Pacific drainages of eastern Asia. It was first brought to the U.S. in the early 1970's as a "contaminant" in imported grass carp stocks delivered to a fish farm in Arkansas. The species closely resembles the grass carp in appearance, except that the gill rakers are fused and hardened (looking almost like human molars) for use in crushing the shells of mollusks and crustaceans, the black carp's primary food. A second importation occurred in the early 1980's; this time for use as a food fish and as a biological control agent to combat the spread of a trematode parasite in cultured catfish. The first and only known record of escapement or release to the wild occurred in Missouri in 1994



**Black carp (*Mylopharyngodon piceus*)**  
■ Drainages with introductions

when thirty or more black carp, along with several thousand bighead carp escaped into the Osage River in Missouri when high water flooded holding ponds at a private aquaculture facility near Lake of the Ozarks. Black carp are currently proposed for widespread use by fish farmers for the control of snails, the intermediate host of the trematode parasite in catfish. Many Mississippi River Basin states have requested through the Mississippi Interstate Coopera-

tive Resource Association (MICRA), that the U.S. Fish and Wildlife Service regulate the use of black carp by placing it on the federal list of injurious wildlife species under the Lacey Act. Most states feel that black carp pose a serious threat to native mollusk and snail species, many of which are federally listed as threatened or endangered. Meanwhile, Mississippi, Arkansas, Texas and Missouri permit stocking of genetically altered and presumably sterile black carp in fish farm ponds. Missouri has also initiated a 5-year program to supply limited numbers of genetically altered black carp to fish farmers in the hope that state officials will be more successful than private operators in preventing the escape and spread of this non-native species.

**What Can You Do?** Become more informed about the spread of non-native species nationwide. Consult your local, state, and federal conservation authorities as to the threat of non-native species in your area, and to the laws and regulations governing the importation, culture, maintenance, and stocking of non-native species. Utilize care in the purchase and use of baitfish in lakes and streams. Ask your bait dealers where their baitfish came from, and never release any unused baitfish to the wild; always destroy them or return them to your bait dealer. Learn and understand the biology and needs of aquarium fish species before purchasing them for your home aquarium. Never release pet fish or aquatic organisms from the home aquarium to open waters. Either destroy them, sell or give them to someone else, or return them to the store where purchased for proper disposal. Support stronger local, state and federal regulations designed to prevent the spread of non-native species, and let others know of your concerns for the protection of native species and biodiversity. Support your local, state and federal natural resource agencies in all of their efforts to stop the spread of non-native species of any kind!

For more information contact:

U.S. Fish and Wildlife Service  
La Crosse Fishery Resource Office  
555 Lester Avenue  
Onalaska, Wisconsin 54650  
(608) 783-8434



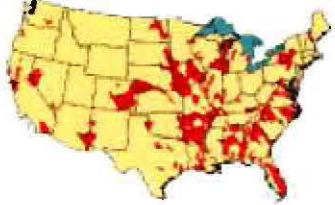
# Asian Carp



**Bighead carp (50 lbs) caught in the Cumberland River, Tennessee in May 2000.**

Four species of large Asian carps (grass, bighead, silver and black) have been imported into the U.S. for use in the aquaculture industry, and biologists are raising more and more concerns about their effect on native fish and shellfish when released or escaped to the wild. In fact, in the fall of 1999, fish kills in isolated ditches adjacent to the Upper Mississippi River on the Mark Twain National Wildlife Refuge in southern Illinois included large numbers (97%) of Asian carps, but only one individual each of four native fish species. After that incident, reports came in of commercial fishermen having to abandon fishing sites on the Missouri River because they were catching so many Asian carps that they found it impossible to raise their nets. The common carp, introduced by European immigrants in the 1800's as a food fish, has become so widespread in the U.S. that in most areas it is considered part of the native fauna. The fear is that in time the other four Asian carps will become as widely distributed and abundant, wreaking widespread havoc with native fish and shellfish habitats and foods.

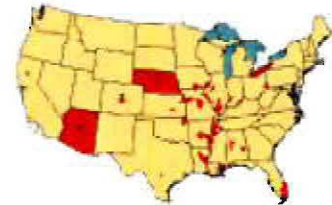
**Grass carp (*Ctenopharyngodon idella*):** The grass carp or white amur, native to eastern Asia, was first imported into the U.S. in 1963 to aquaculture facilities in Auburn, Alabama and Stuttgart, Arkansas for research in the control of aquatic vegetation. This species typically inhabits large rivers but can be raised in ponds and rice fields; and large individuals are known to consume many pounds of aquatic vegetation in a single day. The first release into open waters occurred as a result of escapement from the Fish Farming Experiment Station in Stuttgart. By the mid-1960's the Arkansas Game and Fish Commission was raising the species at a state fish hatchery in Roanoke; and by 1978 Arkansas biologists had stocked the species in more than 100 state lakes. Since that time grass carp have rapidly spread to 45 states through the accidental and intentional, legal and illegal release by numerous state and federal agencies, private groups and individuals. Despite efforts to control the spread of grass carp by stocking individuals thought to be sterile, this large (50+ lbs), elongate, stout-bodied, blunt-headed, pale gray minnow has established itself and is reproducing in the wild. Grass carp began to appear in the catches of Arkansas' commercial fishermen in the early 1970's, and by 1976, 25 tons were reported taken statewide. The species has limited potential as a gamefish, and as a food fish the flesh is often said to be tainted with a strong algal flavor. However, local demand for and acceptance of grass carp is reported to be very high in some markets. Grass carp are regarded as the most palatable of all of the Asian carps. While introduced to consume troublesome aquatic plants, grass carp have been known to clean entire lakes of all aquatic plants, and to then consume organic detritus and animal



Grass carp (*Ctenopharyngodon idella*)  
 ■ Drainages with introductions

materials. Negative impacts on native organisms have been summarized to include: interspecific competition for food with invertebrates (i.e., cray fish) and other fishes; significant changes in the composition of macrophyte, phytoplankton, and invertebrate communities; interference with the reproduction of other fishes; decreases in refugia for other fishes; modification of preferred fish habitats; enrichment and eutrophication of lakes; disruption of food webs and trophic structure; and introduction of nonnative parasites and diseases.

**Bighead carp (*Hypophthalmichthys nobilis*):** Bighead carp, native to the large rivers of eastern China such as the Yangtze, were first brought to the U.S. in 1972 by a private fish farmer in Arkansas who wanted to use them to improve water quality and increase fish production in culture ponds. By 1974 the species was being evaluated by the Arkansas Game and Fish Commission and Auburn University for its potential biological benefits and impacts. Bighead carp first began to appear in open public waters (i.e. the Ohio and Mississippi rivers) in the early 1980's, likely the result of escapement from fish farms and aquaculture facilities. The species has now been recorded from within, or along the borders of, at least 18 states, and is reported to be "piling up" in large numbers below dams on many Midwestern rivers, and filling the nets of commercial fishermen to the point that nets can't be lifted and fishing sites have to be abandoned. The bighead carp is a very large deep-bodied, somewhat laterally compressed (narrow) fish with a very large head. Scales are very tiny, resembling those of trout,



Bighead carp (*Hypophthalmichthys nobilis*)  
 ■ Drainages with introductions

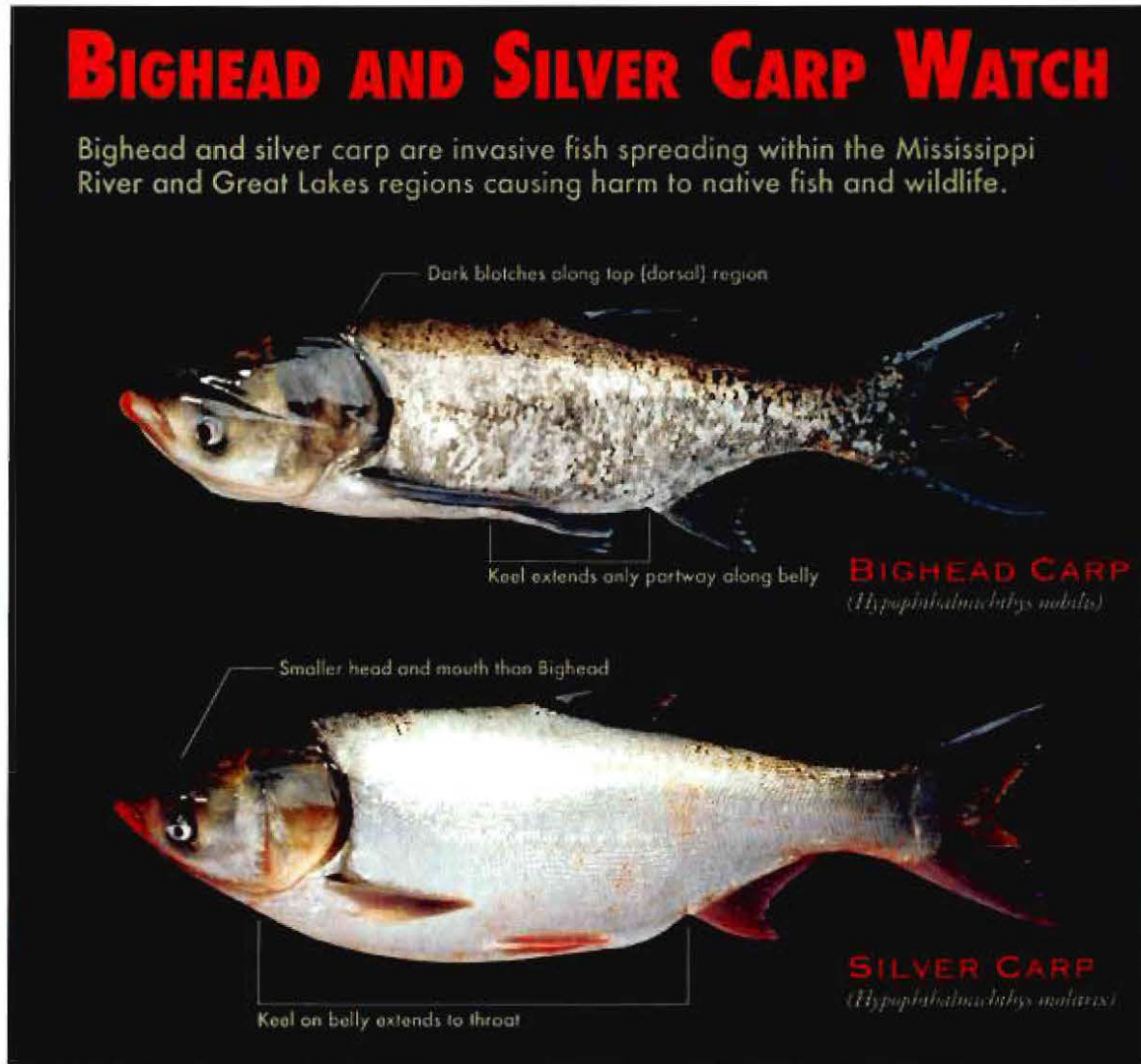
and the eyes are situated below the midline of the body. Gill rakers are long, comblike and close-set allowing the species to strain plankton organisms from the water for food. The bighead carp utilizes open water areas, moving about in the euphotic (surface) zones of large lowland rivers, consuming large quantities of bluegreen algae, zooplankton, and aquatic insect larvae and adults. Because of its feeding habits, the species is a direct competitor with the native paddlefish, bigmouth buffalo, and gizzard shad; as well as with all larval and juvenile fishes and native mussels. Some cultures value the flesh of bighead carp as a source of food protein and prefer that these fish be kept alive until immediately before cooking. Such demands are growing, particularly in cities with large ethnic Asian communities.

**Silver carp (*Hypophthalmichthys molitrix*):** The silver carp, native to eastern Asia and the Amur and other lowland rivers of China, was also first brought to the U.S. by an Arkansas fish farmer in 1973, apparently for use in phytoplankton control in ponds and as a food fish. By the mid 1970's, it was being raised at six state, federal, and private facilities in Arkansas; and by the late 1970's it had been stocked in 4 municipal sewage lagoons. This deep-bodied, laterally compressed (narrow), very large minnow is similar to the bighead carp, but much more efficient at straining suspended material from the water through use of gill rakers that are fused into sponge-like porous plates. By 1981, the silver carp appeared in Arkansas' natural waters at 7 different



Silver carp (*Hypophthalmichthys molitrix*)  
 ■ Drainages with introductions

Attachment 2  
Information from USFWS on Asian Carp Identification



**Attachment 3**  
**IJC Letter dated July 5, 2002**



International Joint Commission

July 5, 2002

Honorable Colin Powell  
Secretary of State  
2201 C Street, NW  
Washington, DC 20520

The Honourable Bill Graham  
Minister of Foreign Affairs  
125 Sussex Drive  
Ottawa, Ontario K1A 0G2

Dear Secretary Powell and Minister Graham

The purpose of this letter is to request immediate action by the governments to prevent the imminent introduction of Asian carp into the Great Lakes. Scientific consensus indicates that the introduction of Asian carp may result in economic and ecological damages to the Great Lakes ecosystem that far exceed those brought about by the previous introduction of the sea lamprey and the zebra mussel.

Recent evidence indicates Asian carp, prolific non-indigenous aquatic nuisance species, may now be within 25 miles of Lake Michigan – putting the entire Great Lakes Basin ecosystem at highest risk of invasion. Three species of Asian carp (silver, bighead, and black) were purposefully introduced to the southern USA to control problematic algal blooms and populations of snails that affected the fish aquaculture industry. The bighead and silver carp species escaped from confinement during major flood events in the early 1990's, and entered the Mississippi River. Since this time, they have moved up through the Mississippi River system, and now occur in the Illinois River and are approaching the Chicago Ship and Sanitary Canal, which is connected, to the Great Lakes near Chicago, Illinois. It is believed that, based upon their current rate of dispersal, Asian carp could reach Lake Michigan from the Mississippi – Illinois system within this year. In addition, one Bighead carp was collected in a net in Lake Erie in 2000 by scientists at the University of Guelph and another was found in a fountain in downtown Toronto, most likely the result of intentional releases.

The International Joint Commission brings this urgent matter to your attention under its alerting capacity pursuant to the Boundary Waters Treaty of 1909 and its responsibilities under the Great Lakes Water Quality Agreement. The Commission believes that Asian carp pose a tremendous threat to the biological integrity of the Great Lakes. Evidence to date indicates that these species can grow to an immense size (over 50 inches and 50 - 110 lbs.) and can consume large quantities of food (up to 40% of their body weight daily in vegetation, zooplankton, or native mussels and fish). Silver carp have been known to reach weights of 12 lbs. in one year of life, quickly becoming so large as to no longer be vulnerable to native predators. Asian carp are extremely prolific (each female carries up to 1 million eggs), quickly becoming common in invaded habitats. Commercial fisheries within some reaches of the Mississippi River have ceased as a result of impacts from these creatures, leaving native fish populations decimated and native

mussel populations at risk. In some backwaters of the Mississippi River system, surveys during seasonal fish kills have documented populations of 97% Asian carp and only one of each of 4 native species.

The National Invasive Species Act of 1996 directed the U.S. Army Corps of Engineers to investigate and identify environmentally sound methods for preventing and reducing the dispersal of non-indigenous aquatic invasive species between the Great Lakes-St. Lawrence River and the Mississippi River drainage basins through the Chicago Ship and Sanitary Canal (the Canal). The Canal forms a man-made link between the Great Lakes and the Mississippi River system, providing a ready conduit for transfers of non-indigenous aquatic invasive species between the two systems.

The Corps of Engineers, working in cooperation with the Environmental Protection Agency, initially began design and construction of an electronic dispersal barrier to determine if the movement of invasive species from the Great Lakes basin into the Mississippi River system could be halted. The round goby (another well known non-indigenous aquatic invasive species) was the initial focus of this effort. Although this project was not completed in time to prevent the movement of the round goby into the Mississippi River, this \$2.2 million barrier system may be effective in preventing the movement of Asian carp into the Great Lakes. The electrical barrier was turned on in April 2002. However, as currently authorized, this barrier is only a limited life, experimental prototype and is scheduled to be removed at the end of the 18-month Corps investigation. It will require more extensive testing and modification to ensure that it effectively prevents movement of Asian carp into the Great Lakes. The current prototype design and funding level does not provide for a backup electrical generator, so that in the absence of electrical power, the barrier will fail (the Chicago area experiences frequent electrical supply interruptions).

In addition, a second, permanent barrier should be installed to increase the probability of stopping the movement of Asian carp into the Great Lakes. Also, it may be necessary to evaluate long-term options with broader applications, other chemical and physical measures, to prevent this waterway from becoming a "revolving door" for aquatic invasive species between the Mississippi River-Great Lakes-St. Lawrence River systems. Research on such issues will require funding.

The Commission believes that it is vital that the governments take action immediately to stop these fish from entering and establishing themselves in the Great Lakes.

The U.S. government needs to:

- 1) Appropriate funds for FY 2003 to support operation of the current temporary barrier system and acquisition of a back-up generation system for this barrier in order to ensure its continuous operation. There are no funds identified in the President's Budget for FY 2003 for operations or for acquisition of back-up generation
- 2) Obtain authorization and appropriation for the Corps of Engineers and/or other

agency to:

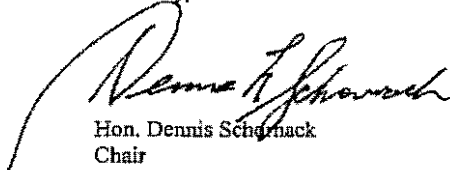
- Continue operation of the current barrier and monitoring of its operation and acquire land for the installation of a second, more permanent barrier. The current authorization of the Corps of Engineers expires in October 2003 and does not include a second barrier or authorization for continued operation.
- Investigate long-term chemical and physical environmentally sound alternatives to prevent the movement of aquatic invasive species to and from the Great Lakes.

Both governments need to consider implementing regulatory controls to prevent introduction of Asian carp via other pathways such as the food and bait fish industries, the aquarium trade, and aquaculture. Other issues that should be considered include establishing regulatory controls to prevent importation of live species of Asian carp, educating the retailers and purchasers of Asian carp for food about the threat of Asian carp to the Great Lakes ecosystem, and discouraging transport of personally-caught bait or water (boat wells, fish lockers) from one water body to another within the Mississippi River-Great Lakes-St. Lawrence River ecosystems.


Before their introduction, no one could have envisioned the full extent of the damage to the Great Lakes ecosystem and its many water-dependent economic sectors caused by zebra mussels. The effects of Asian carp on the Mississippi River system have been well documented by State Agencies and the U.S. Fish and Wildlife Service. This level of destruction in the Great Lakes would be disastrous. It is absolutely clear that the governments should do everything possible to implement coordinated actions to prevent the introduction of Asian carp to the Great Lakes, thus protecting one of our nation's most vital national resources and the largest freshwater ecosystem on earth.

The Commission is ready to provide assistance within its responsibilities and capabilities in addressing this most urgent matter. We have enclosed, for your information, copies of a letter recently sent by the Great Lakes Fishery Commission to the Appropriations Committees of the US Senate and House supporting funding for a barrier system.

Sincerely,



Hon. Dennis Schornack  
Chair  
U.S. Section  
International Joint Commission



The Rt. Hon. Herb Gray, PC, QC  
Chair  
Canadian Section  
International Joint Commission

Encl.: Letter, Great Lakes Fishery Commission to the Subcommittee on Energy and Water of the US Committee on Appropriations

**Attachment 4**

**Chicago Sanitary and Ship Canal Aquatic Nuisance Species Dispersal Barrier Advisory Panel**

Federal	State
U.S. Army Corps of Engineers - Chicago District - Rock Island District - Waterway Experiment Station U.S. Fish and Wildlife Service U.S. Environmental Protection Agency - Great Lakes National Program Office - Water Division U.S. Geological Survey - Biological Resources Division U.S. Coast Guard	Illinois Department of Natural Resources: - Illinois Natural History Survey - Department of Natural Resources - Office of Water Resources Illinois Environmental Protection Agency Illinois Pollution Control Board Minnesota Dept. of Natural Resources Michigan Dept. of Natural Resources Wisconsin Dept. of Natural Resources Mississippi Interstate Conservation Resource Association
International	
International Joint Commission Great Lakes Fishery Commission	Consulate General of Canada
Regional, Municipal, Industrial & Academic	
Illinois International Port Authority Illinois River Carriers Association University of Michigan Loyola University Great Lakes Sportfishing Council University of Windsor Canal Corridor Association City of Chicago Dept. of Environment Northeast Midwest Institute Material Services Corporation Canal Corridor Association Ecological Monitoring and Assessment University of Illinois Metropolitan Water Reclamation District of Greater Chicago	Illinois-Indiana Sea Grant College Program Midwest Generation Commonwealth Edison DuPage County Forest Preserve Great Lakes Commission Friends of the Chicago River Lake Michigan Federation Great Lakes Protection Fund Lewis National University Fish Pro/Cochran & Wilken, Inc. Habitat Solutions Smith-Root, Inc. Garvey International University of Wisconsin Sea Grant Institute



**Attachment 5**  
**USACE Press Release dated August 12, 2009**



U.S. Army  
Corps of Engineers  
Chicago District

## Media Advisory

Contact: Lyne Wheeler  
Telephone: (312) 846-5330  
E-Mail: [lyne.e.wheeler@usace.army.mil](mailto:lyne.e.wheeler@usace.army.mil)

### Army Corps of Engineers to hold press conference to announce increase in barrier operating parameters

Chicago - The U. S. Army Corps of Engineers will host a press conference at 11 a.m. on Wednesday, August 12, 2009 to announce a planned increase in the operating parameters for the electric fish dispersal barrier in the Chicago Sanitary and Ship Canal near Romeoville, Ill. The barrier is designed to deter the passage of invasive species, especially Asian carp, between the Great Lakes and Illinois River watersheds.

The press conference will take place at the Chicago Harbor Lock, 108 North Streeter Drive, Chicago (on the river just south of Navy pier). Interested media can also participate via conference call at (888) 622-5352, participant passcode 221560. Slides being used for this press conference will be available at [www.lrc.usace.army.mil](http://www.lrc.usace.army.mil).

In addition to the Army Corps, participants will include representatives from U.S. Fish and Wildlife Service, Illinois Department of Natural Resources, and the U.S. Coast Guard.

The Corps of Engineers made the decision to increase operating parameters based on the latest, best information available, including results from preliminary genetic water testing obtained July 31<sup>st</sup> which indicate that Asian carp are closer to the barrier than previously thought. Recent research undertaken at the Corps of Engineers research laboratory indicates that the optimal operating parameters are two volts per inch, 15 Hertz frequency and 6.5 milliseconds pulse rate.

To prepare the barrier for the increase, the Corps of Engineers will begin operational testing of the equipment at 8 a.m. Wednesday, August 12, 2009. Operational testing is expected to be complete by Friday, August 14 but will continue until barrier preparation is finalized. In coordination with the Coast Guard, the Army Corps will bring navigation safety tests at the new operating parameters as early as practicable. The timing of the increase is tied to the barrier contractor's ability to change the parameters in a safe manner.




"Once we received the genetic testing results on July 31<sup>st</sup>, we immediately began making preparations to be able to increase the operating parameters," said Maj. Gen. John Peabody, commander of the Corps of Engineers Great Lakes and Ohio River Division. "The earliest we could make the changes was this Friday, so we used the available time to consult with other state and federal agencies and partners. It is clear to us that this is the appropriate action."

### Attachment 6 2009 and 2010 eDNA Results

## Asian Carp Migration



Positive silver carp detection at the base of Lemont Road in Des Plaines

-  - Positive eDNA of silver carp in CSSC
-  - Positive eDNA of silver carp in Des Plaines River
-  - Positive eDNA detection of bighead & silver carp in Illinois & Michigan Canal

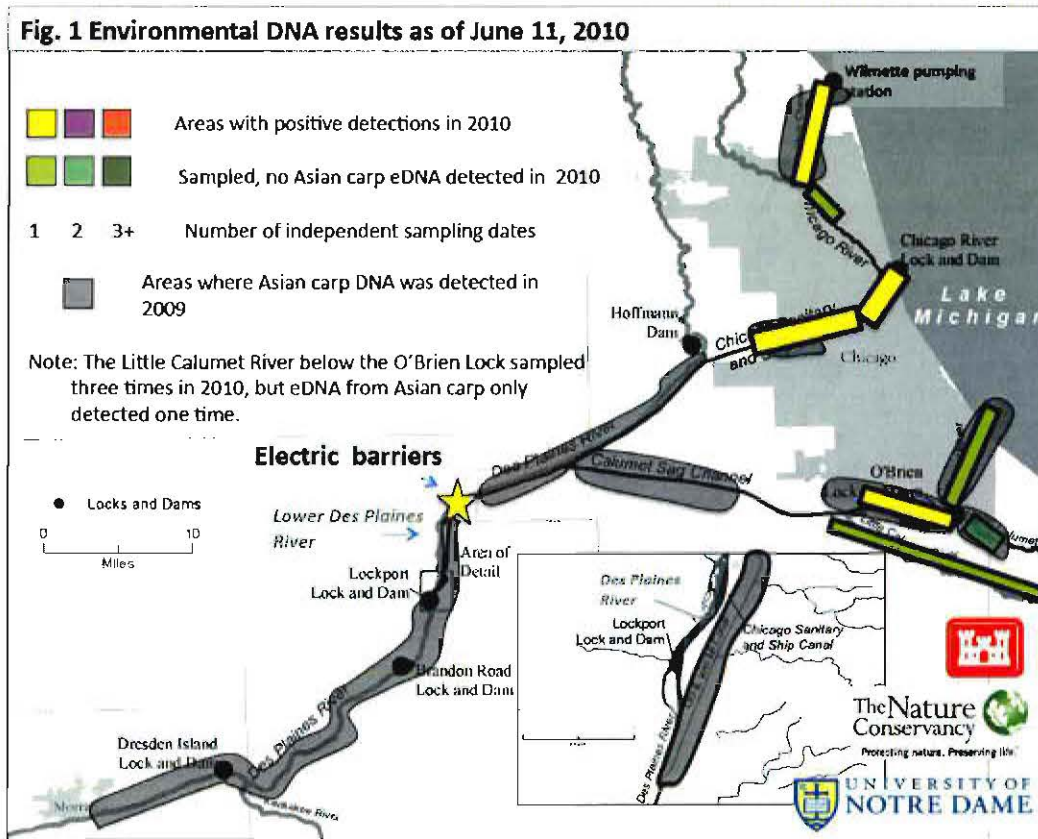


Confluence of I&M Canal from Des Plaines River



**BUILDING STRONG**

Attachment 6 (current eDNA results, with summary of 2009 results)



**Attachment 7**  
**USACE Press Release dated September 18, 2009**

U.S. Army Corps of Engineers  
NEWS RELEASE  
Contact: Lynne Whelan  
Telephone: (312) 846-5330  
E-Mail: [lynne.e.whelan@usace.army.mil](mailto:lynne.e.whelan@usace.army.mil)  
Date: September 18, 2009

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**eDNA testing indicates Asian carp presence less than one mile from electric barriers**

(Chicago) -- As part of its ongoing Asian carp monitoring program, the Army Corps of Engineers is continuing to work with the University of Notre Dame to use eDNA genetic testing of water samples to monitor the presence of bighead and silver carp in the Sanitary and Ship Canal, the Des Plaines River, and the I&M Canal.

On Sept. 16, 2009, the university notified the Corps of Engineers that six of 99 water samples taken from the area between the Lockport Lock and the electric barriers tested positive for the presence of silver carp. The northernmost of the positive samples was from an area less than one mile south of the electric barriers. Other recent eDNA results indicate the likely presence of Asian carp in the Des Plaines River north of the barriers and near the confluence of the Des Plaines River and the I&M Canal.

There are no Asian carp north of the barrier on the Chicago Sanitary and Ship Canal. All results from samples taken in the canal north of the electric barrier have been negative. Additional information about the recent sampling efforts is available on the Army Corps' website at [www.lrc.usace.army.mil](http://www.lrc.usace.army.mil).

"The Army Corps does not intend to alter the operating parameters of the barriers based on this new sampling information," said Col. Vincent Quarles, commander of the Army Corps of Engineers, Chicago District. "We are confident that the barriers are now operating at the optimal setting needed to deter both adult and juvenile fish."

The electric barrier system in the Chicago Sanitary and Ship Canal reduces the risk of Asian carp migrating into the Great Lakes along the most direct pathway, but other pathways do exist and need to be addressed.

The Des Plaines River is one such known potential by-pass to the electric barrier. In the event of heavy rainfall, it is possible for water from the Des Plaines to overflow into the Sanitary and Ship Canal north of the barrier location. This can potentially transfer nuisance species into the canal.

"The Corps of Engineers is already investigating potential by-passes to the barrier system, and as part of that study will work closely with our federal, state and local partners to identify workable solutions and develop conceptual designs," Quarles said. "At this time we don't have any authority that would allow us to construct any preventive measures, but we are continuing to investigate other options within existing Corps authorities."

## Attachment 8



### Illinois Department of Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271  
<http://dnr.state.il.us>

Pat Quinn, Governor  
Marc Miller, Director

Office of Water Resources • 2050 West Stearns Road • Bartlett, Illinois 60103

## PUBLIC NOTICE

### PROPOSED ASIAN CARP BARRIER PARASITIC STRUCTURES ON CHICAGO SANITARY AND SHIP CANAL IN WILL COUNTY BY THE U.S. ARMY CORPS OF ENGINEERS

The Chicago District of the U.S. Army Corps of Engineers, 111 N. Canal Street, Suite 600, Chicago, Illinois 60606, has applied for a permit from the Illinois Department of Natural Resources, Office of Water Resources to authorize the installation of parasitic structures at the Aquatic Nuisance Species Dispersal (Asian Carp) Barriers IIA and IIB. The barriers are located on the Chicago Sanitary and Ship Canal between river miles 296.2 and 296.4 just upstream (north) of 135<sup>th</sup> Street (Romeoville Road) near Romeoville, Illinois. This notice is being sent pursuant to state rules for construction in public waters.

The purpose of the parasitic structures is to control the electrical field produced by Barriers IIA and IIB, and prevent the electrical field from extending outside the immediate vicinity of the barriers. The parasitic structures will be installed on the bottom of the Canal. They will consist of steel frames supporting a wire rope mesh. Each of the five structures will span the width of the Canal (156 ft.) and will be 56 ft. across. The steel frames will be supported by 2 ft. high concrete blocks. The total height of the structures is 4 ft. 8 in. above the Canal bottom. The low pool water depth of the Canal at this location is 19.3 ft., which leaves 14.6 ft. of water depth after installation of the structures. No dredging is proposed as part of this project. The proposed activity is part of the on-going effort to prevent the spread of the invasive Asian Carp from the Mississippi River watershed to the Great Lakes.

The project site is located in the Southwest Quarter of Section 35, Township 37 North, Range 10 East of the Third Principal Meridian in Will County. On the back of this public notice is a project location map.

Plans for the work may be seen by appointment at the Northeastern Illinois Regulatory Programs Section office, 2050 West Stearns Road, Bartlett, Illinois 60103. Inquiries and requests to review the plans may be directed to Gary Jereb of the Bartlett Office at 847/608-3100, extension 2025. You may also contact Lynne Whelan of the U.S. Army Corps of Engineers at 312/846-5330.

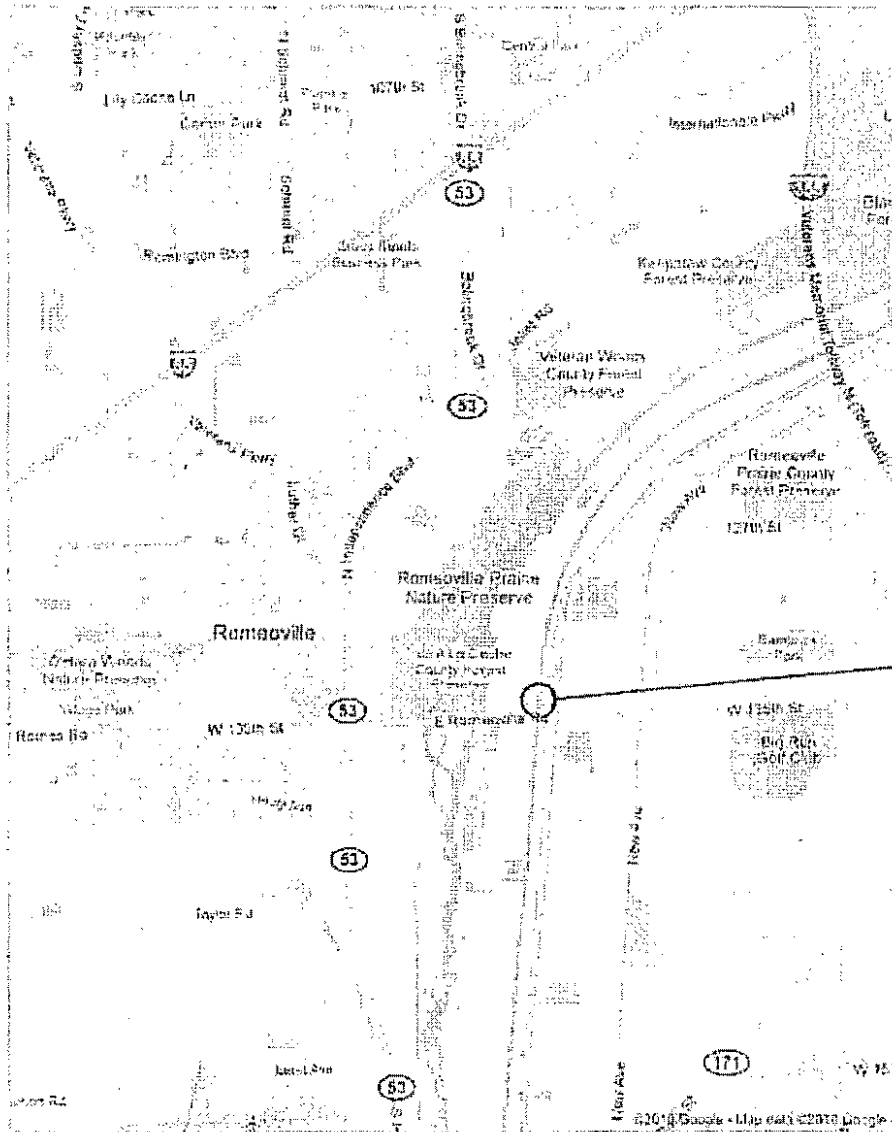
Review of this project will be limited to the following issues: 1) Any obstruction to, or interference with the navigability of the canal; 2) Any encroachment on the canal; and 3) Any impairment of the rights, interests or uses of the public on the canal or in the natural resources thereof.

You are invited to send written comments regarding the project to the IDNR/OWR Bartlett Office by August 9, 2010.

July 19, 2010

Attachment 8 (Cont.)

# LOCATION MAP



PROJECT SITE

### Attachment 8 (Cont.)

Explanation of Parasitic Structures from USACE (Chuck Shea, USACE, personal communication):

The parasitic structures are a safety feature. They are designed to control the extent of the electric field generated by the barriers. We want to make sure the electric field is focused over the area where we want to deter fish, but doesn't spread farther upstream or downstream than is necessary to deter fish. The principle behind the parasitic structures is basic. By placing the structures, we are putting a large amount of metal surface area near the edges of the barriers. These metal structures will absorb electricity and limit how much electricity moves beyond the structures in the canal water.

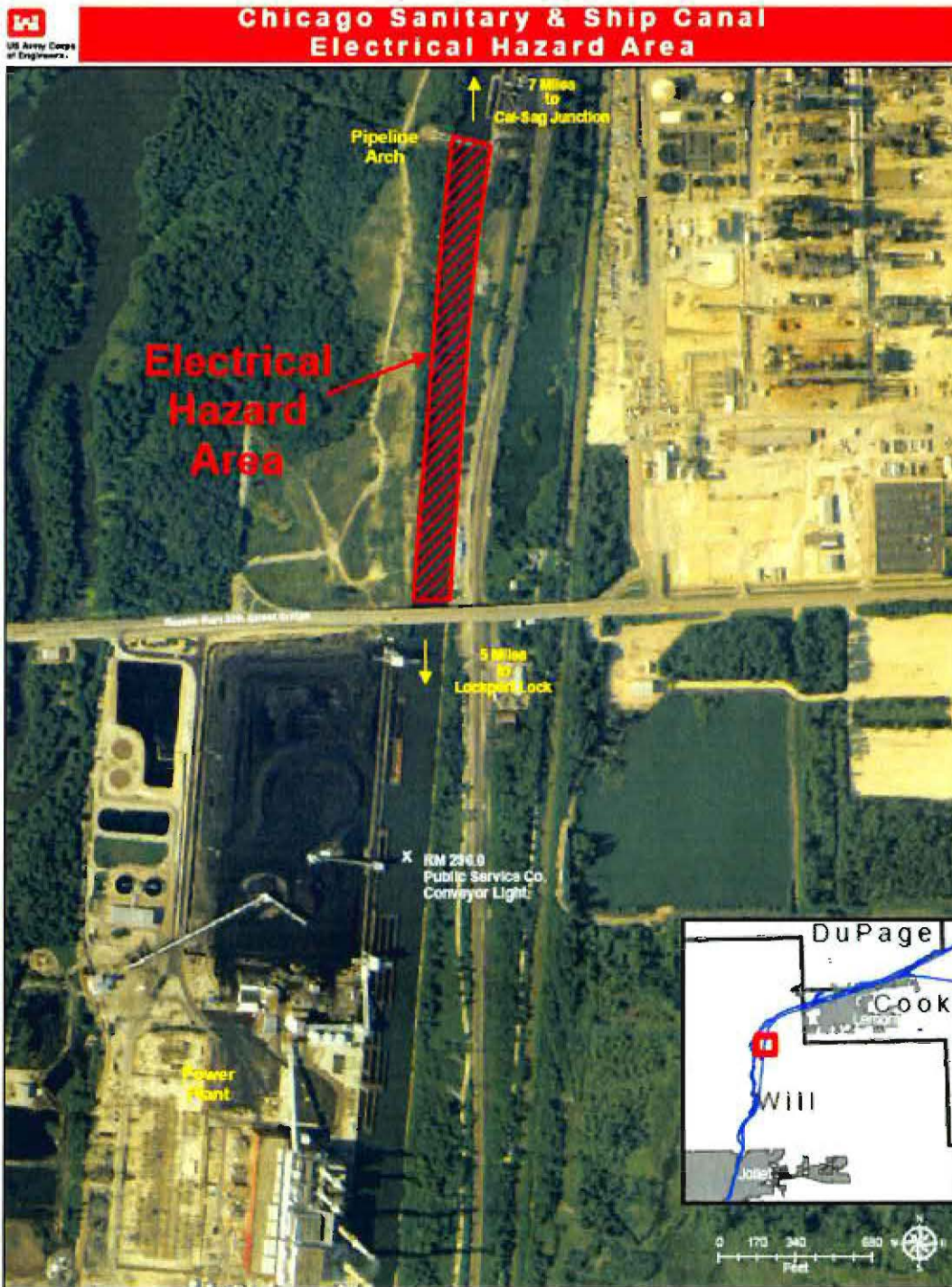
USACE is planning to install three parasitic structures downstream of Barrier IIA, between Barrier IIA and Barrier IIB, and upstream of Barrier IIB. These are designed to control the electric fields from both barriers. The parasitic structures themselves are essentially large metal frames (see Drawing S-09) with steel cables strung back and forth over the framework. Drawing S-12 shows how the cables are connected to the frames. Unfortunately, I don't have a drawing showing an entire frame with cables on it. Hopefully, you can get a sense of the design from S-12 though. (I could send you a photo once we have one fully fabricated.) Stringing cables provides more metal surface area than having one large metal plate.

The parasitic structures will be placed on concrete supports on the bottom of the canal. The top of the structures will be approximately 5 feet above the canal bottom. This will place them more than 5 feet below the authorized navigation depth in the channel.

The structures are more effective at controlling the electric field extent when they are connected to each other to "surround the barriers". This will be done by running cables between the three structures. The cables will run through the rock walls in lined diagonal borings and only be exposed in the canal within the bottom 5 feet of the water column. On land the cables will run through manholes and ductbanks.

### Attachment 9

### Location of Barrier Zone in Relation to Midwest Generation's Will County Station





**Attachment 10  
(highlight added)**

**Dispersal Barrier Advisory Panel Meeting Notes  
June 15, 2010  
Chicago, Illinois**

**Attendees:** Phil Moy, WI Sea Grant; Scudder Mackey, Habitat Solutions; Sandra Morrison, USGS; Beth Murphy, USEPA-GLNPO; Greg Morris, USCG-MSU Chicago; LCDR Sean Brady, USCG-MSU Chicago; Christina Haska, GLFC; Bill Horns, WIDNR; Greg Conover, MICRA; Steve Shults, ILDNR; Sam Finney, USFWS; Pam Thiel, USFWS; Rob Simmonds, USFWS; Vic Santucci, ILDNR; Greg Sass, INHS; Dan Thomas, GLSFC; Blake Ruebush, INHS; Sarah Sinovic, Shedd Aq.; Mariah Shaver, Shedd; Melanie Napoleon, Shedd; Laura seaman, Council of GL Governors; David Naftzger, CGLG; Felicia Kirksey, USACE-Chicago; Col. Vince Quarles, USACE-Chicago; Vic Serveiss, IJC; Mark Burrows, IJC; Kim Israel, IEPA; Rob Sulski, IEPA; Daniel Injerd, IDNR-OWR; Mike Cox, USACE-Rock Island; Lynne Whelan, USACE-Chicago; Sarah gross, USACE-Chicago; Mark Cornish, USACE-Rock Island; Claire Madsen, EIMCO; Jon Svendsen, U of Minnesota; Molly Sapacapan, INHS; Stephanie Liss, INHS; John Quail, Friends of the Chicago River; Joel Brammeier, Alliance for the GL; Pat Carey, City of Chicago; Lindsay Chadderton, TNC; Karen Hobbs, NRDC; Julia Wozniak, Midwest Gen; Lisa Friede, CICI

After a welcome and introductions around the room Phil Moy announced the RCC has proposed the formation of a stakeholders work group and that this may chart a new role or path for the Barrier Advisory Panel. The stakeholders group would likely formalize membership of a Barrier Panel-like body and formally expand the role of the work group to include the entire Chicago Area Waterway not just the barriers.

**Chicago District Update – Col. Quarles**

The Corps intends to improve outreach with stakeholders in part by making some changes to the website.

There has been a 30% increase in the size of the District since 2008.

Col. Quarles has rearranged the management of the barrier project; it's just getting too big for one person to handle all aspects of the effort.

Felicia Kirksey is the District Program Manager for AIS

Chuck Shea will handle the barrier

Scott Kozak will handle the efficiency study

Kelly Baerwaldt will handle monitoring

Ron Barkley will handle safety

Shamel Abu El Seoud is in charge of operations and

Dave Wethington is in charge of the Interbasin Study

The Barrier IIB building is going up. It is larger than the IIA building because all of the electrodes will be enclosed. The electronics should be installed by fall of 2010.

## Attachment 10 (cont.)

Once construction is complete safety testing will begin. They will use the IIA protocol for IIB. A rotenone treatment may be necessary during the safety testing. The goal is to have IIB up and running in time for the next IIA maintenance cycle. This schedule is a full year sooner than originally planned.

Col. Quarles expects to get Barrier I upgraded by 2013. Right now they have authority but no funding. The design will be similar to IIB.

### Optimum voltage testing

The tank test is done. The flume test report is not in.

### Monitoring

We need to know what's out there. The eDNA testing will transition to the Corps and local labs. We need to understand what eDNA can do for us.

Joel Brammier – Will the capacity to run the analyses be increased?

Yes, up to 120 samples per week. We want to be able to afford it.

### Efficacy

Several interim reports are now available. Report I was the emergency measures and potential for bypasses. II is the voltage study. III is the structural options for carp prevention (closing the locks) and IIIA is a study of the acoustic bubble barrier.

- I. The Des Plaines and I&M Canal. This work is to be done by Oct 28 2010. This includes placing rip-rap in the I&M Canal and building a 6 to 8 foot fence and 2 foot high Jersey wall along 13 miles of the Des Plaines River.
- II. The Voltage Study. The small flume study is done; they're waiting on the report. The large flume study has yet to occur.

Are there any efforts to reduce the population?

That is being taken up by the monitoring group.

What about conductivity? Do the tests at ERDC emulate conductivity in the Canal?

The corps is modeling the impacts on the field. 2-3" long fish were stunned in a recent test.

- III. Structural Alternatives. Lock operations will be used in support of rotenone treatments rather than directly for carp control.

IIIA. This report recommends placement of an acoustic bubble barrier below the Brandon Road Lock. This technology uses lights and sound to guide fish to an alternative route. The demonstration project will cost about \$15 million.

### GLMRIS – The Great Lakes Mississippi River Interbasin Study

Chicago will be the early focus of the study, then the Corps will examine the broader GL basin connections. This is expected to be a 5-7 year study. The Corps expects to convene a stakeholder meeting in August.

**Attachment 10 (cont.)**

Joel Brammeier – Does the Corps have sufficient funds for the task?

Yes

Will you contract out the work?

Maybe

Dave Naftzger – The time frame for the project seems long. Do you need staff? How can we help?

There will have to be a full EIS. We want to be certain we get it right.

You need to look at the dynamics of the waterways. To know what is happening with rainfall etc.

Sam Finney – Will there be a bubble barrier across the main channel at the electric barrier? It will probably need a multiple beam approach.

The Brandon Road site addresses the Des Plaines River and the Canal and allows for testing.

Scudder Mackey – We need the interbasin study/project. Existing information is available; the Corps doesn't need to start at zero.

The project will address the long-term solution

These efforts should not be sequential, but rather parallel.

We will seek out that information

Phil Moy – Much effort is focused exclusively on Asian carp, we must keep in mind that we are trying to stop AIS from both directions.

The Regional Coordination Committee – Bill Bolen, USEPA

The members of the RCC have a regional authority, a mandate that involves the canal or control funding that can be applied to the Asian carp prevention effort. There has been lots of litigation in the past. New members have indicated their interest in joining; they will be on one or more of several workgroups.

A new framework was issued in June; it involves \$3.8 million in new money. It will support commercial fishing and address other vectors.

The 2011 framework will be available in July or August.

The USEPA awarded a \$1 million grant to University of Notre Dame for more eDNA work.

There will be a more robust role for the Barrier Panel to support the RCC.

Monitoring and Rapid Response Work Group – Vic Santucci, ILDNR

The WG developed a monitoring plan and actions. There is an active monthly netting program underway. We updated the rapid response plan and identified specific triggers for action. The group also assessed the risk of Asian carp beyond the barrier.

We are doing lots in the field. In Feb & Mar we undertook electrofishing and netting in the Canal. Using eDNA results as a guide, we did electrofishing and netting in the North Shore

**Attachment 10 (cont.)**

Channel. We initiated a rotenone operation on the Little Cal River at O'Brien that involved treatment of about 2.6 miles of river, plus electrofishing and netting.

We currently have crews on Bubbly Creek and the South Branch doing electrofishing and netting.

This summer we will implement the fixed site plan that includes 5 sites for electrofishing and netting on a weekly basis. We are developing a plan for eDNA sampling that will be finalized in about a month and will include effort on the Des Plaines River. Risk Assessment of Asian carp upstream of the barrier is ongoing.

We will have a radio telemetry study headed by Kelly Baerwaldt (Corps). It involves tagging Asian carp and releasing them below the barrier.

What about fish getting through the barrier?

We will set up testing for that.

We need to determine the presence and abundance of small fish. Need to figure out how to sample.

**Environmental DNA -- Lindsay Chadderton, TNC**

Lindsay reviewed the sampling procedure and analysis. In 2009 UND took 1000 samples and analyzed 950. They made multiple sampling trips in some areas and left others untouched. They had multiple positive tests below the barrier, above the barrier below O'Brien Lock and in other areas on a single date.

They have taken 585 samples since March 31 on the North Shore Channel, South Branch, near O'Brien and on the Little Calumet River. There is a small gap on the North Branch. They had 1 positive near O'Brien Lock, 1 positive in the North Shore Channel and 8 positives in the South Branch. They also had one positive under the Lakeshore Drive bridge near Navy Pier.

The last positive BH samples was taken Nov 23; the last positive Silver sample was taken Mar 23.

125 samples were taken May 27 from Chicago Lock down the canal.

1 + under Lakeshore Drive; 4+ near Bubbly Creek and 3+ farther down the system = all for silver carp.

The strength of the evidence varies from strong to weak, with a strong indicator being many positive eDNA tests plus a physical specimens or visual observation. A weak result would be a single positive test with no verification.

False Positives and Alternative Pathways

**Attachment 10 (cont.)**

False positives – there is stringent QAQC in the field and the lab including blind samples, contamination controls, tests for related species. There has been no evidence of false positives.

**Alternative Pathways**

Several alternative pathways have been suggested – bilge, ballast, dead fish, waterfowl, sewage. But when we look at the broader pattern of positive tests the DNA exists in areas where ships don't go like the I&M Canal, the North Shore Channel and the Des Plaines River. The UND crew has never seen a dead Asian carp on the Canal.

UND will be making a transition, handing off eDNA testing to the Corps. The last contract sample was taken May 27th. There will be two transition trips in June. They will do duplicate sample runs at the end of June.

**Next Steps**

They want to take larger water samples and do a calibration study to examine the % of positive tests and relate them to fish abundance. They want to do a decomposition study examining how long dead fish emit detectable DNA. And they want to determine temperature and flow effects on detection rates.

The new EPA grant will support work in Lake Erie and Michigan tributaries.

Col. Quarles – thank you

Joel B. – Are standard operating manual available?

They will be

- What about the main channel and south branch positives? The results need to be clearer and more quickly communicated.

Col. Q. - Why are the number of hits important?

Joel B. - It relates to the strength of the signal. It's all about the number of hits. How did they get there? On the Corps website it was shown as a positive in the reach rather than multiple positives.

Joel B. – Who will analyze the data? We want detailed, raw data

Flowing vs still water makes a difference. Was the boat moving with the current? Were there outflows? Was it dry weather or wet weather?

All sampling events were done in dry weather. There is no surface flow in the cal-sag. In the CSSC the trip was up to downstream with no visible flow.

Mark Burrows – What about the population in the park pond? Could it be a source of DNA?

The DNA probably breaks down faster in the canal than in the lab (6-48h).

Dave N. – what will be the process when the Corps takes over?

The water will be filtered in Chicago and the filter paper will be sent to ERDC.

**Attachment 10 (cont.)**

**Operation Pelican – Steve Shults, ILDNR**

The most recent rotenone operation was triggered by a single positive DNA finding above the barrier as agreed upon by the MRRWG.

The operation gave us a standing stock estimate in the Little Cal. We would capture and remove any Asian carp and be able to correlate capture with traditional gear and actual abundance.

They wanted to complete the operation before Memorial Day and there was zero tolerance for staining recreational boat hulls. This was a concern due to the presence of several area marinas. Tracer dye was used to measure the movement of the treatment plume.

The 8-day operation involved similar partners as in the December operation. The reach treated ran from O'Brien Lock to Beaubien Woods and the Grand Cal River. Electrofishing and netting extended down to the ACME beud.

No Asian carp were seen or captured in the netting operation. Electrofishing for four 30-minute runs captured 28 species.

The flow varied during the treatment from 1000 cfs to -1000 cfs (backflow). There was also mixed flow up and downstream.

There was a greater effort to count and weight fish. Including the fish netted downstream there was 133,820 lbs. Fish in the rotenone area comprised 38 species, 20,549 individuals totaling 97,720 pounds = ~650lbs/acre. No Asian carp were seen or collected.

Divers ran six transects; not a lot of fish were on the bottom, maybe 20-25 fish per transect.

Challenges included multiple landowners, changing flow and health and safety – storms. Overall it was a successful operation. Improvements – need better communication, training and briefing.

**Invasion Control Work Group – Felicia Kirksey, Corps**

Goals of the project – impede the migration of Asian carp and prevent establishment. Identify actions for control – a long term strategy. Provide independent expertise to support the RCC.

They have an MOU and have compiled a list of tools. They will develop a strategic action plan and will consult with advisors.

**Monitoring – Julia Wozniak, Midwest Gen**

For the last 30 years monitoring of the waterway has taken place 2x/month. Electrofishing takes place at 21 stations in the Lockport, Brand Road and Dresden Island pools. In May 6 bighead were captures at the mouth of Jackson Creek, 18 miles downstream of the barrier.

The fish were 15 to 32 pounds. The DNR was notified and no other Asian carp were found.

The monitoring also determined that fish were becoming reestablished in the Lockport Pool below the barrier. The same species are present but in lower numbers.

How big were the fish?

Larger than in 2005.

Did they have eggs?

Don't know.

## Attachment 10 (cont.)

### **Carp Framework Research – Sandra Morrison, USGS**

Sandra quickly reviewed the projects about to get underway or already underway at USGS in support of the Carp Control framework.

Biological Control – Attractant Pheromones; working with the Hammond biological station and the GLFC lamprey control program

Risk Assessment – Assess suitability of tributaries as spawning habitat for Asian carp. Using live larvae to determine length of river needed for habitat suitability.

Assess risk of establishment based on available food resources – examining bighead feeding habits; pelagic zooplankton, detritus, algae. Try to understand the interaction of Asian carp and bluegreen algae; could blooms be enhanced?

Oral Delivery of Chemicals – ID possible toxicants and delivery mechanisms such as micro-matrix technology for existing toxicants. Determine registration requirements for toxicants. The work will examine potential delivery sites for toxicants including gills, skin, GI tract.

Physical Control – Help with the assessment of the problem of interbasin transfer including flooding from the Des Plaines River, groundwater migration, mapping of groundwater flow and fractures and examining Asian carp life history.

Another aspect of physical control involves the use of seismic technology to diver or kill Asian carps. Hitting the fish with strong underwater sound waves could cause immediate and delayed mortality.

Sound and electricity may adversely affect the viability of Asian carp eggs as they drift downstream from spawning areas.

All these projects will help in the control and management of other AIS as well.

Are the reports posted?

Yes, at the Columbia Research Center

### **Bubble Barriers – Blake Ruebush**

Blake shared his results from 2009 and plans for work this summer.

The system cycles through sound from 500 to 2000 Hz. Most native fish hear sound between 0 and 500 Hz.

The speakers and light point downstream into the bubble curtain. 1099 fish comprising 33 species were captured upstream of the barrier and placed downstream of the barrier. 141 silver carp from the Illinois River ranging from 257 to 665 mm long were tagged and placed downstream of the barrier.

There were 33 recaptures of fish that made it back upstream – bluegill, gizzard shad, largemouth bass, and common carp. No silver carp were found upstream.

2010 – The creek is flooded right now. They need the depth to be 1m to do the work. To remove fish they use a backpack shocker, hoop nets and angling. They will estimate sampling efficiency using a depletion estimate doing three electrofishing runs on each side of the creek.

They will test the response to the barrier in both the on and off settings in 1-day trials. They will let fish accumulate below the barrier and acclimate over two-week trials.

The system is designed to guide fish to an alternative channel rather than blocking their upstream movement.

**Attachment 10 (cont.)**

Does the sound cause the fish to jump?

Yes, they may jump over the barrier.

Can you hear the noise?

Somewhat on the bank.

Does it affect wildlife?

Not at a distance of a meter or more.

Do the speakers need to be close to the bubbles?

Flow reversals could affect the effectiveness of the barrier.

**GLRI Funding – Beth Murphy, USEPA-GLNPO**

Beth described the various federal funding amounts provided for work on Asian carp.

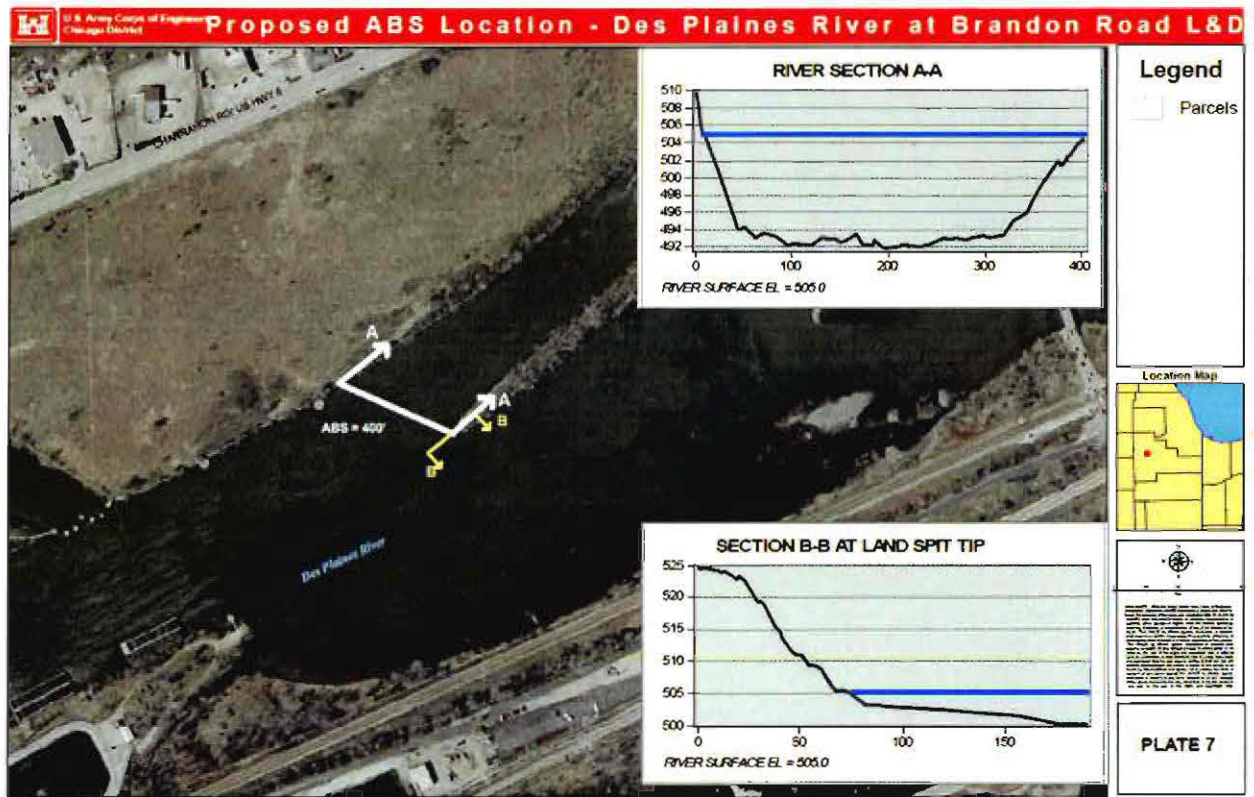
University of Notre Dame received a \$999,372 grant for eDNA work.

IL DNR will get \$300,000 for removal of Asian carp above the barrier and an additional \$3 million for removal of Asian carp below the barrier using commercial fishing.

Efforts listed in the framework total \$78.5 million of which \$58.5 were from GLRI. Part of this funding will be used to assess possible sources for DNA including dead fish from barge decks, fish between barges, and CSOs.



### Attachment 11 ABS Barrier Plan for Brandon Road Lock and Dam



(Source: Dispersal Barrier Efficacy Study  
INTERIM IIIA – Fish Dispersal Deterrents, Illinois & Chicago Area Waterways  
Risk Reduction Study and Integrated Environmental Assessment:

[http://www.lrc.usace.army.mil/pao/02June2010\\_InterimIIIA.pdf](http://www.lrc.usace.army.mil/pao/02June2010_InterimIIIA.pdf)

# **EXHIBIT L**

## **FEBRUARY 2, 2011 JAMES E. HUFF PRE-FILED TESTIMONY UAA RULEMAKING R08-9(C)**

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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


**NOTICE OF FILING**

To: John Therriault, Clerk	Marie Tipsord, Hearing Officer
Illinois Pollution Control Board	Illinois Pollution Control Board
James R. Thompson Center	James R. Thompson Center
100 West Randolph Street - Suite 11-500	100 W. Randolph, Suite 11-500
Chicago, IL 60601	Chicago, IL 60601-3218

Deborah J. Williams, Assistant Counsel	Persons included on the attached SERVICE LIST
Stefanie N. Diers, Assistant Counsel	
Illinois Environmental Protection Agency	
1021 N. Grand Ave. East	
P.O. Box 19276	
Springfield, IL 62794	

Please take notice that on February 2, 2011, we filed electronically with the Office of the Clerk of the Illinois Pollution Control Board the attached Pre-Filed Testimony of James E. Huff, P.E. and accompanying Attachments, a copy of which is served upon you.

CITGO PETROLEUM CORPORATION, and  
PDV MIDWEST, LLC, Petitioners

By:   
One of Its Attorneys

Jeffrey C. Fort  
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Chicago, IL 60606-6404

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD  
 IN THE MATTER OF: )  
 )  
 WATER QUALITY STANDARDS AND )  
 EFFLUENT LIMITATIONS FOR THE ) R08-9  
 CHICAGO AREA WATERWAY SYSTEM ) (Rulemaking-Water)  
 AND THE LOWER DES PLAINES RIVER: )  
 Adm. Code Parts 301, 302, 303 and 304 ) (Subdocket C)

**PRE-FILED TESTIMONY OF JAMES E. HUFF, P.E.**

**Introduction**

My name is James E. Huff, and I am Vice President and part owner of Huff & Huff, Inc., an environmental consulting firm founded in 1979. I have previously testified in this rulemaking on May 6, 2009, prior to its subdivision into subdockets, and a copy of my background is summarized in the pre-filed testimony that accompanied that appearance. This current testimony is a revision of testimony I intended to give at the series hearings which began on November 8, 2010. In response to a motion by the Illinois Environmental Protection Agency (the "Agency"), stakeholders to this proceeding agreed on October 28, 2010 to move my testimony to a later date. See Hearing Officer Order, October 28, 2010, R08-9(C) (Rulemaking - Water).

I have been retained by the Lemont Refinery to review the Aquatic Life Use designation proposed by the Agency for their reach of the Chicago Sanitary & Ship Canal (the "Ship Canal") downstream of the Calumet-Sag Channel confluence (the "Lower Ship Canal") and the technical justification provided by the Agency in support of its proposed Aquatic Life Use designation. I have actively followed the UAA proceedings before the Board. I have also evaluated the impact that the proposed use designation will have on the Lemont Refinery. My prior testimony also focused on the uses of the Ship Canal; my testimony here focuses on the Lower Ship Canal and

to highlight the use of that segment for snow melt runoff and the protection from invasive species.

The collection of waterways currently under consideration represents a range of dissimilar waterways, from natural streams to manmade canals. To some extent, the Agency's proposed changes recognize these differences in two different use categories, as Use A and Use B. My review was focused on the appropriateness of Use B designation for the Lower Ship Canal.

The Lemont Refinery discharges into the Lower Ship Canal. At the point of its discharge, the Lower Ship Canal can be described - as the Agency has stated - as an "effluent dominated" waterway. The uses of the Lower Ship Canal are demonstrably different than the use of the other bodies of water in the Chicago Area Water System ("CAWS") and in this Use Attainability Analysis proceeding.

The Agency is proposing to group the Lower Ship Canal as an Aquatic Life Use B Water, a group that also includes the North Branch Chicago River, the Chicago River, South Branch Chicago River, the Calumet River to Torrence Avenue, the Lake Calumet Connecting Channel, and the Lower Des Plaines River from the Lower Ship Canal to the Brandon Road Lock and Dam. With the exception of the Lake Calumet Connecting Channel and the Lower Ship Canal, all of the waterways in this group are natural waterways. A proper consideration of the uniqueness of the artificially created and physically constrained Lower Ship Canal is lost by including it in this grouping. Aquatic Life Use B Waters are, "capable of maintaining aquatic life populations predominated by individuals of tolerant types that are adaptive to the unique physical conditions, flow patterns, and operational controls designed to maintain navigational

use, flood control, and drainage functions in deep-draft, steep-walled shipping channels.” (Agency’s Statement of Reasons, p 49). The Agency has proposed statutory language which sets out the “Purpose” of these Aquatic Life Use B restrictions as protecting “the highest quality aquatic life ... that is attainable...” (Agency proposal for 35 Ill. Adm. Code 302.402.)

The focus of my testimony here is on the chloride and sulfate water quality limits proposed for the Lower Ship Canal. The Lemont Refinery discharge contains sodium sulfate from the recently installed Wet Gas Scrubber used to reduce sulfur dioxide air emissions as well as chlorides removed from the crude oil in the desalting process. Under the Agency’s proposal, the chloride water quality standard would be set at 500 mg/L, and at least during periods when the Ship Canal exceeds 500 mg/L, the Lemont Refinery would be restricted to a discharge of 500 mg/L chlorides, which it can not achieve. The sulfate limit is more complicated in that the sulfate water quality standard is based on the chloride concentration; however, sulfate water quality standards are limited to waterways having less than 500 mg/L chlorides, from which one could conclude that no net increase in sulfates is allowed when the receiving stream exceeds 500 mg/L chlorides.

Others have already addressed the unique uses of the Lower Ship Canal for stopping the spread of invasive species such as the Asian Carp from the Illinois River system toward Lake Michigan. As stated later, I would recommend that the Board *not* accept the Agency’s proposed upgraded use of this water and not group this waterway with other unrelated waterways in the Use B group. Rather, I suggest the addition of a Use C category which would be comprised of the Regulated Navigation Area surrounding the United States Coast Guard’s electric barrier system,

which stretches from River Mile 295.5 to 297.2 (*see* the map at Exhibit A), which recognizes the truly unique use of this waterway. (*See* Exhibit B for proposed regulatory language establishing a Use C.) A Use C designation would properly take into account the exceptional characteristics of these waters. This language is based on the existing regulatory language drafted by the Agency in defining Use B waters with minor alterations to reflect the use of the waters to prevent the migration of invasive species and to take up snowmelt runoff.

### **Uniqueness of the Lower Ship Canal**

As the Agency noted in its Statement of Reasons, “the environmental potential for the river was historically deemed to be limited to the point of hopelessness.” (Agency’s Statement of Reasons, p 17). The Illinois Pollution Control Board (“Board”) has consistently recognized the challenges, variability, and uniqueness of the CAWS and Lower Des Plaines River and many of the same challenges and limitations that the Board recognized in the early 1970s remain valid today. This is particularly true for the Lower Ship Canal.

The Lower Ship Canal is typically 200 to 300 feet wide with depths greater than 27 feet. (CDM, 2007). The construction of the Lower Ship Canal includes vertical walls and steep embankments. The Lower Ship Canal was completed as part of the greater Ship Canal in 1907 to divert pollutants away from Lake Michigan, the City of Chicago’s primary water supply, and it was expanded in 1919 to its present form to increase navigation capabilities and provide additional waste dilution. With the potential exception of the Calumet-Sag Channel, as described later in my testimony, there is no other water body in the CAWS which has the unique physical features, commercial shipping, discharge loadings, and lack of appropriate habitat for

aquatic life, as the Lower Ship Canal. And none are so specifically associated with efforts to control the spread of invasive species.

The aquatic habitat of the Lower Ship Canal is rated as "poor to very poor" (IEPA, 2006). Overall stream use is designated as *non-support* for fish consumption and aquatic life, which does not factor in the electric barrier or the periodic use of rotenone to kill all the fish. The identified causes of impairment were polychlorinated biphenyls (PCBs), iron, oil and grease, dissolved oxygen ("D.O."), total nitrogen, and total phosphorus. Identified sources of the impairment include combined sewer overflows, urban runoff/storm sewers, and impacts from hydrostructure flow regulation/ modification, municipal point source discharges, and other unknown sources.

Stormwater runoff flows into the Lower Ship Canal, carrying with it pollutants from roads, parking lots and other surfaces. In the winter months, this stormwater carries road salt and other chemicals used by the state and municipalities to keep streets, highways and parking lots safe. While there are potential activities to reduce the amount of sodium chloride applied within the basin, there has been no demonstration that these reductions will be sufficient to achieve the proposed chloride water quality standard of 500 mg/L. When de-icing salts cause a spike in the chloride level, the Lemont Refinery loses its mixing zone for chlorides (and sulfates), as the Lower Ship Canal's upstream water quality exceeds the water quality standard for chlorides.

In addition to the stormwater runoff impact, the electric barrier system and rotenone applications on the Lower Ship Canal are particularly unique hazards to aquatic life. Both these hazards, lying within the same reaches of the Lower Ship Canal as the Lemont Refinery, are designed to



create *non-support* conditions for aquatic life so as to prevent invasive species from entering and leaving the Great Lakes. The Agency's proposal to upgrade the aquatic life use designation of the Lower Ship Canal directly conflicts with the local, state, and federal existing use of these waters as a barrier to halt the spread of invasive species. These barriers were authorized by Congress, with the full recognition on the part of federal and state biologists that any positive fish migration in the Lower Ship Canal was being sacrificed to protect the Great Lakes as well as the Mississippi River Basin from aquatic invasive species.

These electric barriers will not only prevent the aquatic invasive species from migrating, but they will also prevent all other fish from migrating up or down the Lower Ship Canal at Lockport, effectively terminating the water body at this point from a biological perspective. Normally, preventing migration is not a desirable outcome, but it is certainly necessary in light of the greater goal of protecting the biological integrity of the Great Lakes and the Mississippi River Basin.

### **Mixing Zone Implications**

Because of the uniqueness of the Lower Ship Canal, a separate use category is appropriate. However, the Agency has proposed strict limits for chlorides and sulfates, essentially proposing standards adopted for General Use waters. While I recognize that Subdocket D will directly address water quality standards and limits, it is important in this Subdocket C to recognize the impact a use designation and the water quality standards which are appropriate for that use designation, will have on the Lower Ship Canal.

Under 35 Ill Adm Code 302.102, mixing zones and Zones of Initial Dilution ("ZIDs") are

allowed, subject to certain restrictions. Section 302.102(b)(9) prohibits mixing zones for constituents where the water quality standard is already violated in the receiving stream. Assuming for the moment that this prohibition only applies during the period of time the receiving water body exceeds a water quality standard, then there will be times during each year when all dischargers adding any chlorides or sulfates will have to meet the water quality standards at the end of pipe. The Agency noted in its Statement of Reasons (p 76) that it expects that there will be violations of the chloride standard during the winter months, yet it offers no solution in its proposal and it does not address at all the loss of mixing zones. It is likely that every discharger on the Lower Ship Canal will be negatively impacted by this loss of mixing zone, with significant economic implications.

Exhibit C presents four years of chloride data from the Lemont Refinery's water intake (which is upstream of its discharge). During the summer and fall months, the chloride levels are typically below 500 mg/L. However during snow melt periods, chloride levels as high as 998 mg/L have been recorded in the Lower Ship Canal. There have been chloride violations every winter/spring recorded in these data. These cold-weather exceedances are attributed to highway and parking lot de-icing runoff. The intense population center (i.e. the City of Chicago and suburban Cook County which are upstream of the Lemont Refinery) on an effluent dominated stream makes achieving a 500 mg/L chloride standard not practicable without drastically changing de-icing practices. Moreover, while ignoring the current uses being made of the Lower Ship Canal, the proposal penalizes the point source dischargers on the Lower Ship Canal.

During periods of elevated chlorides in the waterway, no discharger can contribute any chlorides

or sulfates under the proposed water quality regulations. The Board has already granted variances relating to Total Dissolved Solids to the Lemont Refinery (and changed the water quality standard for TDS for the Exxon-Mobil Refinery) due to the snow-melt phenomenon. Facilities that use once through cooling water would not be allowed to add chlorine (increase in chlorides) to control microbial growth, nor can they add sulfite type compounds to consume any chlorine residual (de-chlorinate) in the discharge. On an effluent dominated stream, chlorinating the incoming water is important to prevent biological growth on the heat exchangers. To discontinue discharging would entail ceasing operations for most industries, which has its own economic ramifications. In addition, new dischargers to the Lower Ship Canal would essentially be limited to operations that did not chlorinate, de-chlorinate, use de-icing salt in the winter, or any process that contributes chlorides or sulfates. I would expect that many existing dischargers would also not be allowed to discharge during periods when the Lower Ship Canal is over 500 mg/L chlorides, as their effluent will also exceed 500 mg/L chlorides during these same periods.

### **Chloride Reduction Efforts**

Excess chlorides in the winter/spring season is not unique to the Lower Ship Canal in Illinois. A considerable effort has gone into education programs to minimize the application of excess de-icing salt. Last year there was a significant spike in salt prices, which provided a larger incentive on users to reduce wastage. What is unique about the Lower Ship Canal is the huge population center upstream. An estimated 270,000 tons of highway salt are applied annually in the Chicago Area. The peak chloride level of 998 mg/L recorded in 2007 would require more than a 50 percent reduction of salt use during the heaviest storm events to achieve a 500 mg/L chloride water quality standard. There are certainly opportunities to reduce highway de-icing salt, but I

am unaware of any study that indicates a 50 percent reduction in salt in the Chicagoland area is technically feasible. The Village of Winnetka has a green vision that has a goal of reducing salt consumption by 30 percent. For major highways, opportunities to reduce salt consumption by this much is unlikely, because salt application is not optional from a safety perspective. In summary, while efforts to reduce salt usage are underway, achievement of a 500 mg/L chloride water quality standard on the Lower Ship Canal is not technically feasible and does not reflect the uses of the Lower Ship Canal.

**The Board Should Reject any Upgrade in Water Quality UsCs for the Lower Ship Canal**

An upgrade of designated water quality uses and associated criteria in the Lower Ship Canal, particularly as it regards TDS, chlorides, or sulfates, is not appropriate. The Lower Ship Canal is used to prevent the spread of invasive species, to carry runoff from de-icing, and for commercial activity vital to the local economy. Even the existing standard of 1,500 mg/L for TDS set out in 35 Ill. Adm. Code 302.407 cannot be met during periods of road salt runoff. As a result, the Board has had to repeatedly grant variances to account for such runoff (*see, e.g.*, PCB 08-33, Opinion and Order, May 15, 2008).

Nonetheless, the Agency seeks to copy most of its General Use water quality standards from 35 Ill. Adm. Code 302.208(e-g) and insert them into a revised 35 Ill. Adm. Code 302.407(e-g).<sup>1</sup>

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<sup>1</sup> In at least two instances, , the Agency even seeks to impose *more restrictive* water quality standards on these formerly designated “Secondary Contact” waters than it imposes on the “General Use” waters. The first, temperature, has been discussed at length in these proceedings. The second is the arsenic water quality standard in 302.407(e), which is 340 µg/L for acute standards and 150 µg/L for chronic standards. By comparison, the existing “General Use” arsenic water quality standard in 302.208(e) is 360 µg/L for acute standards and 190 µg/L for chronic standards.

The proposed chloride standard in 35 Ill. Adm. Code 302.407(g) of 500 mg/L paradoxically upgrades the existing water quality standards despite the fact that the current standard cannot be met and that there are external biological, political, and economic reasons that will prevent any increase in aquatic life quality for the Lower Ship Canal.

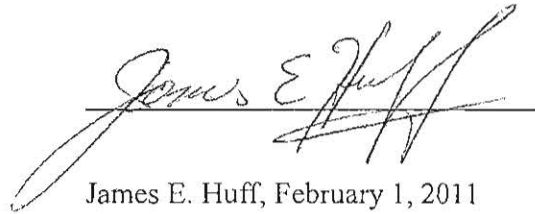
There is no indication in the record I reviewed that the Agency has considered the loss of mixing zones that will occur on the Lower Ship Canal if the Use B designation and the associated proposed water quality standards are adopted to this waterway. The unintended consequences of the Agency's proposed UAA rules for chlorides and sulfates could be addressed by other means, such as the development of Best Management Practices (BMP) for chlorides in place of winter chloride water quality standards and the elimination of the 500 mg/L chloride maximum in the sulfate water quality formula. The Lemont Refinery expects to bring forward further testimony on this issue in Subdocket D.

### **Conclusion**

The uniqueness of the Lower Ship Canal, as outlined in my testimony, is so apparent that a separate use category is needed. The Agency recognized that the Lower Ship Canal met three of the criteria which justified not upgrading the use of this segment. (*See* Exhibit 29.) That recognition occurred before the Board considered the effect of the invasive species such as the Asian carp, and without regard to the snow melt runoff conditions that I have addressed above. The use of the Lower Ship Canal as a control point for prevention of invasive species migration, and the technical infeasibility of attainment of the proposed chloride standard due to its use in receiving snow-melt runoff from the most heavily urbanized area in the state (and hence with the

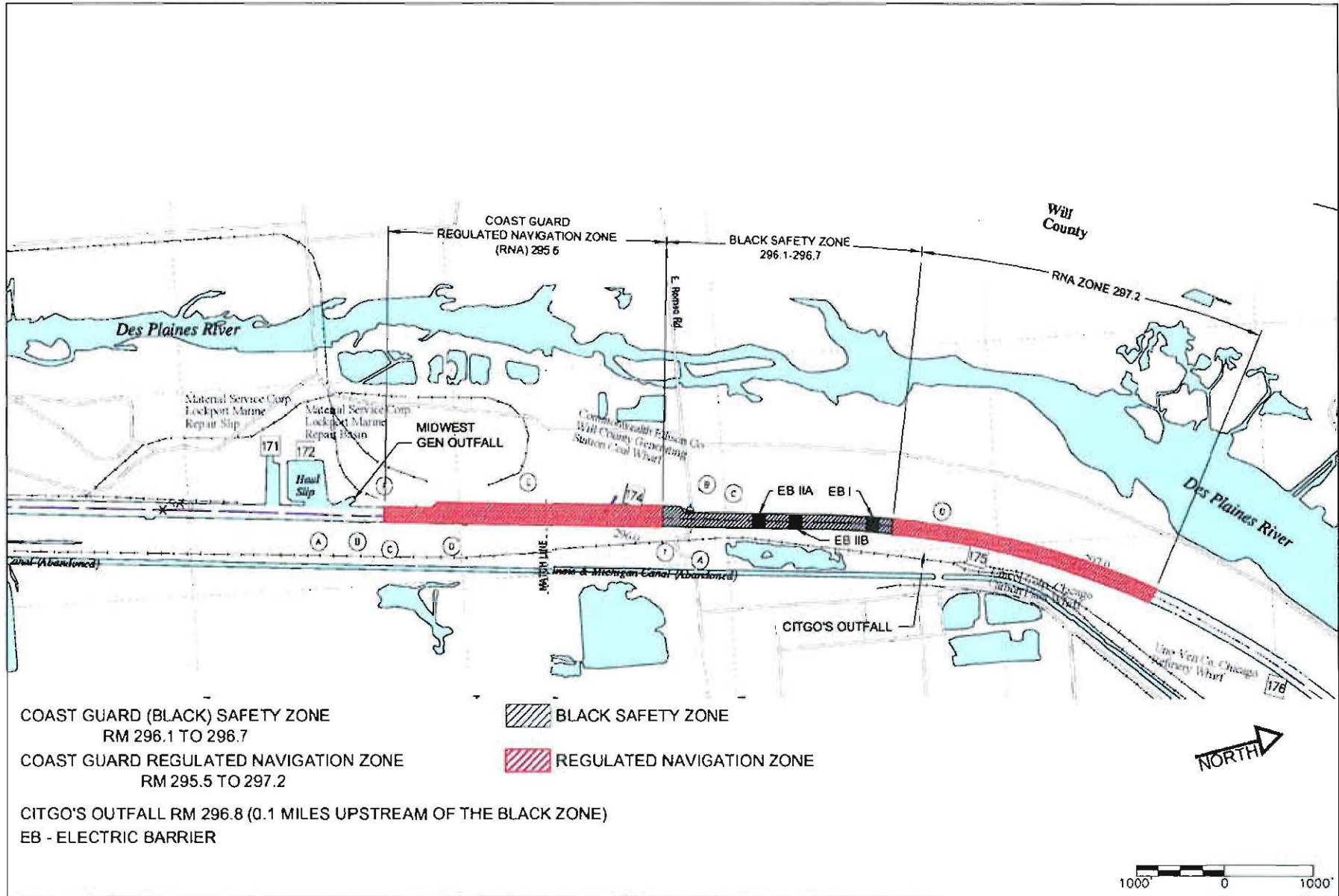
greatest need for de-icing practices) justifies special attention to this segment of the CAWS. Such a use category should recognize the existing uses and limitations of the Canal. Since this set of hearings is focused on the proposed uses of the CAWS, I will not go further into the appropriate water quality standards for the Lower Ship Canal. But I would urge the Board to establish a separate use designation for the Lower Ship Canal and examine in another docket the appropriate water quality standards based on the unique conditions of the Lower Ship Canal.

Thank you, this concludes my pre-filed testimony.



James E. Huff, February 1, 2011

Exhibit A



Testimony of Jim Huff, February 2, 2011, Illinois Pollution Control Board R08-09 (Subdocket C).

## Exhibit B

### Proposed Use C

#### STANDARD:

#### 303.238 Chicago Area Waterway System Aquatic Life Use C Waters

Waters designated as Chicago Area Waterway System Aquatic Life Use C Waters are not capable of maintaining aquatic-life populations. They have unique physical conditions, flow patterns, and operational controls designed to maintain navigational use, flood control, and drainage functions in deep-draft, steep-walled shipping channels. These waters are also used for controls, such as electric fish barriers and other methods, with respect to preventing invasive species from migrating from the Illinois River system towards Lake Michigan. Finally, these waters are used to take up waters with high chloride levels as a result of de-icing actions. The following waters are designated as Chicago Area Waterway System Aquatic Life Use C waters and must meet the water quality standards of 35 Ill. Adm. Code 302, Subpart D:

- a) The Chicago Sanitary and Ship Canal from River Mile 295.5 to river mile 297.2.

#### EXPLANATION:

CAWS Aquatic Life Use C waters are utilized in maintaining controls to prevent invasive species, such as Asian carp species, from entering the Great Lakes. In addition, they are artificially constructed or channelized, straight, deep-draft, steep-walled shipping channels with little or no fixed aquatic or overhanging riparian vegetation or other refugia for aquatic life from shipping traffic and predation. They are generally 15 feet or more deep and square or rectangular in cross section. The channel walls are kept in place by sheet piling, concrete, timbers or various combinations of each. Use C waterways are subject to recurring, moderate to severe anthropogenic impacts such as the application of fish poison, the use of electric fish barriers, sediment scouring, wake disturbances of shoreline areas, and rapid changes in water levels and flow velocities; the impacts are attributable primarily to control of invasive species, navigational uses, de-icing and stormwater run-off, and flood control functions.



Exhibit C

CHICAGO SANITARY & SHIP CANAL CHLORIDE LEVELS  
AT LEMONT (CITGO's WATER INTAKE)

2010		2009		2008		2007	
Date	Chloride (mg/L)	Date	Chloride (mg/L)	Date	Chloride (mg/L)	Date	Chloride (mg/L)
1/1/10	344	1/2/09	342	1/7/08	562	1/1/07	174
1/4/10	350	1/5/09	297	1/11/08	272	1/5/07	156
1/6/10	301	1/9/09	270	1/18/08	270	1/8/07	113
1/8/10	276	1/12/09	300	1/21/08	256	1/12/07	133
1/11/10	223	1/16/09	436	1/25/08	252	1/15/07	250
1/15/10	311	1/19/09	470	1/28/08	514	1/19/07	239
1/18/10	267	1/23/09	331	2/1/08	556	1/22/07	203
1/22/10	297	1/26/09	282	2/4/08	625	1/26/07	384
1/25/10	342	1/30/09	224	2/8/08	896	1/29/07	286
1/29/10	281	2/2/09	298	2/11/08	848	2/2/07	225
2/1/10	310	2/6/09	214	2/15/08	666	2/5/07	227
2/5/10	259	2/9/09	270	2/18/08	489	2/9/07	181
2/8/10	305	2/13/09	402	2/22/08	351	2/12/07	224
2/12/10	283	2/16/09	355	2/25/08	376	2/16/07	181
2/15/10	833	2/20/09	310	2/29/08	299	2/19/07	695
2/19/10	446	2/23/09	344	3/3/08	460	2/23/07	549
2/26/10	648	2/27/09	376	3/7/08	398	2/26/07	600
3/1/10	559	3/2/09	255	3/10/08	304	3/2/07	734
3/3/10	580	3/6/09	881	3/14/08	333	3/5/07	616
3/5/10	528	3/9/09	167	3/17/08	316	3/9/07	395
3/8/10	422	3/13/09	198	3/21/08	301	3/12/07	250
3/12/10	343	3/16/09	237	3/24/08	294	3/16/07	350
3/19/10	536	3/20/09	252	3/28/08	388	3/19/07	340
3/22/10	261	3/23/09	249	3/31/08	413	3/23/07	281
3/22/10	261	3/27/09	245	4/4/08	333	3/23/07	281
3/26/10	259	3/30/09	237	4/7/08	328	3/26/07	415
3/29/10	285	4/3/09	225	4/11/08	275	3/30/07	258
4/2/10	266	4/6/09	228	4/14/08	247	4/2/07	252
4/5/10	246	4/10/09	210	4/18/08	158	4/6/07	236
4/9/10	187	4/13/09	231	4/21/08	266	4/9/07	232
4/12/10	192	4/17/09	214	4/25/08	251	4/13/07	214
4/16/10	210	4/20/09	240	4/28/08	242	4/16/07	242
4/19/10	215	4/24/09	218	5/2/08	224	4/20/07	259
4/23/10	218	4/27/09	220	5/5/08	90	4/23/07	241
4/26/10	191	5/1/09	155	5/9/08	220	4/27/07	136
4/30/10	197	5/4/09	174	5/12/08	172	4/27/07	136
5/3/10	196	5/8/09	204	5/16/08	172	4/30/07	169
5/7/10	177	5/11/09	187	5/19/08	174	5/4/07	176
5/10/10	165	5/15/09	205	5/23/08	213	5/7/07	215
5/14/10	143	5/18/09	119	5/26/08	204	5/11/07	202
5/17/10	129	5/22/09	155	5/30/08	170	5/14/07	200
5/21/10	234	5/25/09	189	6/2/08	183	5/18/07	191
5/24/10	252	5/27/09	191	6/6/08	163	5/21/07	180
5/28/10	131	5/29/09	349	6/9/08	133	5/23/07	188
5/31/10	336	6/1/09	142	6/13/08	130	5/25/07	170
6/4/10	100	6/5/09	156	6/16/08	157	5/28/07	187
6/7/10	132	6/8/09	159	6/20/08	165	6/1/07	150
6/11/10	127	6/12/09	168	6/23/08	175	6/4/07	138
6/14/10	143	6/15/09	120	6/27/08	171	6/8/07	145
6/18/10	104	6/19/09	115	6/30/08	110	6/11/07	148
6/21/10	457	6/22/09	108	7/4/08	144	6/15/07	144
6/25/10	197	6/24/09	132	7/7/08	154	6/18/07	141
6/28/10	100	6/26/09	197	7/11/08	156	6/22/07	110
7/2/10	580	6/26/09	120	7/14/08	124	6/25/07	119
7/5/10	143	6/29/09	130	7/18/08	135	6/29/07	108
7/12/10	123	7/3/09	84	7/21/08	105	7/2/07	108
7/16/10	122	7/6/09	111	7/25/08	110	7/6/07	115
7/19/10	435	7/10/09	108	7/28/08	111	7/9/07	100
7/23/10	158	7/13/09	116	8/1/08	111	7/13/07	104
7/26/10	100	7/17/09	118	8/4/08	99	7/16/07	103
7/30/10	146	7/20/09	110	8/8/08	109	7/20/07	108
8/2/10	109	7/24/09	104	8/11/08	101	7/23/07	114

**Exhibit C**

**CHICAGO SANITARY & SHIP CANAL CHLORIDE LEVELS  
AT LEMONT (CITGO's WATER INTAKE)**

2010		2009		2008		2007	
Date	Chloride (mg/L)	Date	Chloride (mg/L)	Date	Chloride (mg/L)	Date	Chloride (mg/L)
8/6/10	554	7/27/09	105	8/15/08	100	7/27/07	99
8/9/10	116	7/31/09	99	8/18/08	99	7/30/07	105
8/13/10	110	8/3/09	100	8/22/08	90	8/3/07	102
8/16/10	503	8/7/09	88	8/25/08	140	8/6/07	102
8/20/10	116	8/10/09	103	8/29/08	126	8/10/07	90
8/23/10	122	8/14/09	90	9/1/08	90	8/13/07	101
8/27/10	102	8/17/09	89	9/5/08	77	8/17/07	99
8/30/10	105	8/21/09	91	9/8/08	88	8/20/07	111
9/3/10	620	8/24/09	85	9/12/08	112	8/24/07	92
9/6/10	80	8/28/09	73	9/15/08	140	8/27/07	88
9/10/10	83	8/31/09	77	9/19/08	110	8/31/07	115
9/13/10	293	9/4/09	100	9/22/08	138	9/3/07	105
9/17/10	89	9/7/09	96	9/26/08	116	9/7/07	101
9/20/10	105	9/11/09	86	9/29/08	89	9/10/07	91
9/24/10	83	9/14/09	88	10/3/08	96	9/14/07	89
9/27/10	445	9/16/09	88	10/6/08	106	9/17/07	94
10/1/10	596	9/18/09	83	10/10/08	86	9/21/07	87
10/4/10	95	9/21/09	86	10/20/08	115	9/24/07	100
10/8/10	89	9/25/09	85	10/24/08	124	9/28/07	105
10/11/10	691	9/28/09	80	10/27/08	119	10/1/07	101
10/15/10	96	10/2/09	79	10/31/08	127	10/5/07	99
10/18/10	894	10/5/09	82	11/3/08	145	10/8/07	110
10/22/10	105	10/9/09	94	11/7/08	146	10/12/07	107
10/25/10	106	10/12/09	92	11/10/08	152	10/15/07	107
10/29/10	646	10/16/09	100	11/14/08	115	10/19/07	104
11/1/10	104	10/19/09	100	11/17/08	147	10/22/07	91
11/5/10	107	10/23/09	118	11/21/08	149	10/26/07	103
11/8/10	684	10/26/09	81	11/24/08	154	10/29/07	114
11/12/10	121	10/30/09	121	11/28/08	149	11/2/07	111
11/15/10	870	11/2/09	72	12/1/08	155	11/5/07	122
11/19/10	123	11/6/09	111	12/5/08	133	11/9/07	120
11/22/10	142	11/9/09	158	12/8/08	244	11/12/07	127
11/26/10	111	11/11/09	134	12/12/08	272	11/16/07	130
11/29/10	87	11/13/09	137	12/15/08	277	11/19/07	128
12/3/10	91	11/16/09	151	12/19/08	313	11/23/07	122
12/6/10	111	11/20/09	137	12/22/08	337	11/26/07	100
12/10/10	295	11/23/09	133	12/26/08	448	11/30/07	103
12/13/10	177	11/27/09	145	12/29/08	385	12/7/07	261
12/17/10	316	11/30/09	119			12/10/07	717
12/20/10	316	12/4/09	119			12/14/07	654
12/24/10	259	12/7/09	143			12/17/07	404
12/27/10	326	12/9/09	144			12/21/07	998
12/31/10	525	12/11/09	286			12/24/07	614
		12/14/09	275			12/28/07	488
		12/18/09	301			12/31/07	412
		12/21/09	259				
		12/25/09	412				
		12/28/09	424				
<b>Average</b>	<b>273</b>		<b>187</b>		<b>231</b>		<b>214</b>
<b>Maximum</b>	<b>894</b>		<b>881</b>		<b>896</b>		<b>998</b>

CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 2<sup>nd</sup> day of February, 2011, I have served electronically the attached Pre-Filed Testimony of James E. Huff, P.E., accompanying Attachments, and Notice of Filing upon the following person:


John Therriault, Clerk  
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:

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**EXHIBIT M**

**JULY 21, 2015 AFFIDAVIT OF  
MARIA RACE, MIDWEST  
GENERATION DIRECTOR, ASSET  
MANAGEMENT**



BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

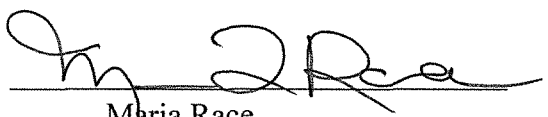
MIDWEST GENERATION, LLC	)	
	)	
Petitioner,	)	
v.	)	PCB _____
ILLINOIS ENVIRONMENTAL	)	(Variance - Water)
PROTECTION AGENCY	)	
	)	
Respondents.	)	

**AFFIDAVIT OF MARIA RACE**

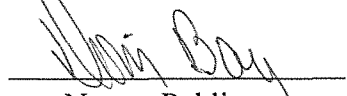
I, Maria Race, being first duly sworn on oath, depose and state as follows:

- I am currently employed as a Director, Asset Management, of NRG Energy, a position which I have held since April, 2014. Prior to this position, I was the Director, Environmental Services at Midwest Generation, LLC. I have been personally involved in matters related to the thermal discharges from the Will County Station, Joliet 9 Station and Joliet 29 Station ("MWGen Stations") to the Chicago Sanitary & Ship Canal and the Upper Dresden Island Pool of the Lower Des Plaines River on behalf of Midwest Generation, LLC ("MWGen") and subsequently for NRG Energy since approximately August, 2001. I also am familiar with both the current NPDES permits for the MWGen Stations as well as the future plans for conversion of the Joliet 9 and 29 Stations to natural gas. I received a Bachelor of Science in Physics from University of Illinois in Urbana-Champaign in 1989 and a Master of Science in Environmental Technology from New York Institute of Technology in 1997.
- I participated in the preparation of the Petition for Variance dated July 21, 2015 to the extent it references and describes factual information relating to MWGen.
- I have read the Petition for Variance dated July 21, 2015, and based upon my personal knowledge and belief, the facts stated relating to MWGen are true and correct.

FURTHER AFFIANT SAYETH NOT

  
 \_\_\_\_\_  
 Maria Race

Subscribed and sworn to before me  
this 21 day of July, 2015.

  
 \_\_\_\_\_  
 Notary Public



## **EXHIBIT N**

# **JULY 21, 2015 AFFIDAVIT OF JOE T. VONDRUSKA, SCIENTIST VI AND BRANCH MANAGER, EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. PCB**

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

MIDWEST GENERATION, LLC	)	
	)	
Petitioner,	)	
v.	)	PCB _____
ILLINOIS ENVIRONMENTAL	)	(Variance - Water)
PROTECTION AGENCY	)	
	)	
Respondents.	)	

**AFFIDAVIT OF JOE T. VONDRUSKA**

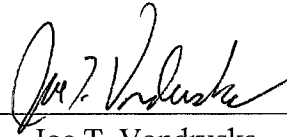
I, Joe T. Vondruska, being first duly sworn on oath, depose and state as follows:

1. I am currently employed as a Scientist VI and Branch Manager at EA Engineering, Science, and Technology, Inc., PBC ("EA") in Deerfield, Illinois, a position which I have held since September 3, 2005. Prior to becoming a Scientist VI, I have held the following positions at EA between January 1985 and September 2005: Environmental Specialist, Technician III, Assistant Scientist, Associate Scientist, Scientist II, Scientist III, Scientist IV, and Scientist V. I have been personally involved in conducting and/or managing a variety of physicochemical and fisheries-related studies, including the annual temperature/dissolved oxygen and fisheries monitoring studies performed in the Chicago Sanitary & Ship Canal and/or in the Dresden Island Pool of the Lower Des Plaines River on behalf of Midwest Generation, LLC ("MWGen") since approximately 2000. I also was involved in performing similar studies on behalf of ComEd from 1987 through 1999. I received a Bachelor of Science in Agriculture from The University of Nebraska-Lincoln in 1984 and a Master of Science in Environmental Management from the Illinois Institute of Technology in 2002.

2. I participated in the preparation of the Petition for Variance dated July 21, 2015 to the extent it references and describes information relating to the compliance plan Section 316(a) thermal demonstration work and associated estimated timetable, prior EA studies, and conclusions regarding environmental impacts based thereon.

3. I have read the Petition for Variance dated July 21, 2015, and based upon my personal knowledge and belief, the facts stated regarding the compliance plan Section 316(a) thermal demonstration work and associated estimated timetable, prior EA studies, and conclusions regarding environmental impacts to the aquatic community based thereon are true and correct.

FURTHER AFFIANT SAYETH NOT



Joe T. Vondruska

Subscribed and sworn to before me  
this 21<sup>st</sup> day of July, 2015.



Notary Public

