ILLINOIS POLLUTION CONTROL BOARD
September 18, 2014

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

Proposed Rule. First Notice.

OPINION AND ORDER OF THE BOARD (by D. Glosser):

SUMMARY OF TODAY'S ACTION

The Board today proposes water quality standards for the Chicago Area Waterways System (CAWS) and the Lower Des Plaines River (LDPR) that are necessary to meet the aquatic life uses for those waterways. The Board is proceeding with the standards for many constituents as proposed by the Illinois Environmental Protection Agency (IEPA), with two notable exceptions. The Board finds that the 500 mg/L chloride standard must be adapted for the Chicago Sanitary and Ship Canal (CSSC) from December 1 until April 30. Therefore the Board proposes for the CSSC a numeric standard of 620 mg/L as a chronic water quality standard and 990 mg/L an acute water quality standard for chloride from December 1 until April 30.

The Board also finds that the temperature water quality standards proposed by IEPA as well as those suggested by other participants are not appropriate. Therefore, the Board proposes that the General Use temperature standards apply to the waterways.

The Board also declines to proceed with mixing zones for chloride or with site-specific relief for dischargers at this time. The Board seeks additional input from participants on these issues.

GUIDE TO THE BOARD'S OPINION

Numerous public hearings have been held, numerous comments received, and exhibits have been filed, in addition to IEPA original proposal. Thus, for the convenience of the reader, IEPA's statement of reasons is cited as "SR" and attachments to the proposal are cited as "Attach" while hearing exhibits are cited as "Exh.". Hearing transcript are cited by date 01/01/01 and "A" or "P" if there are separate morning or afternoon transcripts. Public comments are cited as "PC".

The Board's opinion begins by addressing the procedural background (page 2) followed by the statutory background (page 4). The Board next supplies the historical background and a description of the waterways at issue (page 4). The regulatory history is included next (page 7).

The Board then summarizes the Clean Water Act (CWA) requirements and the corresponding federal regulations (page 10).

The rulemaking detail begins with a description of the designated uses developed by the Board in Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9(C), (Feb. 6, 2014) (page 13). IEPA's regulatory proposal follows (page 13). The Board summarizes the testimony (page 33) and then the public comments (page 91). Finally, the Board discusses the Board's decision (page 175) before reaching its conclusions (page 219) and issuing its order (page 219).

PROCEDURAL BACKGROUND

On October 26, 2007, IEPA filed a proposal under the general rulemaking provisions of Sections 27 and 28 of the Environmental Protection Act (Act) (415 ILCS 5/27, 28 (2012)). Generally, the proposal amends the Board's rules for Secondary Contact and Indigenous Aquatic Life Use to update the designated uses and criteria necessary to protect the existing uses of CAWS and LDPR. On November 1, 2007, the Board accepted the proposal for hearing. On November 15, 2007, the Board granted a motion to hold hearings in Chicago and Joliet.

On June 12, 2008, the Metropolitan Water Reclamation District of Greater Chicago (District) filed a motion to stay the rulemaking proceeding, which was supported by: 1) Midwest Generation L.L.C (Midwest Generation), 2) Chemical Industry Council of Illinois, and 3) Stepan Company (Stepan). On June 25, 2008, the Environmental Groups filed a response in opposition to the motion. Joining in the opposition to the motion were Southeast Environmental Task Force, the People of the State of Illinois, and IEPA. On July 21, 2008, the Board denied the motion to stay and directed the parties to proceed with additional hearings already scheduled.

On March 18, 2010, the Board granted a motion filed by CITGO Petroleum Corporation and PDV Midwest, LLC. (Citgo/PDV) for an additional hearing on Asian carp, but delayed that hearing until later in 2010. The Board also granted a motion filed by the Environmental Law and Policy Center, Friends of the Chicago River, Sierra Club Illinois Chapter, Natural Resources Defense Council and Openlands (Environmental Groups) to sever the dockets. The Board severed the dockets as follows: 1) Subdocket A dealt with the issues related to recreational use designations and the final rule was adopted on August 18, 2011; 2) Subdocket B addressed issues relating to disinfection and whether or not disinfection may or may not be necessary to meet those use designations and the final rule was adopted on February 2, 2012; 3) Subdocket C addressed the issues involving proposed aquatic life uses and the final rule was adopted on February 6, 2014; and 4) Subdocket D addresses the issues dealing with water quality standards and criteria that are necessary to meet the aquatic life use designations.

The Board held 39 days of hearing as of March 18, 2010, when the docket was divided, and additional hearings proceeded in the Subdockets. During the first 39 days of hearings, hearings were held in Chicago: January 28, 2008 through February 1, 2008, June 16, 2008, September 8, 2008 through September 10, 2008, September 23, 2008 through September 25, 2008, February 17 and 18, 2009, March 3 and 4, 2009, April 15, 2009, May 5, 6, and 20, 2009,

July 28 and 29, 2009, August 13 and 14, 2009, October 5, 2009, November 9 and 10, 2009, and January 13 and 14, 2010. Hearings were held in Joliet: March 10, 2008 through March 12, 2008, October 27 and 28, 2008 and November 17, 2008. Hearings were held in Des Plaines: April 23 and 24, 2008, and December 2 and 3, 2008.

Not all the testimony received during the 39 days of hearing held prior to March 18, 2010, is relevant to this Subdocket. Those whose testimony is relevant are the following:

Rob Sulski of IEPA (Exhibit 1)
Scott Twait of IEPA (Exhibit 2)
Roy Smogor of IEPA (Exhibit 3)
Chris O. Yoder on behalf of IEPA (Exhibit 13)
Adrienne D. Nemura on behalf of the District (Exhibit 116)
Stephen F. McGowan on behalf of the District (Exhibit 133, 211)
Charles S. Melching on behalf of the District (Exhibit 169)
Jennifer Wasik on behalf of the District (Exhibit 187, 230)
Samuel G. Dennison on behalf of the District (Exhibit 191, 209)
Paul L. Freedman on behalf of the District (Exhibit 204)
David R. Zenz on behalf of the District (Exhibit 217)
John Mastracchio on behalf of the District (Exhibit 223)
James E. Huff on behalf of Citgo/PDV (Exhibit 285)
Joseph V. Idaszak on behalf of Corn Products (Exhibit 305)
James E. Huff on behalf of Corn Products (Exhibit 304)
Carl E. Adams Jr. and Robin Garibay on behalf of Stepan Company (Exhibit 318)
Julia Wozniak on behalf of Midwest Generation (Exhibit 364)
Greg Seegert on behalf of Midwest Generation (Exhibit 366)
Dr. G. Allen Burton on behalf of Midwest Generation (Exhibit 369)

In addition to hearing testimony, the Board received over 381 exhibits and over 500 public comments, prior to the dockets being divided on March 18, 2010. Many of the comments and exhibits are not relevant to a determination of aquatic life use, and therefore will not be discussed.

Proceedings Since March 18, 2010

The Board held an additional five days of hearings all in Chicago for Subdocket D. The first of those on November 9 and 10, 2010, was devoted to the issue of the impact of Asian carp prevention measures on the aquatic life uses and water quality standards. The Board held hearings on issues regarding aquatic life water quality standards in 2013 on July 29, September 23 and December 17.

By hearing officer order, the pre-first notice comment period closed on April 30, 2014, with responsive comments to be filed by May 14, 2014.

The following individuals representing industry, environmental organizations, and state agencies testified during the five additional days of hearings held on Subdocket D:

Scott Twait on behalf of IEPA (Exhibit 480)
Lial F. Tischler on behalf of ExxonMobil Oil Corporation (ExxonMobil) (Exhibit 488)
Bruce Nelson on behalf of Citgo/PDV (Exhibit 489)
Roger Klocek on behalf of Citgo/PDV (Exhibit 491)
Larry Tyler on behalf of Citgo/PDV (Exhibit 492)
James E. Huff on behalf of Citgo/PDV (Exhibit 493)

In addition to hearing testimony, the Board received 493 exhibits and over 1400 public comments in all the dockets combined. Not all comments and exhibits are relevant to a determination of aquatic life water quality standards, and therefore will not be listed. Further, many public comments consist of one page or less from numerous individuals. Those comments are: PC 306-483, 485-494, 501-504, 507-510, 1258-1274, 1294-1329, 1330-1336, 1339-1354, 1355-1365, 1369-1371, 1400. Those comments express support for cleaning up the waters. The public comments from participants are:

IEPA PC 286, 1396, 1401, 1409
Honorable John Fritchey of the 11th District, Illinois House of Representatives PC 289
The Environmental Groups PC 1407, 1412
The District PC 1292, 1366
Citgo/PDV PC 1394, 1395, 1399, 1402, 1410
Stepan Company PC 1405, 1411
ExxonMobil Oil Corporation PC 1397, 1398, 1406, 1413
Midwest Generation PC 1403, 1408a and 1408b
United States Environmental Protection Agency (USEPA) PC 1337, 1338, 1367, 1404

On May 24, 2013, IEPA filed a motion to amend the proposal (AmProp.) and supported the amendment with testimony by Scott Twait (Exh. 480). The Board today grants the motion to amend the proposal.

STATUTORY BACKGROUND

This proposal was filed as a regulatory proposal of general applicability pursuant to Sections 27 and 28 of the Act (415 ILCS 5/27, 28 (2012)) and as a general rulemaking pursuant to Section 5-40 of the Illinois Administrative Procedure Act (5 ILCS 100/5-40 (2012). SR at 2. Pursuant to Section 27(a) of the Act (415 ILCS 5/27(a) (2012)), the Board is required to take into account "the existing physical conditions, the character of the area involved, including the character of surrounding land uses, zoning classifications, the nature of the existing air quality or receiving body of water, as the case may be, and the technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution." 415 ILCS 5/27(a) (2012).

DESCRIPTION AND ENGINEERING HISTORY OF THE WATERWAYS

The Board will begin with a description of CAWS and then LDPR. The Board will then discuss the engineering history of CAWS and LDPR.

CAWS Description

The Chicago area is drained by a series of waterways, including many that were manmade, to direct water flow away from Lake Michigan to protect drinking water. SR at 18. CAWS consists of 78 miles of manmade channels that allow for commercial navigation, and that provide an outlet for urban stormwater runoff and treated municipal wastewater effluent. *Id*. CAWS also supports recreational boating, fishing, streamside recreation, and aquatic life and wildlife. *Id*. Approximately 75% of the waterway consists of manmade canals while the other 25% is formerly natural stream channels which have been deepened, straightened or widened. *Id*. The flow is artificially controlled by four hydraulic structures managed by the District allowing the water levels to be lowered in anticipation of a storm event. Wastewater treatment plant effluent makes up approximately 70% of the annual flow through the Lockport Powerhouse and Lock and Powerhouse facility. *Id*.

CAWS drainage area is approximately 740 square miles and comprises the Chicago River and Calumet River drainages. SR at 18. The Chicago River System consists of 55 miles of waterways, including the Chicago River, Chicago Sanitary and Ship Canal (CSSC), North Branch Chicago River (including the North Branch Canal), North Shore Channel, South Branch Chicago River, and South Fork of South Branch Chicago River (Bubbly Creek). *Id*. The Calumet River System, 23 miles in length, includes Calumet-Saganashkee (Cal-Sag) Channel, portions of Little Calumet River, portions Grand Calumet River, Calumet River, Lake Calumet Connecting Channel and Lake Calumet. *Id*.

LDPR Description

The Des Plaines River originates in Wisconsin and flows into Illinois through Lake and Cook counties. SR at 16. Near Lyons, the Des Plaines River turns southwest and parallels the Chicago Sanitary Ship Canal (CSSC) and then joins the CSSC. *Id*. The Des Plaines River, without the CSSC, has a drainage area of 13,371 square miles, and the CSSC's drainage area is 740 square miles. *Id*. The length of the Des Plaines River from the Wisconsin state border to the confluence with the Kankakee River is 110.7 miles. *Id*.

The LDPR is the section of the Des Plaines River currently designated as Secondary Contact and Indigenous Aquatic life use and extends from the confluence with the CSSC to the Interstate 55 Bridge at River Mile 277.9. *Id*. The LDPR's reach is almost entirely impounded and has two geomorphologically different segments in the Brandon Pool above the Brandon Road Lock and Dam and the portion of the Dresden Island Pool upstream of the Interstate 55 Bridge known as the Upper Dresden Island Pool (UDIP). *Id*.

The Brandon Pool is four miles in length and approximately 300 feet wide with depths of 12 to 15 feet. SR at 16. The Brandon Pool is a highly modified stream channel, and the CSSC contributes approximately 80% of the flow to the Brandon Pool downstream of the confluence. SR at 17.

The entire Dresden Island Pool is 14 miles long and approximately 800 feet wide. SR at 17. The UDIP is defined as the 8.1 mile reach of the impoundment that is upstream of the Interstate 55 Bridge. *Id*. The UDIP is more natural than Brandon Pool and has natural shoreline and side channels. *Id*.

The LDPR is a part of the Upper Illinois Waterway[1] which is one of the busiest inland commercial navigation systems in the United States. SR at 17. The Illinois Waterway provides a link between the Great Lakes/St. Lawrence Seaway navigation system and the Mississippi River navigation system. The entire Illinois Waterway is channelized to maintain a minimum depth of nine feet. *Id*.

Engineering History of CAWS and LDPR

CAWS and LDPR consist of portions of the Chicago River, Calumet River and LDPR drainages that were altered by human engineering from the mid-1800s into the mid-1900s. SR at 14. These rivers were altered to promote commercial navigation and to eliminate the flow of untreated sewage into Lake Michigan. *Id*. Canals and dams were added during that time to redirect the flow of CAWS to the Des Plaines River. Four canals were dug where no major waterways existed before, and five dams were installed. *Id*. The existing channels were enhanced and stream flow was altered by deepening, widening, and channelizing various reaches, and by augmenting existing flow with navigational makeup and "discretionary diversion" from Lake Michigan. *Id*. Upon completion of these alterations, flows in several of the major reaches were in a reverse direction of their original paths. *Id*. With urban development, CAWS and LDPR grew in importance as storm water management systems. *Id*.

Prior to the human alterations that began in the mid-1800s, the Chicago River flow originated from the north and south branches. SR at 15. The North Branch Chicago River flowed south and converged with north flowing South Branch Chicago River to form the Chicago River. *Id*. The Chicago River then meandered east and emptied into Lake Michigan. *Id*. The North Branch Chicago River received most of the flow from two forks (east and middle), and from a wetland system known as the Skokie Marsh. *Id*. The South Branch Chicago River headwaters included the southern and western forks of the Chicago River. *Id*. The entire drainage for the Chicago River consisted of relatively small, sluggishly flowing prairie streams. *Id*.

The Calumet River System consisted of Little Calumet River, Grand Calumet River and, a network of wetlands. SR at 15. The Little Calumet River began in La Porte County, Indiana, flowed west into Illinois, made a hairpin curve north and then back east. *Id*. The Little Calumet River then joined numerous wetland flows to form the Grand Calumet River, which flowed east and emptied into Lake Michigan in Miller, Indiana. *Id*. During this period, Lake Calumet and the Calumet River had fairly undefined boundaries. *Id*. There existed a complex system of marshes, dunes and swales surrounding an area of open water. Depending on rain events and

[1] "The term Upper Illinois Waterway generally refers to the waters from Lake Michigan through the Chicago area downstream through the Ship Canal and Lower Des Plaines and on to the connection with the Mississippi River." 1/13/10ATr. at 12

Lake Michigan levels, the system sometimes flowed into the Grand Calumet River and its tributary, Little Calumet River, while at other times the system flowed into Lake Michigan or remained stagnant and isolated. *Id*.

Prior to urbanization and the reversal of the Chicago River system, the LDPR had a much smaller amount of water flowing through the system. SR at 15. The LDPR was modified from the original configuration to accommodate shipping traffic and the increased flow from CAWS. SR 16. Specifically, the LDPR was deepened and channelized, and the Lockport Lock and Power House and the Brandon Road Lock and Dam were added. *Id*.

The LDPR has historically received flows from the CSSC, which was created during the alterations of CAWS. SR at 17. The flow in the CSSC is predominantly treated and partially treated effluents from the District's wastewater reclamation plants and combined sewer overflows (CSOs). *Id*. The population equivalent of the effluent carried by the CSSC to the LDPR is about 9.5 million. *Id*. The CSO discharges have been reduced with partial completion of the Tunnel and Reservoir Project (TARP) and will be further reduced with the completion of TARP. *Id*.

REGULATORY HISTORY

Prior to adoption of the Environmental Protection Act (Act) in 1970, the Illinois Sanitary Water Board had jurisdiction over water quality management activities, including establishment of water quality standards. SR at 7. The Sanitary Water Board initially designated the LDPR as an "Industrial Water Supply Sector" with numeric and narrative criteria appropriate to that use category pursuant to the Federal Water Quality Act of 1965 (PL89-235). *Id.*, citing SWB-8 (Adopted December 1, 1966, approved by U.S. Department of Interior January 27, 1968, reapproved by Sanitary Water Board March 5, 1968). Sanitary Water Board Regulation SWB-15 established the uses and numeric and narrative water quality standards applicable to CAWS. *Id.*, citing SWB-15 (Adopted June 28, 1967, approved by U.S. Department of Interior January 27, 1968 and reapproved by Sanitary Water Board on March 5, 1968).

The uses specified within the Industrial Water Supply Sector and CAWS included "commercial vessel and barge shipping, recreational boating transit, withdrawal and return of industrial cooling and process water, and to receive effluents from industrial and domestic waste treatment facilities." SR at 8. The narrative standards included freedom from unnatural bottom deposits, floating debris, and nuisance or toxic conditions. *Id.* Water quality standards for dissolved oxygen (DO), pH, temperature, dissolved solids, and bacteria were also included in Rule 1.07 of SWB-8 and Rule 1.03 of SWB-15. *Id.* In addition, the North Shore Channel and Chicago River were used for recreational activities, and the Calumet Harbor was used as a public water supply and for fish and aquatic life. *Id.*, citing SWB-15, Rule 1.02.

Following adoption of the initial water quality criteria, the Sanitary Water Board submitted a plan for implementation of the standards applicable to the LDPR and CAWS to the federal government on August 10, 1967. SR at 8. The U.S. Department of Interior approved these plans on January 27, 1968. *Id.*

The Sanitary Water Board was superseded by the creation of the Illinois Pollution Control Board and IEPA upon enactment of the Act in 1970. *Id.* The Board and IEPA almost immediately focused attention on the development of new water quality standards. *Id.* Draft proposed rules were published for public comment on May 12, 1971, (docketed as Water Quality Standards Revisions, R71-14), and public hearings were conducted shortly thereafter. *Id.*

The Secondary Contact and Indigenous Aquatic Life Use designations were developed during the R71-14 proceedings. SR at 8-9. In developing the draft proposed rules, the Board considered classifying the CSSC as "Restricted Use" upstream of the confluence with the Des Plaines River (at Lockport), and considered placing the LDPR downstream from Lockport within the higher General Use designation. *Id.* Restricted Use was later changed to Secondary Contact and Indigenous Aquatic Life Use as currently understood. SR at 9. During the R71-14 proceedings, the Board spent a great deal of time debating where the Secondary Contact and Indigenous Aquatic Life Use designations should end and the General Use designation should begin. *Id.*

Commonwealth Edison Company (ComEd), the City of Joliet, and the United States Steel Corporation of Joliet (U.S. Steel) voiced concerns during the R71-14 proceedings regarding the Restricted Use designation for the Des Plaines River upstream from the Interstate 55 Bridge. The City of Joliet suggested that the point of changeover be made at the confluence of the Des Plaines and Kankakee rivers because being directly downstream of the proposed use change at Lockport would force the City of Joliet to comply with the General Use standards even though the waters had not come to a point of dilution. *Id.* U.S. Steel suggested that the Restricted Use designation be extended to the area near Brandon Locks because that area was industrial. *Id.*

ComEd argued against applying the General Use standards to the LDPR upstream of its confluence with the Kankakee River. SR at 9-10. ComEd noted that the costs of imposing the higher water quality standards on the LDPR would outweigh any benefits and that, even if the standards were met, the river would not be suitable for aquatic life due to heavy industrialization, barge traffic, diking of the shoreline and dredging. SR at 10. IEPA stated that ComEd did not believe that the General Use standards for temperature could be met in the LDPR upstream of its confluence with the Kankakee River, and that meeting the temperature standard was not important due to the small possibility that General Use water quality standards would be met in other respects. *Id.* Because the waterway would be incapable of supporting aquatic life now and use of the river for recreation up to the Interstate 55 Bridge was nonexistent due to industrialization, there would be no advantage to adopting the General Use standards. *Id.*

The Board ultimately classified CAWS and the LDPR from Lockport to the Interstate 55 Bridge as Restricted Use waters. SR at 10, citing R71-14 (March 7, 1972). Restricted Use was later changed to the -Secondary Contact and Indigenous Aquatic Life Use, contained in the current Board regulations. SR at 10. The term "Secondary Contact", means any recreational or other water use in which contact with the water is incidental or accidental and the probability of ingesting water is minimal. SR at 19. Activities such as fishing, commercial and recreational boating and other shoreline activities where contact is minimal are considered secondary contacts. *Id*. One common characteristic of the waterbodies designated as Secondary Contact

and Indigenous Aquatic Life Use in Northeastern Illinois is that the waterbodies were engineered to reverse the flow of the Chicago River. *Id.*

When the Board adopted the Secondary Contact and Indigenous Aquatic Life Use category in R 71-14, the waters designated as secondary contact were described as follows:

1) Routinely dredged and maintained channels, including steep-sided cross-sections designed to accommodate barge traffic and optimize flow.

2) Significant sludge deposition, as a result of combined sewer overflows, industrial waste discharges and urban runoff. Sludge depth in the channel system can reach five feet or more despite dredging.

3) Flow reversal projects, such as this one, place a premium on head differential. The entire system has minimum slope and, consequently, low velocity, stagnant flow conditions. Because of international agreements on the use of Lake Michigan water, diversion to maintain flow in the system is kept as low as possible.

4) Urban stress is significant within the entire drainage area. There was essentially no recreation potential with most adjacent property commercially owned and access limited.

5) Good physical habitat for aquatic communities in the main channel was nonexistent due to the impact of commercial and recreational watercraft use of the system as well as sludge deposition. Watercraft lockage through the Chicago River Control Works averages 25,000 vessels annually; most activity occurs during the summer months.

6) In addition to the above human-made and irretrievable modifications, CAWS also carries a massive wastewater load including combined sewer overflows during wet weather. During the summer periods, a small "discretionary diversion" of Lake Michigan water is permitted to minimize the combined effects of waste load from the municipal and industrial discharges to the system and poor assimilative capacity. SR at 19-20.

In developing water quality standards in the 1970s, the Board declined to act on amendments proposed by ComEd to move the General Use boundary to the confluence with the Kankakee River in In the Matter of: Water Quality Standards Revisions, R72-4 (Dec. 4, 1975). SR at 10. The Board reasoned that the location of the bridge corresponded to changes in the physical characteristics of the area. SR at 10-11, citing R72-4, slip op. at 5 (Nov. 8, 1973). IEPA stated that the industrial characteristics described by ComEd's witnesses could not be applied to the area below the bridge. SR at 11. The Board also noted that the five-mile stretch downstream of the bridge was capable of providing recreation important to the area and supporting desirable aquatic biota. *Id.*, citing R72-4 at 8.

IEPA noted that few regulatory changes have been made to the use designations or water quality standards applicable to CAWS and the LDPR since 1972. SR at 11. The stretch of the North Shore Channel from the North Side Sewage Treatment Works to Lake Michigan and the stretch of the Calumet River from the O'Brien Locks and Dam to Lake Michigan were upgraded from Secondary Contact and Indigenous Aquatic Life Use to General Use in Amendments to Water Quality and Effluent Standards Applicable to the Chicago River System and Calumet River System, R87-27 (May 19, 1988). *Id.*, citing R87-27. The main branch of the Chicago River was not included in the Secondary Contact and Indigenous Aquatic Life Use in R71-14 but was included in a list of waters exempt from the Public and Food Processing Water Supply Use designation in Rule 303. *Id.*, citing 35 Ill. Adm. Code 303.

One other area where changes have been made to the water quality standards since 1972 is the thermal standards. SR at 11. The thermal standards for Secondary Contact and Indigenous Aquatic Life Use waters require that the temperature not exceed 34º C (93º F) more than five percent of the time, or 37.8º C (100º F) at any time. SR at 11-12. The General Use thermal standard requires that the temperature be no higher than 32º C (90º F) during April through November and no higher than 16º C (60º F) for the remainder of the year. SR at 12. The maximum temperature for General Use waters in the summer months is 33.7º C (93º F) and 17.7º C (63º F) for the remainder of the year. *Id*. ComEd (and later Midwest Generation) has requested regulatory relief from these standards several times over the years. *Id*.

ComEd sought regulatory relief for the General Use thermal standards for a "five mile stretch" of the Des Plaines River below the Interstate 55 Bridge. SR at 12, citing Water Quality Standards Revisions, R72-4 (Nov. 8, 1973). The Board granted relief that had a sunset provision of July 1, 1978. *Id*. The Board then granted a variance to ComEd and required it to provide a thermal demonstration that the discharges were not causing ecological damage. That variance expired on July 1, 1981. SR at 12-13, citing Commonwealth Edison Company v. IEPA, PCB 78-79 (May 25, 1978). Additional variances were granted allowing ComEd to continue the discharge, while developing its thermal demonstration. *See* Commonwealth Edison Company v. IEPA, PCB 81-34 (June 10, 1981); Commonwealth Edison Company v. IEPA, PCB 84-33 (Dec. 20, 1984. On August 1, 1988, after receiving ComEd's thermal demonstration the Board granted a variance from the thermal standards. SR at 12-13, citing Commonwealth Edison Company v. IEPA, PCB 87-93 (Nov. 15, 1989). On November 21, 1991, another variance to the General Use water quality standard was granted for ComEd's two Joliet facilities and the relief expired on November 21, 1996. SR at 13, citing Commonwealth Edison Company v. IEPA, PCB 91-29 (Nov. 21, 1991). On October 3, 1996 the Board granted an adjusted standard applicable to all five of the ComEd's facilities at the Interstate 55 Bridge. SR at 13, citing Petition of Commonwealth Edison Company for Adjusted Standard from 35 Ill. Adm. Code 302.211(d) and (e), AS 96-10 (Oct. 3, 1996). In AS 96-10 the Board set monthly temperature limits ranging from 60º F in January and February to 91º F from June 16 through August 31. SR at 13-14. The standards may be exceeded by no more than 3º F two percent of the time. SR at 14.

CLEAN WATER ACT AND FEDERAL REGULATIONS

The proposed rulemaking is intended to meet certain obligations of the State of Illinois under the Federal Water Pollution Control Act (Clean Water Act or CWA) (33 U.S.C. § 1313). SR at 3. Section 303 of the CWA requires that a state periodically (at least once each three year period beginning with October 18, 1972) hold public hearings for the purpose of reviewing applicable water quality standards, and to modify the standards as necessary (33 U.S.C. § 1313(c)(1)). *Id*. The national goal of the CWA is to attain "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for the recreation in and on the water. . .." 33 U.S.C. § 1251(a)(2). *Id*. This is commonly known as the "fishable and swimmable" goal. SR at 3.

Under the federal regulations, the phrase "water quality standards" includes both the establishment of designated uses for intrastate waters and the promulgation of necessary criteria to protect these uses. SR at 3-4. Therefore, IEPA's triennial review includes the designation of uses for specified waters and the establishment of numeric and narrative criteria intended to protect these designated uses. SR at 4. Through the federal regulations, USEPA has provided six minimum elements for State water quality standards under 40 C.F.R. § 131.6. The six elements are:

(a) Use designations consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the [Clean Water] Act.

(b) Methods used and analyses conducted to support water quality standards revisions.

(c) Water quality criteria sufficient to protect the designated uses.

(d) An antidegradation policy consistent with [40 C.F.R.] §131.12.

(e) Certification by the State Attorney General . . . that the water quality standards were duly adopted pursuant to State law.

(f) General information which will aid [USEPA] in determining the adequacy of the scientific basis of the standards which do not include the uses specified in section 101(a)(2) of the [Clean Water] Act as well as information on general policies applicable to State standards which may affect their application and implementation. 40 C.F.R. § 131.6.

In addition, USEPA has outlined procedures for designating uses and conducting use attainability analyses, permitting states to adopt sub-categories of a use with appropriate criteria as well as seasonal uses. SR at 5, citing 40 C.F.R § 131.10. To remove a designated use or establish a use other than the CWA aquatic life and recreational goals, States must consider six Use Attainability Analysis (UAA) factors to adopt such a use. SR at 5, citing 40 C.F.R § 131.10(g). The six UAA factors are:

1) Naturally occurring pollutant concentrations prevent the attainment of the use; or

2) Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the use . . .; or

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

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

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

6) Controls more stringent than those required by sections 301(b) and 306 of the Act [CWA effluent standards] would result in widespread economic and social impact. 40 C.F.R § 131.10(g).

In addition to the six UAA factors, States are prohibited from removing or downgrading uses that are existing uses (as of November 28, 1975) currently being attained or that could be attained by implementing the CWA effluent limits. SR at 6, citing 40 C.F.R. § 131.10. IEPA describes the UAA as a federal model for conducting a structured scientific assessment of the factors affecting the attainability of uses by taking into consideration physical, chemical, biological, and economic factors. Exh. 1 at 5-6.

After designating uses, States establish criteria sufficient to protect these uses pursuant to 40 C.F.R. § 131.11. SR at 6. States must establish criteria, for the relevant parameter, that protect the most sensitive use and must address all parameters necessary to protect the use. *Id*., citing 40 C.F.R. § 131.11(a). States must also specifically address toxic pollutants through numeric or narrative criteria as well as adopt a statewide antidegradation policy and methods for implementing that policy. SR at 6, citing 40 C.F.R. § 131.11(b), 131.12. Illinois' statewide antidegradation policy can be found in the Board's regulations at 35 Ill. Adm. Code 302.105.

In addition to reviewing the numeric criteria or standards for particular pollutants, States are also obligated to review the designated use portion of water quality standards every three years where a use has been established that does not meet the CWA aquatic life goal or recreational goal. SR at 7, citing 33 USC § 1251(a)(2).

According to IEPA, waters in Illinois designated for General Use can attain the CWA goals, and the waters designated for Secondary Contact and Indigenous Aquatic life use are incapable of attaining CWA aquatic life and recreational goals. SR at 7. IEPA noted that this proposal includes rulemaking changes to update the designated uses and criteria necessary to

protect such uses for the waters currently designated as Secondary Contact and Indigenous Aquatic life use in 35 Ill. Adm. Code 303. *Id*. The standards adopted by the Board to protect these uses are currently found in 35 Ill. Adm. Code 302. Subpart D. *Id*.

DESIGNATED USES

The Board designated aquatic life uses for CAWS and LDPR in Subdocket C. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(C), (Feb. 6, 2014). After reviewing the record and examining the CWA goal of "water quality which provides for the protection and propagation of fish, shellfish, and wildlife. . ." (33 U.S.C. § 1251(a)(2)), the Board adopted three aquatic life use designations and developed definitions of those aquatic life use designations. The Board adopted a CAWS Aquatic Life Use (ALU) A, CAWS and Brandon Pool Aquatic Life Use (ALU) B, and UDIP Aquatic Life Use (ALU).

CAWS ALU A waters are capable of maintaining tolerant and intermediately tolerant species such as channel catfish, largemouth bass, bluegill, black crappie, spotfin shiner, orangespotted sunfish, common carp, and goldfish. The Board adopted as CAWS ALU A waters: Upper North Shore Channel, Lower North Shore Channel, North Branch of the Chicago River, South Branch of the Chicago River, Cal-Sag Channel, Calumet River, Little Calumet River, Grand Calumet River, Lake Calumet, and Lake Calumet Connecting Channel.

CAWS and Brandon Pool ALU B waters are capable of protecting aquatic life populations predominated by individuals of tolerant types such as common carp, golden shiner, bluntnose minnow, yellow bullhead, and green sunfish. The Board adopted as ALU B waters the Chicago Sanitary and Ship Canal and Brandon Pool.

The UDIP ALU is defined as waters capable of maintaining, and having quality sufficient to protect, aquatic-life populations consisting of individuals of tolerant, intermediately tolerant, and intolerant types such as largemouth bass, bluntnose minnow, channel catfish, orangespotted sunfish, smallmouth bass, shorthead redhorse, and spottail shiner. The UDIP is the only water given this designated use.

The Board maintained the General Use standard for the Chicago River, so no change in the aquatic life use designation for the Chicago River was adopted.

IEPA REGULATORY PROPOSAL

The Board will summarize IEPA's proposal. Where the amended proposal changed the language from the original proposal the Board will describe the amended proposal.

Section 302.101 Scope and Applicability

IEPA proposed changes to ensure that the general requirements of Part 302 were consistent with the proposed rules. SR at 52; Exh. 481 at 7.

Section 302.102 Allowed Mixing, Mixing Zones and ZIDs

IEPA proposed a minor change to update cross-references in order to require all acute toxicity standards to apply within mixing zones established for numerical standards for toxic parameters. SR at 53.

302.Subpart D

IEPA proposed that the title of this Subpart be changed to Chicago Area Waterway System and Lower Des Plaines River Water Quality. SR at 53; Exh. 481 at 12.

Section 302.401 Scope and Applicability

IEPA's proposal updates this Section to eliminate references to secondary contact provisions and include the references to the new CAWS and LDPR provisions. SR at 54; Exh. 481 at 12.

Section 302.402 Purpose

Section 302.402 is being amended to remove references to the Secondary Contact and Indigenous Aquatic life purpose and replace it with new statements concerning the adopted aquatic life uses and primary contact recreational use. SR at 54; Exh. 481 at 12.

Section 302.403 Unnatural Sludge

IEPA did not propose a change to this section; instead IEPA recognized the history of sediment pollution in CAWS and LDPR. SR at 55. IEPA intends to implement the existing narrative standard to prevent additional accumulations of sediment. *Id*.

Section 302.404 pH

IEPA proposed a change to the pH standard that will update the standard to conform with current General Use standards. SR 55-56; Exh. 481 at 13. IEPA expects that this new standard of 6.5 to 9.0 will be attained at most times in CAWS and LDPR. SR a 56.

Section 302.405 Dissolved Oxygen

IEPA proposed DO standards based on criteria and corresponding justification in USEPA's national criteria document *Ambient Aquatic Life Water Quality Criteria for Dissolved Oxygen (Freshwater)* (1986) (Attach X). SR at 57-58. The proposed standards represent minimum concentration thresholds intended to protect aquatic organisms from acutely lethal effects and from chronic, sublethal effects of low DO. A daily minimum is established to protect all life stages from acute lethal effects of low DO. SR at 58. Two standards are set to protect against chronic sublethal effects. To protect life stages other than early life stages, a seven-day average daily minimum has been proposed. *Id*. In order to protect early life stages, a daily mean averaged over an extended period of either seven days or 30 days has been proposed. *Id*.

IEPA proposed different DO standards for each of the three different aquatic life use designations. IEPA proposed standards for UDIP ALU that are identical to those recommended for General Use waters. SR at 58.[2] For CAWS ALU A waters, IEPA proposed a standard that reflects the lower biological potential of these waters as compared to UDIP ALU. SR at 59. IEPA is proposing one of the two types of chronic standards to protect against harmful effects of low DO. IEPA is not proposing standards recommended by USEPA that are achieved through other applicable standards. *Id*. Specifically, IEPA did not propose a chronic criterion of 5.0 mg/L as a daily mean averaged over seven days for early life stages or an analogous standard for 4.0 mg/L for other life stages, as both those standards are reflected in the daily minimum proposed. *Id*.

DO standards for CAWS and Brandon Pool ALU B waters are incrementally lower than CAWS ALU A waters. Also, there are no standards for early life stages of fish as these waters do not have the potential to consistently support early life stages for fish. SR at 60. As with CAWS ALU A waters, only one of two types of chronic standards is needed to provide sufficient chronic protection. *Id*.

In the original proposal, IEPA acknowledged that the current Secondary Contact and Indigenous Aquatic Life DO standards of 3.0 mg/L for Calumet-Sag Channel and 4.0 mg/L for the remainder of CAWS and LDPR were "frequently violated during wet weather periods." SR at 61. IEPA stated that it may be necessary for the District to implement additional treatment technologies to achieve compliance. *Id*.

IEPA's proposed language is:

> Dissolved oxygen ~~(STORET number 00300)~~ concentrations shall not be less than the applicable values in subsections (a), (b) and (c) of this Section ~~4.0 mg/l at any time except that the Calumet-Sag Channel shall not be less than 3.0 mg/1 at any time~~.
>
> a) For the Upper Dresden Island Pool Aquatic Life Use waters listed in Section 303.237,
>
> 1) during the period of March through July:
>
> A) 6.0 mg/L as a daily mean averaged over 7 days, and

[2] IEPA's amended proposal withdrew the UDIP ALU DO standard as the Board's first notice proposal in Subdocket C did not include a UDIP ALU. Exh. 480 at 2-3; *see also* Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9(C), (Feb. 21, 2013). However, as the Board adopted a UDIP ALU, the Board includes a summary of the original proposal. *See* Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9(C), (Feb. 6, 2014)

B) 5.0 mg/L at any time; and

2) during the period of August through February:

A) 5.5 mg/L as a daily mean averaged over 30 days,

B) 4.0 mg/L as a daily minimum averaged over 7 days, and

C) 3.5 mg/L at any time.

b) For the Chicago Area Waterway System Aquatic Life Use A waters listed in Section 303.230,

1) during the period of March through July, 5.0 mg/L at any time; and

2) during the period of August through February:

A) 4.0 mg/L as a daily minimum averaged over 7 days, and

B) 3.5 mg/L at any time.

c) For the Chicago Area Waterway System and Brandon Pool Aquatic Life Use B waters listed in Section 303.235,

1) 4.0 mg/L as a daily minimum averaged over 7 days, and

2) 3.5 mg/L at any time.

d) Assessing attainment of dissolved oxygen mean and minimum values.

1) Daily mean is the arithmetic mean of dissolved oxygen concentrations in 24 consecutive hours.

2) Daily minimum is the minimum dissolved oxygen concentration in 24 consecutive hours.

3) The measurements of dissolved oxygen used to determine attainment or lack of attainment with any of the dissolved oxygen standards in this Section must assure daily minima and daily means that represent the true daily minima and daily means.

4) The dissolved oxygen concentration used to determine a daily mean or daily minimum should not exceed the air-equilibrated concentration.

5) "Daily minimum averaged over 7 days" means the arithmetic mean of daily minimum dissolved oxygen concentrations in 7 consecutive 24-hour periods.

6) "Daily mean averaged over 7 days" means the arithmetic mean of daily mean dissolved oxygen concentrations in 7 consecutive 24-hours periods.

7) "Daily mean averaged over 30 days" means the arithmetic mean of daily mean dissolved oxygen concentrations in 30 consecutive 24-hour periods. SR at 56-57; Exh. 481 at 13-14.

Section 302.407 Chemical Constituents

Section 302.407 establishes acute standards, chronic standards and human health standards for chemical constituents. SR at 61. New subsections (a) through (d) include general provisions and definitions applicable to the individual toxic pollutants. SR at 62. The standards proposed are intended to protect aquatic life from both acute and chronic toxicity and the water quality standards are the same for the three aquatic life uses applicable to CAWS and LDPR.

Chromium (Hexavalent, Total), Cyanide and Total Residual Chlorine

The proposed standards for these constituents are based on existing General Use water quality standards and are identical to and based on the most recent USEPA national criteria document at the time the proposal was filed. SR at 63.

Arsenic (Trivalent, Dissolved) and Chromium (Trivalent, Dissolved)

IEPA proposed the exact same standards for these constituents as the most recent national criteria document, at the time the proposal was filed, and are being updated to include a translator from total arsenic (trivalent) to dissolved arsenic (trivalent) and total chromium (trivalent) to dissolved chromium (trivalent). SR 65-66.

Cadmium (Dissolved)

IEPA considered basing the acute and chronic cadmium standards on the recalculation procedures in the 2001 national criteria. SR at 66. The acute standard was based on calculations of the final acute value divided by two, and the chronic standard was not changed from the criteria document. SR at 67. IEPA looked to data provided by the District to determine whether or not the standards based on the national criteria document could be met. SR at 66-67. Based

on the data provided, IEPA determined that the exceedances of the chronic criteria would occur in the summer months and the most likely cause was contaminated sediment. SR at 67. After reviewing the data, IEPA determined that the cadmium (dissolved) water quality standard needed to be adjusted from the standard developed using the 2001 national criteria. SR at 68. IEPA proposed the same cadmium (dissolved) water quality standard for all three aquatic life uses as the General Use water quality standard. *Id*.

Lead (Dissolved), Benzene, Ethylbenzene, Toluene, Xylene, Nickel (Dissolved), Zinc (Dissolved)

IEPA proposed the same water quality standard for these constituents for all three aquatic life uses. SR at 69-70. IEPA based its proposed standard on the most recent USEPA national criteria, at the time the proposal was filed. The proposed water quality standards are the same as the General Use water quality standards, which were updated in Water Quality Triennial Review: Amendments to 35 Adm. Code 302.105, 302.208(e)-(g), 302.504(a), 302.575(d), 309.141(h); and Proposed 35 Ill. Adm. Code 301.267, 301.313, 301.413, 304.120, and 309.157, R02-11 (Dec. 19, 2001). *Id*.

Mercury (Dissolved)

IEPA proposed a water quality standard for the protection of aquatic life uses for mercury (dissolved) that was developed using the most recent national criteria document, at the time the proposal was filed. IEPA also includes a translator from total mercury to dissolved mercury. The General Use standard was updated in R02-11 to reflect this change. SR at 70.

Copper (Dissolved)

The acute and chronic copper water quality standards are based on the recalculation procedure established in the 1995 national criteria document and not the 2007 update. SR at 70-71. IEPA choose not to incorporate the 2007 criteria document as the new methodology was complex and a departure from the way copper water quality standards had been developed in the past. SR at 71. IEPA included a translator from total copper to dissolved copper, which was adopted for General Use waters in R02-11. SR at 70.

Iron (Dissolved)

IEPA proposed a standard for iron that is identical to the General Use water quality standard for iron (dissolved). SR at 73. The only national criteria for iron are from a 1976 document, while the Board changed the General Use standard in Proposed Amendments to Title 35, Subtitle C (Toxics Control), R88-21(B) (June 21, 1990). *Id*. at 74.

Silver (Dissolved)

IEPA proposed a standard for silver (dissolved) that is the same as the most recent national criterion, at the time the proposal was filed. SR at 74. The standard proposed is 1.1

mg/L and includes a metals translator value of 0.85. IEPA noted that this standard is more up to date than the General Use standard, which is 5.0 micrograms (µg) per liter (L). *Id*.

Selenium (Total)

IEPA proposed no changes in the selenium (total) water quality standard from that in the existing Secondary Contact and Indigenous Aquatic Life standard. SR at 74.

Sulfate and Chloride

Under the Secondary Contact and Indigenous Aquatic Life classifications, there are no sulfate or chloride standards for CAWS and LDPR. SR at 75. IEPA patterns its proposal after Triennial Review of Sulfate and Total Dissolved Solids Water Quality Standards: Proposed Amendments to 35 Ill. Adm. Code 302.102(b)(6), 302.102(b)(8),302.102(b)(10), 302.208(g), 309.103(c)(3), 405.109(b)(2)(A), 409.109(b)(2)(B), 406.100(d); Repealer of 35 Ill. Adm. Code 406.203 and Part 407; and Proposed New 35 Ill. Adm. Code 302.208(h) R07-9 (Sept. 4, 2008). SR at 75. With sulfate, IEPA did not include a standard to protect livestock watering, nor did IEPA limit sulfate in instances where hardness is less than 100 mg/L or chloride is less than 5 mg/L, as those conditions do not exist in CAWS and LDPR. SR at 76.

IEPA proposed the same chloride standards for all three aquatic life uses, and it is the standard adopted for General Use waters. SR at 76. IEPA proposed a single value of 500 mg/L, recognizing that there will be violations of the chloride standard during winter months. *Id*. IEPA noted that this problem is not unique to CAWS and LDPR and IEPA is addressing issues in National Pollution Discharge Elimination System (NPDES) stormwater permits. SR at 76-77.

Standards for Human Health Mercury and Benzene

IEPA noted that CAWS and LDPR are not designated as a source for public water supply and food processing so the human health exposure is limited primarily to consumption of fish from the system. SR at 72. Therefore, IEPA proposed standards for mercury and benzene that mirror the exiting provisions in the General Use water quality standards. SR at 72.

In its amended proposal, IEPA added a human health standard for phenols. Exh. 481 at 16. USEPA expressed concerns with the removal of the standard for phenols and requested that IEPA protect the human health use by adding fish consumption based on the national criterion. Exh. 480 at 6. IEPA proposes adding that standard to the rule. *Id*.

Removal of Standards

IEPA proposed the removal of several parameters from the existing rules. SR at 77. In the case of ammonia, IEPA added a stand-alone section to address ammonia standards. *Id*. For the other parameters, IEPA determined that the parameter itself or the value it was based on are not necessary for protection of aquatic life. *Id*. Barium, manganese, oil/fat/grease, phenols and total dissolved solids (TDS) are all out-of-date water quality standards. USEPA has not adopted a federal national criteria document for protection aquatic life for any of these parameters. *Id*.

More specifically with manganese, IEPA looked to other guidance documents and determined based on those documents that a standard was not necessary to protect aquatic life in the effluent dominated CAWS and LDPR. SR at 78. The basis for removal of the TDS standard was more fully explained in R07-9. *Id*.

Also IEPA explained that with fluoride, manganese, oil/fat/grease, and phenols the existing standards are identical to the existing effluent limitations in Section 304.124. SR at 79. IEPA believes that oil/fat/grease are more effectively regulated through a narrative standard. *Id*. IEPA noted that phenols are regulated for taste and odor, and since CAWS and LDPR are not designated for public water supply or food processing, the existing standard is not appropriate. SR at 79-80. For barium, the existing effluent limit is more stringent than the water quality standard. SR at 80.

IEPA originally withdrew the fluoride and manganese standards but reinserted the standards in the amended proposal. Exh. 481 at 15-16. IEPA restored these standards in response to concerns raised by USEPA. Exh. 480 at 3. IEPA proposed the same standards as the General Use water quality standards adopted Triennial Review of Water Quality Standards for Boron, Fluoride and Manganese: Amendments to 35 Ill. Adm. Code 301.106, 302.Subparts B, C, E, F and 303.312, R11-18 (Nov. 15, 2012). *Id*. IEPA noted that fluoride and manganese have no national criteria developed for protection of aquatic life uses. *Id*.

IEPA also amended the proposed cyanide standard. Exh. 481 at 15. IEPA noted that rainbow trout are not found in Illinois outside of Lake Michigan, and therefore, rainbow trout were removed from the cyanide chronic calculation. Exh. 490 at 6. After the removal of rainbow trout, the four most sensitive species are brook trout, yellow perch, bluegill, and black crappie. *Id*. The calculated chronic value for cyanide then becomes 9.799 µ/L and IEPA recommended rounding up to 10. *Id*.

Rule Language

IEPA proposed to replace existing Section 302.407 with the following:

> a) The acute standard (AS) for the chemical constituents listed in subsection (e) shall not be exceeded at any time except as provided in subsection (d).
>
> b) The chronic standard (CS) for the chemical constituents listed in subsection (e) shall not be exceeded by the arithmetic average of at least four consecutive samples collected over any period of at least four days, except as provided in subsection (d). The samples used to demonstrate attainment or lack of attainment with a CS must be collected in a manner that assures an average representative of the sampling period. For the chemical constituents that have water quality based standards dependent upon hardness, the chronic water quality standard will be calculated according to subsection

(e) using the hardness of the water body at the time the sample was collected. To calculate attainment status of chronic standards, the concentration of the chemical constituent in each sample is divided by the calculated water quality standard for the sample to determine a quotient. The water quality standard is attained if the mean of the sample quotients is less than or equal to one for the duration of the averaging period.

c) The human health standard (HHS) for the chemical constituents listed in subsection (f) shall not be exceeded when the stream flow is at or above the harmonic mean flow pursuant to Section 302.658 nor shall an annual average, based on at least eight samples, collected in a manner representative of the sampling period, exceed the HHS except as provided in subsection (d).

d) In waters where mixing is allowed pursuant to Section 302.102 of this Part, the following apply:

1) The AS shall not be exceeded in any waters except for those waters for which a zone of initial dilution (ZID) applies pursuant to Section 302.102 of this Part.

2) The CS shall not be exceeded outside of waters in which mixing is allowed pursuant to Section 302.102 of this Part.

3) The HHS shall not be exceeded outside of waters in which mixing is allowed pursuant to Section 302.102 of this Part.

e) Numeric Water Quality Standards for the Protection of Aquatic Organisms

Constituent	AS (µg/L)	CS (µg/L)
Arsenic (trivalent, dissolved)	340 X 1.0*=340	150 X 1.0*=150
Benzene	4200	860
Cadmium (dissolved)	exp[A+Bln(H)] X {1.138672-[(lnH)(0.041838)]}*, where A=-2.918 and B=1.128	exp[A+Bln(H)] X {1.101672-[(lnH)(0.041838)]}*, where A= -3.490 and B=0.7852
Chromium (hexavalent, total)	16	11
Chromium (trivalent, dissolved)	exp[A+Bln(H)] X 0.316*, where A=3.7256 and B=0.8190	exp[A+Bln(H)] X 0.860*, where A=0.6848 and B=0.8190
Copper	exp[A+Bln(H)] X 0.960*,	exp[A+Bln(H)] X 0.960*.

(dissolved)	where A=-1.645 and B=0.9422	where A=-1.646 and B=0.8545
Cyanide**	22	10
Ethylbenzene	150	14
Flouride (total)	$e^{A+B\ln(H)}$, where A=6.7319 and B=0.5394	$e^{A+B\ln(H)}$, but shall not exceed 4.0 mg/L where A=6.0445 and B=0.5394
Lead (dissolved)	exp[A+Bln(H)] X {1.46203-[(lnH)(0.145712)]}*, where A=-1.301 and B=1.273	exp[A+Bln(H)] X {1.46203-[(lnH)(0.145712)]}*, where A=-2.863 and B=1.273
Manganese (dissolved)	$e^{A+B\ln(H)}$ X 0.9812* where A=4.9187 and B=0.7467	$e^{A+B\ln(H)}$ X 0.9812* where A=4.0635 and B=0.7467
Mercury (dissolved)	1.4 X 0.85*=1.2	0.77 X 0.85*=0.65
Nickel (dissolved)	exp[A+Bln(H)] X 0.998*, where A=0.5173 and B=0.8460	exp[A+Bln(H)] X 0.997*, where A=-2.286 and B=0.8460
Toluene	2000	600
TRC	19	11
Xylene(s)	920	360
Zinc (dissolved)	exp[A+Bln(H)] X 0.978*, where A=0.9035 and B=0.8473	exp[A+Bln(H)] X 0.986*, where A=-0.4456 and B=0.8473

where: µg/L = microgram per liter,

exp[x] = base of natural logarithms raised to the x- power,

ln(H) = natural logarithm of Hardness in milligrams per liter,

* = conversion factor multiplier for dissolved metals, and

** = standard to be evaluated using either of the following USEPA approved methods, incorporated by reference at 35 Ill. Adm. Code 301.106: Method OIA-1677, DW; Available Cyanide by Flow Injection, Ligand Exchange, and Amperometry, January 2004, Document Number EPA-821-R-04-001 or Cyanide Amenable to Chlorination, Standard methods 4500-CN-G (40 C.F.R. 136.3).

f) Numeric Water Quality Standard for the Protection of Human Health

Constituent	HHS in micrograms per liter (µg/L)
Benzene	310
Mercury (total)	0.012
Phenols	860,000

g) Numeric Water Quality Standards for other chemical constituents

Concentrations of the following chemical constituents shall not be exceeded except in waters for which mixing is allowed pursuant to Section 302.102 of this Part.

Constituent	Unit	Standard
Chloride	mg/L	500
Iron (dissolved)	mg/L	1.0
Selenium (total)	mg/L	1.0
Silver (dissolved)	µg/L	exp[A+Bln(H)] X 0.85*, where A=-6.52 and B=1.72
Sulfate (where H is ≥ 100 but ≤ 500 and C is ≥ 25 but ≤ 500)	mg/L	[1276.7+5.508(H)-1.457(C)] X 0.65
Sulfate (where H is ≥ 100 but ≤ 500 and C is ≥ 5 but < 25)	mg/L	[-57.478 + 5.79(H) + 54.163(C)] X 0.65
Sulfate (where H > 500 and C ≥ 5)	mg/L	2,000

where: mg/L = milligram per liter,

µg /L = microgram per liter,

H = Hardness concentration of receiving water in mg/L as $CaCO_3$,

C = Chloride concentration of receiving water in mg/L,

exp[x] = base of natural logarithms raised to the x-power,

ln(H) = natural logarithm of Hardness in milligrams per liter, and

* = conversion factor multiplier for dissolved metals

SR at 61-80; Exh. 481 at 14-18.

Section 302.408 Temperature

IEPA's proposed temperature standards are based on a report by Midwest Biodiversity Institute (MBI) and Center for Applied Bioassessment and Biocriteria (CABB) entitled *Temperature Criteria Options for the Lower Des Plaines River* (October 2005). SR at 80, citing Attach GG. The principle objective of the project was to develop seasonal temperature options to protect the existing biological assemblages. SR at 81. The approach included using published data from thermal effects literature to create a database of fish. *Id*. Representative aquatic species (RAS) were created, and the thermal effects data were used to calculate four behavioral and physiological thresholds. This approach was used by the Ohio Environmental Protection Agency. *Id*.

Four thermal input variables were used to determine the summer average and daily maximum; however, up to six thermal parameters were first considered. SR at 81. "Of the six thermal parameters that were inventoried for each fish species, the upper incipient lethal temperature (UILT), chronic thermal maximum (ChTM), and the critical thermal maximum (CTM) are considered lethal thresholds and the remaining four (optimum, final preferendum, growth, and upper avoidance) are considered sublethal thresholds." *Id*.

For CAWS and Brandon Pool ALU B waters, IEPA used eight species that represent the species that could maintain populations in those waters. SR at 82. For CAWS ALU A waters, IEPA added white sucker to the eight species considered in ALU B waters. *Id*. For UDIP ALU, IEPA determined that 27 species should be used. SR at 83.

For non-summer months, criteria were derived to maintain seasonal norms and cycles of increasing and decreasing temperatures. SR at 83. Seasonal ambient temperature data were gathered from eight locations on CAWS and LDPR, and IEPA used the 75th percentile as the monthly average to ensure that seasonal norms were preserved in the system. *Id*. The daily maximum of the summer months was preserved for the entire year to assure no acute lethal temperatures are present. *Id*.

The proposed standards have a period average as well as a daily maximum limit. SR at 86. IEPA proposed a period average in recognition of the realities of temperature variations and thermal tolerance of fish. *Id*. IEPA proposed standards more stringent than existing General Use water quality standards for the months April through November, while the remaining standards are "approximately equivalent". *Id*. IEPA proposed allowing excursions two percent of the time of up to 2º C or 3.6º F. *Id*.

In its amended proposal, IEPA amended period averages for several months and added a provision to address cold shock.[3] Specifically IEPA proposed a new Section 302.408(d), which provides:

> d) Cold Shock
>
> Water temperatures of discharges to the Chicago Area Waterways Aquatic Life Use A Waters and the Chicago Area Waterways and Brandon Pool Aquatic Life Use B Waters shall be controlled in a manner to protect fish and aquatic life uses from the deleterious effects of cold shock.

[3] IEPA's amended proposal withdrew the UDIP ALU temperature standards as the Board's first notice proposal in Subdocket C did not include a UDIP ALU. Exh. 480 at 2-3; *see also* Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9(C), (Feb. 21, 2013). However, as the Board adopted a UDIP ALU, the Board includes a summary of the original proposal. *See* Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9(C), (Feb. 6, 2014)

IEPA proposed replacing the existing language in Section 302.408 with the following:

a) Water temperature shall not exceed the maximum limits in the applicable table that follows during more than two percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature at such locations exceed the maximum limits in the applicable table that follows by more than 2º C (3.6º F).

b) Water temperature in the Chicago Area Waterway System Aquatic Life Use A waters listed in 35 Ill. Adm. Code 303.230 shall not exceed the period average limits in the following table during any period on an average basis.

Months – dates	Period Average (ºF)	Daily Maximum (ºF)
January 1-31	54.3	88.7
February 1-28	53.6	88.7
March 1-31	54.4	88.7
April 1-15	58.9	88.7
April 16-30	62.9	88.7
May 1-15	68.1	88.7
May 16-31	70.4	88.7
June 1-15	75.5	88.7
June 16-30	85.1	88.7
July 1-31	85.1	88.7
August 1-31	85.1	88.7
September 1-15	85.1	88.7
September 16-30	76.5	88.7
October 1-15	73.2	88.7
October 16-31	69.4	88.7
November 1-30	66.2	88.7
December 1-31	59.9	88.7

c) Water temperature in the Chicago Area Waterway System and Brandon Pool Aquatic Life Use B waters listed in 303.325, shall not exceed the period average limits in the following table during any period on an average basis.

Months – dates	Period Average (ºF)	Daily Maximum (ºF)
January 1-31	54.3	90.3
February 1-28	53.6	90.3

March 1-31	54.4	90.3
April 1-15	58.9	90.3
April 16-30	62.9	90.3
May 1-15	68.1	90.3
May 16-31	70.4	90.3
June 1-15	75.5	90.3
June 16-30	86.7	90.3
July 1-31	86.7	90.3
August 1-31	86.7	90.3
September 1-15	86.7	90.3
September 16-30	76.5	90.3
October 1-15	73.2	90.3
October 16-31	69.4	90.3
November 1-30	66.2	90.3
December 1-31	59.9	90.3

d) Water temperature for the Upper Dresden Island Pool, as defined in 35 Ill. Adm. Code 303.237, shall not exceed the period average limits in the following table during any period on an average basis.

Months – dates	Period Average (^{o}F)	Daily Maximum (^{o}F)
January 1-31	54.3	88.7
February 1-28	53.6	88.7
March 1-31	57.2	88.7
April 1-15	60.8	88.7
April 16-30	62.1	88.7
May 1-15	69.2	88.7
May 16-31	71.4	88.7
June 1-15	74.2	88.7
June 16-30	85.1	88.7
July 1-31	85.1	88.7
August 1-31	85.1	88.7
September 1-15	85.1	88.7
September 16-30	77.0	88.7
October 1-15	73.2	88.7
October 16-31	69.6	88.7
November 1-30	66.2	88.7
December 1-31	59.9	88.7

e) Cold Shock

Water temperatures of discharges to the Chicago Area Waterways Aquatic Life Use A Waters and the Chicago Area Waterways and

Brandon Pool Aquatic Life Use B Waters shall be controlled in a manner to protect fish and aquatic life uses from the deleterious effects of cold shock. SR at 84-86; Exh. 481 at 18-20.

Section 302.409 Cyanide

The water quality standard for cyanide has been moved to the table in Section 302.407. IEPA proposed to repeal this stand-alone section. SR at 87; Exh. 481 at 21.

Section 302.410 Substances Toxic to Aquatic Life

IEPA noted that the CWA requires States to protect aquatic life and wildlife against toxic pollutants or other harmful effects with ambient standards. SR at 89. The standards must either be numerical criteria or a narrative standard. IEPA updated existing narrative toxic standards. *Id*. USEPA allows the use of derived criteria for toxic parameters, and Subpart F (35 Ill. Adm. Code 302.Subpart F) includes such criteria. IEPA therefore proposed changes to make clear that the procedures and methods in Subpart F apply to water quality standards in this subpart. *Id*.

IEPA proposed to amend Section 302.410 as follows:

Any substance or combination of substances toxic to aquatic life not listed in Section 302.407 shall not be present in amounts toxic to aquatic life or wildlife ~~exceed one half of the 96-hour median tolerance limit (96-hour TL_m) for native fish or essential fish food organisms~~.

a) Any substance or combination of substances shall be deemed to be toxic or harmful to aquatic life if present in concentrations that exceed the following:

1) An Acute Aquatic Toxicity Criterion (AATC) validly derived and correctly applied pursuant to procedures set forth in Sections 302.612 through 302.618 or in Section 302.621; or

2) A Chronic Aquatic Toxicity Criterion (CATC) validly derived and correctly applied pursuant to procedures set forth in Sections 302.627 or 302.630.

b) Any substance or combination of substances shall be deemed to be toxic or harmful to wild or domestic animal life if present in concentrations that exceed any Wild and Domestic Animal Protection Criterion (WDAPC) validly derived and correctly applied pursuant to Section 302.633.

c) Any substance or combination of substances shall be deemed to be toxic or harmful to human health if present in concentrations that

exceed criteria, validly derived and correctly applied, based on either of the following:

1) Disease or functional impairment due to a physiological mechanism for which there is a threshold dose below which no damage occurs calculated pursuant to Sections 302.642 through 302.648 (Human Threshold Criterion); or

2) Disease or functional impairment due to physiological mechanism for which any dose may cause some risk of damage calculated pursuant to Sections 302.651 through 302.658 (Human Nonthreshold Criterion).

d) The most stringent criterion of subsections (a), (b), and (c) shall apply at all points outside of any waters within which, mixing is allowed pursuant to Section 302.102. In addition, the AATC derived pursuant to subsection (a)(1) shall apply in all waters except that it shall not apply within a ZID that is prescribed in accordance with Section 302.102.

e) The procedures of Subpart F set forth minimum data requirements, appropriate test protocols and data assessment methods for establishing criteria pursuant to subsections (a), (b), and (c). No other procedures may be used to establish such criteria unless approved by the Board in a rulemaking or adjusted standard proceeding pursuant to Title VII of the Act. The validity and applicability of the Subpart F procedures may not be challenged in any proceeding brought pursuant to Titles VIII or X of the Act, although the validity and correctness of application of the numeric criteria derived pursuant to Subpart F may be challenged in such proceedings pursuant to subsection (f).

f) Agency derived criteria may be challenged as follows:

1) A permittee may challenge the validity and correctness of application of a criterion derived by the Agency pursuant to this Section only at the time such criterion is first applied in an NPDES permit pursuant to 35 Ill. Adm. Code 309.152 or in an action pursuant to Title VIII of the Act for violation of the toxicity water quality standard. Failure of a person to challenge the validity of a criterion at the time of its first application shall constitute a waiver of such challenge in any subsequent proceeding involving application of the criterion to that person.

2) Consistent with subsection (f)(1), if a criterion is included as, or is used to derive, a condition of an NPDES discharge permit, a

permittee may challenge the criterion in a permit appeal pursuant to Section 40 of the Act and 35 Ill. Adm. Code 309.181. In any such action, the Agency shall include in the record all information upon which it has relied in developing and applying the criterion, whether such information was developed by the Agency or submitted by the Petitioner. THE BURDEN OF PROOF SHALL BE ON THE PETITIONER TO DEMONSTRATE THAT THE CRITERION-BASED CONDITION IS NOT NECESSARY TO ACCOMPLISH THE PURPOSES OF SUBSECTION (a) (Section 40(a)(1) of the Act), but there is no presumption in favor of the general validity and correctness of the application of the criterion as reflected in the challenged condition.

3) Consistent with subsection (f)(1), in an action where alleged violation of the toxicity water quality standard is based on alleged excursion of a criterion, the person bringing such action shall have the burdens of going forward with proof and of persuasion regarding the general validity and correctness of application of the criterion.

g) Subsections (a) through (e) do not apply to USEPA registered pesticides approved for aquatic application and applied pursuant to the following conditions:

1) Application shall be made in strict accordance with label directions;

2) Applicator shall be properly certified under the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 135 et seq. (1972)); and

3) Applications of aquatic pesticides must be in accordance with the laws, regulations and guidelines of all state and federal agencies authorized by law to regulate, use or supervise pesticide applications. SR at 87-88; Exh. 481 at 21-23.

Section 302.412 Total Ammonia Nitrogen

IEPA added a stand-alone section for the water quality standard for ammonia. SR at 91. IEPA noted that the language differs from the General Use water quality standard in order to address the applicability of the early life stage absent limits year round to CAWS and Brandon Pool ALU B waters. *Id.* IEPA proposed the following language:

a) Total ammonia nitrogen must in no case exceed 15 mg/L.

b) The total ammonia nitrogen acute, chronic, and sub-chronic standards are determined by the equations given in subsections (b)(1) and (b)(2) of this Section. Attainment of each standard must be determined by subsections (c) and (d) of this Section in mg/L.

1) The acute standard (AS) is calculated using the following equation:

$$AS = \frac{0.411}{1 + 10^{7.204\text{-pH}}} + \frac{58.4}{1 + 10^{\text{pH-}7.204}}$$

2) The chronic standard (CS) is calculated using the following equations:

A) During the Early Life Stage Present period, as defined in subsection (e) of this Section:

i) When water temperature is less than or equal to 14.51° C:

$$CS = \left\{ \frac{0.0577}{1+10^{7.688-\text{pH}}} + \frac{2.487}{1+10^{\text{pH}-7.688}} \right\} (2.85)$$

ii) When water temperature is above 14.51° C:

$$CS = \left\{ \frac{0.0577}{1+10^{7.688-\text{pH}}} + \frac{2.487}{1+10^{\text{pH}-7.688}} \right\} \left(1.45 * 10^{0.028*(25-T)}\right)$$

Where T = Water Temperature, degrees Celsius

B) During the Early Life Stage Absent period, as defined in subsection (e) of this Section:

i) When water temperature is less than or equal to 7° C:

$$CS = \left\{ \frac{0.0577}{1+10^{7.688-\text{pH}}} + \frac{2.487}{1+10^{\text{pH}-7.688}} \right\} \left(1.45 * 10^{0.504}\right)$$

ii) When water temperature is greater than 7° C:

$$CS = \left\{ \frac{0.0577}{1+10^{7.688-\text{pH}}} + \frac{2.487}{1+10^{\text{pH}-7.688}} \right\} \left(1.45 * 10^{0.028(25-T)}\right)$$

Where T = Water Temperature, degrees Celsius

3) The sub-chronic standard is equal to 2.5 times the chronic standard.

c) Attainment of the total ammonia nitrogen Water Quality Standards

1) The acute standard for total ammonia nitrogen (in mg/L) must not be exceeded at any time except in those waters for which the Agency has approved a ZID pursuant to Section 302.102 of this Part.

2) The 30-day average concentration of total ammonia nitrogen (in mg/L) must not exceed the chronic standard (CS) except in those waters in which mixing is allowed pursuant to Section 302.102 of this Part. Attainment of the chronic standard (CS) is evaluated pursuant to subsection (d) of this Section by averaging at least four samples collected at weekly intervals or at other sampling intervals that statistically represent a 30-day sampling period. The samples must be collected in a manner that assures a representative sampling period.

3) The 4-day average concentration of total ammonia nitrogen (in mg/L) must not exceed the sub-chronic standard except in those waters in which mixing is allowed pursuant to Section 302.102. Attainment of the sub-chronic standard is evaluated pursuant to subsection (d) of this Section by averaging daily sample results collected over a period of four consecutive days within the 30-day averaging period. The samples must be collected in a manner that assures a representative sampling period.

d) The water quality standard for each water body must be calculated based on the temperature and pH of the water body measured at the time of each ammonia sample. The concentration of total ammonia in each sample must be divided by the calculated water quality standard for the sample to determine a quotient. The water quality standard is attained if the mean of the sample quotients is less than or equal to one for the duration of the averaging period.

e) The Early Life Stage Present period occurs from March through October. All other periods are subject to the Early Life Stage Absent period, except that waters listed in Section 303.235 are not subject to Early Life Stage Present ammonia limits at any time.

BOARD NOTE: Acute and chronic standard concentrations for total ammonia nitrogen (in mg/L) for different combinations of pH and temperature are shown in Appendix C. SR at 91-92; Exh. 481 at 23-25.

Subpart F

In the amended proposal IEPA proposed changes to Subpart F in Section 302.601, 302.648, and 302.657. Exh. 481 at 25-26. Mr. Twait explained that the IEPA's original intent was to protect all designated uses with the derived water quality procedures in Section 302.410. Exh. 480 at 6. USEPA correctly pointed out that human health from fish consumption was not being protected. *Id*. Therefore, IEPA proposed language that ensures that the derived criteria are

protective of human health. *Id*. IEPA proposed adding a subsection (c) to Section 302.410 that references the derivation procedures in Subpart F relating to human health threshold criterion and nonthreshold criterion. Exh. 480 at 7. IEPA also proposed adding a cross-reference to Section 302.410 in Section 302.601, which is the applicability section of Subpart F. In Sections 302.648 and 302.657, IEPA proposes removing the phrase "General Use" from the description of the term "W" in the equation for calculating human and nonhuman threshold criteria under Sections 302.648 and 302.657 to ensure that the term "W" is not limited to General Use, but applicable to CAWS and LDPR waters. *Id*.

Specifically IEPA proposed:

Section 302.601 Scope and Applicability

This Subpart contains the procedures for determining the water quality criteria set forth in Section 302.210(a), (b) and (c) and 302.410(a), (b) and (c).

* * *

Section 302.648 Determining the Human Threshold Criterion

HTC = ADI/[W + (F x BCF)]

where:

W = Per capita daily water consumption equal to 2 liters per day (L/d) for surface waters at the point of intake of a public or food processing water supply, or equal to 0.01 liters per day (L/d) which represents incidental exposure through contact or ingestion of small volumes of water while swimming or during other recreational activities for areas which are determined to be public access areas pursuant to Section 302.102 (b)(3), or 0.001 liters per day (L/d) for other ~~General Use~~ waters;

* * *

Section 302.657 Determining the Human Nonthreshold Criterion

HNC = RAI/[W + (F x BCF)]

where:

W = Per capita daily water consumption equal to 2 liters per day (L/d) for surface waters at the point of intake of a public or food processing water supply, or equal to 0.01 liters per day (L/d) which represents incidental exposure through contact or ingestion of small volumes of water while swimming or during other recreational activities for areas which are determined to be public access areas pursuant to Section 302.102(b)(3), or 0.001 liters per day (L/d) for other ~~General Use~~ waters; Exh. 481 at 25-27

SUMMARY OF TESTIMONY

Illinois Environmental Protection Agency

Scott Twait, Exhibit 2

Scott Twait is an Environmental Protection Engineer and has worked in the Water Quality Standards Section with IEPA since October 1996. Exh. 2 at 1. He has a Bachelor's degree in civil engineering from the University of Illinois. Mr. Twait served as the lead technical staff on the LDPR UAA. *Id.* Mr. Twait's focus was on IEPA's formulation of its proposed numeric water quality standards, which are necessary to "protect the designated aquatic life and recreational uses being established for the Lower Des Plaines River and Chicago Area Waterway System". *Id.* at 2. IEPA reviewed the latest available criteria documents and literature in developing their proposal. In most cases, the latest criteria documents were from USEPA; however, this type of information was lacking for two parameters, temperature and bacteria. *Id.*

Mr. Twait explained that "In most cases, identical numeric water quality standards are necessary to protect all of the proposed aquatic life use designations. The exceptions to this are temperature, dissolved oxygen and ammonia." Exh. 2 at 2. IEPA attempted to use the most current criteria available, which was accomplished for all parameters except cadmium, copper, and chloride. *Id.* at 2 and 3.

Mr. Twait stated that IEPA's proposed numeric water quality standards are based on both USEPA's national criteria document and General Use Standard for pH, Chromium (total hexavalent), cyanide, and Total Residual Chloride. Exh. 2 at 3. The standard for ammonia was based on both documents with two variations discussed below. *Id.*

Regarding the pH standard, Mr. Twait reported that IEPA has proposed updating the current standard of 6.0 to 9.0 to confirm to the current General Use standard of 6.5 to 9.0, which is consistent with the most recent federal criteria document. Exh. 2 at 3. Mr. Twait said that it is expected that this standard will be attained at most times in CAWS and the LDPR, although based on data from the District there may be occasional violations below 6.5. *Id.* at 4.

Mr. Twait stated that the standard for ammonia is based on the national criteria document and is the same as the General Use standard, with two exceptions. Exh. 2 at 4. First, the seasonal ammonia standard protecting the early life stage period is not applicable to waters not designated for protecting early life stages, which are CAWS and Brandon Pool in IEPA's

proposal. Second, the additional safety factor for protecting early life stages contained in 35 Ill. Adm. Code 302.212(e) will not be included for CAWS or the LDPR. *Id.*

In some circumstances, Mr. Twait reported that IEPA found that existing General Use standards were either more up-to-date than the national criteria documents or there were no national criteria at all. Exh. 2 at 5. This was true for lead, benzene, ethylbenzene, toluene, xylene, nickel, zinc, mercury (human health standard), benzene (human health standard), and iron. Mr. Twait stated that IEPA proposed the Board adopt the General Use standards for these parameters. *Id.*

Mr. Twait explained that for several parameters, IEPA found that USEPA national criteria were more current than what was adopted for General Use waters. Exh. 2 at 5. This applies to arsenic, chromium (trivalent), silver, and the aquatic life standard for mercury. *Id.* at 5 and 6. Mr. Twait stated that in these circumstances, IEPA proposed adopting the national criteria because the national criteria are based on the most up-to-date information. *Id.* at 6.

Mr. Twait reported the status of cadmium and copper. IEPA proposed that "the General Use dissolved cadmium water quality standards would fully protect the aquatic life uses" defined for CAWS and the LDPR. Exh. 2 at 6 and 7. The proposed acute and chronic copper water quality standards are "based on the recalculation procedure established in the 1995 national criteria document, which removed cold water species not native to Illinois, such as several species of salmon and trout. Exh. 2 at 7.

According to Mr. Twait, there are no sulfate or chloride ambient water quality standards applicable to CAWS or LDPR. Exh. 2 at 8. He explained that the proposed "chloride water quality standard is exactly the same as the current General Use water quality standard of 500 mg/L". IEPA expects that there will be violations of the chloride standard during the winter months when road salting occurs, but this is not unique to CAWS or the LDPR. IEPA plans to continue to work with state and local governments to mitigate the harmful effects to aquatic life from the use of road salts. *Id.* at 9.

Mr. Twait indicated that the General Use chloride standard has not been updated since the original adoption. Exh. 2 at 9. USEPA's national criteria document recommends a Criterion Maximum Concentration of 860 mg/L and a Criterion Chronic Concentration of 230 mg/L. Mr. Twait explained that it would be inconsistent with research results to use the federal methodology that results in an acute value that is less restrictive than the General Use standard, and a chronic value that is more restrictive. *Id.*

According to Mr. Twait, the national criteria document for temperature is not updated. Exh. 2 at 10. As a result, IEPA hired a consultant to develop temperature criteria options to protect aquatic life for uses in the LDPR. *Id.* at 10. Mr. Twait explained that the methodology used by the expert, Chris Yoder, relies on the use of a Representative Aquatic Species (RAS) list. Summer daily maximum and period average thermal criteria were developed using this RAS list. *Id.* at 11. Mr. Twait stated that the report used three main categories of RAS lists: "General Use, Modified Use, and Secondary Contact/Indigenous Aquatic Life Use, with 49, 27, and 8 species RAS lists respectively". IEPA concluded that the proposed CAWS and Brandon Pool Aquatic

Life Use B waters should use the option of the eight species RAS list to determine the summer daily maximum and period average due to the aquatic life and habitat in these stream reaches. *Id.*

Mr. Twait reported that because the white sucker was present in certain waters, IEPA proposed that CAWS ALU A waters should use the eight RAS list, plus the white sucker to determine the summer daily maximum and period average. Exh. 2 at 12. IEPA believed that "those nine species are representative of the species that would be found" in these waters. Mr. Twait explained that "the Des Plaines River between the Brandon Road Lock and Dam and the I-55 bridge has incrementally more diverse aquatic life and higher quality habitat than the rest" of CAWS and the LDPR, so the 27 species RAS list would be used to determine the summer daily maximum and period average. *Id.*

The criteria for non-summer periods, explained Mr. Twait, were "derived to maintain seasonal norms and cycles of increasing and decreasing temperatures". Exh. 2 at 13. Mr. Twait reported that the monitoring location at Route 83 on the CSSC was used as the "background" location because it was believed to be representative of "background temperatures". Because the source of water for CAWS is the wastewater treatment effluents, the temperature of these waters is expected to be higher than background temperature at certain times of the year, so IEPA decided to use the effluent temperature from the District's North Side, Calumet and Stickney facilities as background during the non-summer months. *Id.* Mr. Twait explained that had IEPA not used this methodology, "the water quality standards for the three aquatic life use designations proposed for CAWS and Lower Des Plaines River would have been lower than the District effluents and would have required installation of cooling towers". *Id.* at 14.

According to Mr. Twait, IEPA used the 75th percentile of the temperatures from the District's effluent and Route 83 CSSC station as the period average "to ensure that the seasonal norms are preserved in the system". Exh. 2 at 14. Mr. Twait acknowledged that the proposed thermal water quality standards are more stringent than the current Secondary Contact/ Indigenous Aquatic Life standards for all months. He further explained that the proposed thermal standards are also more stringent than the current General Use standards for the months of April through November, particularly concerning the period average. For the remaining months, the proposed standards are "approximately equivalent to the existing General Use standards. *Id.*

Because fish can tolerate short-term elevations in temperature, Mr. Twait explained that IEPA is "proposing to allow excursions from the daily maximum criteria to occur two percent of the time". Exh. 2 at 15. This rate is between the one percent allowed for General Use waters and the five percent for existing Secondary Contact/Indigenous Aquatic Life standards. Mr. Twait stated that IEPA also proposed to limit the allowable excursions of the daily maximum up to 2º C (or 3.6º F), which is between the 1.7º C (or 3º F) excursion allowed for the General Use Standard and 3.8º C (or 7º F) for the existing Secondary Contact/Indigenous Aquatic Life standards. *Id.*

Mr. Twait agreed that "significant portions of CAWS and Lower Des Plaines River currently may not meet the proposed thermal and dissolved oxygen water quality standards".

3/10/08PTr. at 81. Mr. Twait was asked whether meeting the proposed temperature standard was an issue other than where Midwest Generation discharges. He responded by citing several additional heat sources, such as refineries and cooling towers. *Id.* at 91. He also stated that there are no known violations of the thermal standards with the Chicago River. *Id.* at 92.

When asked whether the LDPR is able to meet the proposed DO standards, Mr. Twait stated that "it looks like it would attain the proposed standard". 3/10/08PTr. at 97. He further noted that this would apply to the UDIP and Brandon Pool. *Id.*

When asked to explain how "background temperature" was established, Mr. Twait explained that IEPA looked at ambient data from several of the sites along with the District's effluent temperature. 3/10/08 Tr. at 102. Mr. Twait further explained that IEPA started with the ambient station and developed period averages. "Sometimes the period average was two weeks; sometimes it was the entire month. And then we asked the District to provide their effluent data…and then we took the least stringent…for each period". *Id.* at 105.

Mr. Twait explained the differences in chemical water quality standards for the Aquatic Life Use B waters. 3/11/08 Tr. at 158. Because these waters do not support early life states, DO, temperature, and ammonia standards are different than for Aquatic Life Use A waters. The standards for all other parameters are the same for both Aquatic Life Use A and B waters. *Id.* at 159.

Mr. Twait opined that IEPA "isn't proposing to use general use standards per se…[but] to use the most current standard available. 3/11/08 Tr. at 173. In some instances, this was USEPA's national criteria and in others it was IEPA's general use standard. Mr. Twait clarified that USEPA's national criteria is even more stringent than the general use standard. *Id.* Mr. Twait stated that the standards for copper, chromium trivalent, mercury, and silver were based on USEPA's national criteria. 3/11/08 Tr. at 174 and 175.

Mr. Twait was asked to explain how the existing secondary contact standards are not protective of aquatic life. He explained that "secondary contact water quality standards were not based on protection of aquatic life, they were based on effluent standards". 3/11/08 Tr. at 176. He opined that "back in 1972 they were not trying to protect aquatic life beyond having effluent standards". Mr. Twait provided the example of arsenic, indicating that the secondary contact water quality standard of one milligram per liter is not protective of aquatic life. *Id.* at 177. This is based on research data, the national criteria document, and the Board's general use water quality standard. Mr. Twait further explained that the national criteria are based on lab results regarding toxicity, and that habitat in the lab "doesn't matter". *Id.* at 178. The lab conducts toxicity tests to determine what level kills organisms in the lab. *Id.*

Mr. Twait was asked whether the species that may actually exist in waters such as the CSSC have been reflected in all the proposed water quality parameters. He explained that the decision was to propose either the national criteria or the general use standard where the water quality standard could be met. 3/11/08 Tr. at 180.

The report by MBI and CABB entitled "Temperature Criteria Options for the Lower Des Plaines River", October 11, 2005, (Exhibit 15), provided technical support and temperature criteria options for the LDPR. 3/11/08 Tr. at 187. Mr. Twait was asked how the conclusions and options presented in this report, which focused on the LDPR, were used to develop temperature standards for CAWS. Mr. Twait explained that IEPA believed "that CAWS system was similar to the Brandon pool, therefore, IEPA used the RAS group, . . . of eight species throughout CAWS", and later added white sucker. *Id.* at 188, 189. Mr. Twait stated that the white sucker was initially added to the RAS group at the recommendation of USEPA. *Id.* at 199. This decision was supported by fish collection data as well. *Id.* at 199 and 200. He elaborated that it was at this point that IEPA differentiated ALU A and ALU B waters for temperature. Mr. Twait explained that the white sucker is the most sensitive of the nine fish species in the RAS group. *Id.* at 200.

Mr. Twait provided an explanation as to how and why IEPA's proposed standards changed from the March 2007 outreach meeting document and what IEPA ultimately proposed. 3/11/08 Tr. at 202. Mr. Twait explained there were four changes. First, a correction was made for the summer temperature for the eight RAS species, which made the proposed standards more stringent. The daily maximum went from 91.9º F degrees to 90.3º F, and the monthly average went from 88.3º F degrees to 86.7º F for CAWS ALU B waters. *Id.* The second change was the addition of the white sucker, which made the standard more stringent for ALU A waters. *Id.* at 203. The third change was including the District's "effluent as part of the background, and this made the non-summer months less stringent". *Id.* The fourth change was IEPA deciding to extend the daily maximum summer temperature throughout the year instead of having monthly daily maximum temperatures based on ambient data, which made the standards less stringent. *Id.*

Mr. Twait explained that the temperature standards proposed by IEPA were to maintain seasonal norms and cycles. 3/11/08 Tr. at 222. He was asked if this reflects the "thermal prerequisites of the aquatic species that inhabit or that it anticipates will inhabit CAWS and the Upper Dresden Pool". Mr. Twait stated that "maintaining seasonal norms and cycles is for reproduction in the fish". *Id.* He elaborated that, while IEPA does not expect there to be early life stages of fish present in the CSSC, the standards were to protect fish that "could swim upstream or downstream to find the habitat to spawn". *Id.* at 233. He opined that "we're trying to protect their ability to spawn". *Id.* at 234.

Mr. Twait was asked if one of the purposes of using period averages for temperature was to protect against cold shock. His response was no. 3/11/08 Tr. at 236. He elaborated to say that without period averages, there would be nothing to protect against cold shock, although there is no evidence that cold shock syndrome is a phenomenon that exists in these types of water bodies or with these types of species. *Id.*

Regarding IEPA's proposed use of the summer maximum temperature applied throughout the year as the daily maximum rather than the 98th percentile, Mr. Twait explained that this was to prevent a high number of exceedances. 3/11/08 Tr. at 241.

Mr. Twait was asked to explain the difference between the use of the monitoring location at Route 83 on the CSSC as "background", as compared to the "background" location chosen for the LDPR. 3/11/08 Tr. at 243. He explained that this system does not have "any background temperatures" because some areas are influenced by Lake Michigan and others are influenced by thermal sources or the District's discharges. Mr. Twait opined that IEPA "tried to choose non-summer thermal criteria that was reasonable and we ended up choosing the Route 83 monitoring location on the Chicago Sanitary and Ship Canal". *Id.* at 244.

As further evidence of a lack of true "background" temperatures, the source water of CAWS is composed of the District's wastewater treatment plant effluents. 3/11/08 Tr. at 245. As a result, the temperature of these waters is expected to exceed other measures of background or ambient temperature at certain times of the year. Mr. Twait testified that IEPA decided to use the effluent temperature from the District's north side, Calumet and Stickney facilities, as the background temperature, noting that this is not a normal waterway and that the majority of flow is from the District. *Id.* at 245 and 246. In response to the many questions related to why IEPA used the District's effluent as background, which did not then require them to install supplemental cooling equipment, while other dischargers were not given this option, IEPA explained that the "basis of this decision was the fact that the flow of this water system comes from the district's effluents". *Id.* at 252 and 253. Mr. Twait opined that IEPA would not have proposed this if there would have been adverse impacts to the aquatic community. *Id.* at 258.

Mr. Twait was asked to explain IEPA's use of the 75th percentile as the monthly average to ensure that the seasonal norms are preserved in the system. 3/11/08 Tr. at 258. Mr. Twait stated that if data were collected year by year, you would use the 50th percentile to maintain the seasonal norms. *Id.* at 259. Half of the data would be above that point and half below. He explained that IEPA chose the 75th percentile because there is variation from year to year. The 75th percentile means that 75% of the data points would fall below that number and 25% above. *Id.* Mr. Twait pointed out that the 75th percentile was based on data over a longer period of time, not just a single year. *Id.* at 260.

Mr. Twait was asked whether a downstream discharger would likely need to cool the water withdrawn from the waterway before discharging it back into the same waterway when the ambient temperature of the waterways is at or near the thermal water quality standard. 3/11/08 Tr. at 277. He explained that if the "water were warmer than the water quality standard and they were adding heat to it, they would need to provide cooling". *Id.* at 277 and 278. Mr. Twait was further asked whether the downstream dischargers would be required to provide cooling if they did not add heat before discharging. *Id.* at 278. Mr. Twait stated that he "believed that there are some NPDES…rules about taking water from the same source as you're discharging to and as long as you're not increasing the parameter that you're concerned with, it doesn't put it back into your permit". *Id.*

Exhibit 480

Mr. Twait testified a second time in support of IEPA's amended proposal. Exh. 480 at 1. Mr. Twait testified that IEPA developed minor changes and updates to its proposal, and his testimony supports those changes. *Id.* Mr. Twait stated that the changes proposed are being

made for the following reasons: 1) to update the proposal to reflect rule changes the Board has adopted since the proposal was filed, 2) to update the proposal to incorporate the existing use designation recommendations of the Board, 3) to correct errors discovered since the proposal was filed, and 4) to attempt to address concerns raised by USEPA in their January 29, 2010, comments on the language of the proposal. *Id.*, *see*, PC 286.

Updates to Reflect Recent Board Rulemakings. Mr. Twait noted that the Board made several changes in other rulemaking proceedings since the initial proposal was filed by IEPA. Those changes include: dissolved oxygen, changing metals to chemical constituents, adding fluoride and manganese water quality standards, updating the chronic zinc standard, and including "total" in the mercury standard. Exh. 480 at 3. Because of these rule changes, IEPA made adjustments to the proposal. *Id.*

Mr. Twait testified that the proposed amendments to the dissolved oxygen standard in Section 302.405 make this proposal consistent with the General Use water quality standards adopted in Proposed Amendments to Dissolved Oxygen Standard 35 Ill. Adm. Code 302.206, R 04-25 (Jan. 24, 2008). Exh. 480 at 3.

Within 302.407(b) IEPA proposed changing "metals" to "chemical constituents" and removing references to "metal" samples, in order to abide by the General Use water quality standards adopted in Triennial Review of Water Quality Standards for Boron, Fluoride and Manganese: Amendments to 35 Ill. Adm. Code 301.106, 302.Subparts B, C, E, F and 303.312, R11-18 (Nov. 15, 2012). Exh. 480 at 3.

USEPA became concerned when IEPA proposed to remove the fluoride and manganese water quality standards and not replace them with another protective measure. Exh. 480 at 3. As a result IEPA proposed adding the fluoride and manganese water quality standards to Section 302.407(e). *Id.* The fluoride and manganese water quality standards are the same as the General Use water quality standards adopted in the Triennial Review of Water Quality Standards for Boron, Fluoride and Manganese: Amendments to 35 Ill. Adm. Code 301.106, 302.Subparts B, C, E, F and 303.312, R11-18 (Nov. 15, 2012). *Id.* Mr. Twait then testified that fluoride and manganese have no national criteria developed for the protection of aquatic life uses. *Id.*

IEPA is correcting the chronic zinc water quality standard in Section 302.407(e), to reflect the correction made in the R11-18 rulemaking. Exh. 480 at 3. Mr. Twait suggested reading the testimony of IEPA employee Brian Koch in Triennial Review of Water Quality Standards for Boron, Fluoride and Manganese: Amendments to 35 Ill. Adm. Code 301.106, 302.Subparts B, C, E, F and 303.312, R11-18 (Nov. 15, 2012), because it explained the change made to the zinc formula. *Id.* at 3-4.

IEPA also proposed adding a footnote to Section 302.407(e), to address the test methods that may be used to determine compliance with cyanide water quality standards, adopted in the R11-18 rulemaking. Exh. 480 at 4.

IEPA clarified that the mercury water quality standard for the protection of human health located in Section 302.407(f) is in the total form adopted in the R11-18 rulemaking. Exh. 480 at 4.

Finally, IEPA is modifying its proposed language in Sections 302.401 and 302.402 to reflect changes made by the Board to 35 Ill. Adm. Code 303.204 in Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System (CAWS) and the Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303 and 304, R08-9(B) (Feb. 6, 2014). Exh. 480 at 4. IEPA's proposals involve adding the phrase "except that waters designated as Primary Contact Recreation Waters in 35 Ill. Adm. Code 303.220 must meet the numeric water quality standard for bacteria applicable to protected waters in 35 Ill. Adm. Code 302.209" to the end of Section 302.401, as well as adding the term "primary contact," before "incidental contact" in Section 302.402. *Id*.

Water Quality Standards Changes. Mr. Twait testified that IEPA is amending its cyanide water quality standard as well as adding a water quality standard for phenols to protect human health. Exh. 480 at 4.

Mr. Twait stated that Jenifer Wasik submitted prefiled testimony on cyanide (Exh. 230), which correctly asserted that the Board previously approved a site-specific chronic cyanide water quality standard of 10 µg/L in Petition of the Metropolitan Water Reclamation District of Greater Chicago for Site-Specific Water Quality Regulation: 35 Ill. Adm. Code Parts 302 thru 304, R95-14 (Feb. 1, 1996) for Salt Creek, Higgins Creek, the West Branch DuPage River, and the Des Plaines River. Exh. 480 at 4-5. Mr. Twait stated that this site specific standard is found in Section 303.444. *Id*.

Mr. Twait argued the proposed cyanide acute water quality standard is identical to the General Use water quality standard, and also is consistent with the most recent national criteria document. Exh. 480 at 5. Mr. Twait testified that the cyanide standard was updated during the Proposed Amendments to Title 35, Subtitle C (Toxics Control), R88-21(A) (Jan. 25, 1990). *Id*. Mr. Twait also stated that the most recent national criteria document for cyanide is Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water (EPA-820-B-96-001) (1995). *Id*; Attach Y. This update does not supersede the January 1985 national criteria document (EPA 440/5-84-028). *Id*.

Mr. Twait stated that IEPA's original chronic cyanide water quality standard proposal was based on the recalculation procedure established in the 1995 national criteria document. Exh. 480 at 5; Attach Y.

Mr. Twait indicated that for the amended cyanide chronic proposal, IEPA used the same recalculation procedures, and tests from Table 1 of the 1995 national criteria document, and excluded certain things from Table 3. Exh. 480 at 5. Mr. Twait testified that Rainbow Trout was removed from the acute database along with their Genus Mean Acute Value (GMAV) and Species Mean Acute Value (SMAV) because this species is not found in Illinois outside of Lake Michigan, and therefore is not representative of aquatic life in the subject waters. *Id*.

Mr. Twait explained that the chronic standard was based on Final Acute Value (FAV) and Final Acute-Chronic Ratio (FACR). Exh. 480 at 6.

Mr. Twait claimed that if the rainbow trout is not included in the cyanide chronic calculation, the four most sensitive species of fish become the brook trout, yellow perch, bluegill, and the black crappie. Exh. 480 at 6. Further, Mr. Twait explained that when these four species are used, the calculated chronic value for for cyanide becomes 9.799 µg/L, and IEPA recommended that the Board rounds the chronic cyanide water quality standard to 10 µg/L. *Id*.

IEPA's proposal amends the cyanide acute standard to 22 µg/Land the chronic standard is 10 µg/L. Exh. 480 at 6.

Mr. Twait stated that after IEPA's proposal was released, USEPA expressed concern that IEPA removed the phenol water quality standard, and requested that IEPA protect human health use by adopting the fish consumption only national criterion of 860 mg/L. Exh. 480 at 6. Mr. Twait testifies that USEPA published the phenol human health criteria in the Federal Register on June 10, 2009. *Id*. IEPA agreed to accept USEPA's proposal, but noted that the effluent standard would be applicable to dischargers, which is stricter than the proposed human health water quality standard. *Id*.

Subpart F and Protection of Human Health for Fish Consumption. Mr. Twait testified that it was IEPA's intent from the beginning to protect all designated uses with Section 302.410, however, he acknowledges that USEPA correctly points out that protecting human health from fish consumption was not being taken into consideration. Exh. 480 at 6. In order to ensure Section 302.410 is protective of human health, IEPA is adding subsection (c) to Section 302.410, which references the derivation procedures in Sections 302.642 through 302.648 for Human Threshold Criterion and Sections 302.651 through 302.658 for the Human Nonthreshold Criterion. *Id*. at 6-7.

IEPA added a clause to Section 320.601 to include Section 302.410(a), (b), and (c) to the applicability of Subpart F. Exh. 480 at 7. Mr. Twait explained that IEPA also proposes eliminating the words "General Use" from the phrase "other General Use waters:" in the definition of "W" in the equation in Sections 302.648 and 302.657. *Id*. This is in order to ensure the definition of "W" is applicable to the waters used in the equation. *Id*.

Temperature. Mr. Twait testified that after reviewing the original language with USEPA, IEPA is proposing several changes including, clarification of the period average terminology, amendments to the background temperature proposal with resulting changes in the period average water quality standards, and new language to address a narrative standard that protects aquatic life against cold shock. Exh. 480 at 7.

In response to USEPA's concern over IEPA's proposed language, "… shall not exceed the period average limits in the following table during any period on an average basis[.]", IEPA has proposed removing the last phrase "on an average basis." Exh. 480 at 8.

Mr. Twait stated that IEPA changed the period average temperatures during the non-summer months, due to comments by USEPA and questions proposed by Midwest Generation during the 2008 hearings. Exh. 480 at 8. Mr. Twait explained that USEPA commented that they believed the background station IEPA selected (CSSC – Route 83) was not a good representative of the system, and after discussion IEPA agreed to use the less impacted Cal-Sag Channel Route 83 station. *Id*. Mr. Twait then explained that originally IEPA was to use the 75th percentile of temperatures from the District and Route 83 CSSC station as the period average to ensure seasonal norms are preserved within the system. *Id*. However, after questions by Midwest Generation during the 2008 hearings concerning the practicality of this standard IEPA realized the standard would result in violations from the background station and raised the standard to the 90th percentile. *Id*.

Because of the above changes, IEPA used the effluent temperature from the District's North Side, Calumet and Stickney facilities as the background temperature instead of the Cal-Sag Canal – Route 83 station during the non-summer months of January, February, September 16-30, October, November, and December. Exh. 480 at 9. Mr. Twait then stated that for the non-summer months of March, April, May, and June 1-15, IEPA used the temperature values from the Cal-Sag Canal – Route 83 station in setting the period averages because the ambient values were higher than the effluent data values. *Id*.

Finally, to address USEPA's concern for aquatic life succumbing to cold shock, Mr. Twait explained that although IEPA is not aware of cold shock being a concern in the system, IEPA intends to implement a narrative with language similar to that which was implemented in Wisconsin. Exh. 480 at 9. IEPA's proposed language is that "Water temperatures of discharges to CAWS Aquatic Life Use A Waters and CAWS and Brandon Pool Aquatic Life Use B Waters shall be controlled in a manner to protect fish and aquatic life uses from the deleterious effects of cold shock." *Id*. Mr. Twait stated IEPA also plans to implement this standard similar to Wisconsin. He added that this is not intended to be applied to emergency shutdowns, but all efforts should be made through general operation planning to avoid an emergency shutdown that would cause aquatic life cold shock. *Id*. at 9-10.

Rob Sulski

Rob Sulski was employed by IEPA for 24 years, working primarily in Cook and its surrounding counties. Exh. 1 at 1. Mr. Sulski has a Bachelor of Arts degree in biology and a Master of Science in environmental engineering from Southern Illinois University. He has participated in programs related to toxics, sediments, wastewater engineering, native ecosystem management, and water quality standards. *Id.* Mr. Sulski spent the first 19 years with IEPA working primarily on water pollution control regulatory compliance issues, where he became IEPA's expert on the "operations of Chicago area industries and water treatment authorities" and CAWS, to which they discharge. *Id.* For the next five years, Mr. Sulski served as the project manager for CAWS UAA and as a technical staff for the LDPR UAA. *Id.* at 2.

Mr. Sulski provided an historic overview of CAWS and LDPR, indicating that both water bodies "have been classified in a distinct category separate from the remaining surface water resources in the State from the onset of the Illinois Environmental Protection Act, enacted in

1970 and the federal counterpart Clean Water Act…". Exh. 1 at 2. He further noted that while water quality standards were established for all surface waters in Illinois, "standards adopted for CAWS and Lower Des Plaines River, so greatly stressed by historic and ongoing urban and industrial influences, reflected lower expectations". *Id.* at 3. Mr. Sulski stated that there had been no comprehensive review or revision of the water quality standards for CAWS and LDPR from the 1970s until 2000, which led to the proposed standards by IEPA. *Id.* at 4.

According to Mr. Sulski, CAWS UAA found that the water quality in CAWS "for the most part" met Illinois' General Use numerical standards, but could not achieve CWA goals due to limitations posed by the six UAA Factors. Exh. 1 at 9. Temperature, dissolved oxygen, and bacteria were the three parameters not meeting General Use numerical standards in CAWS. *Id.* The UAA further found that "attainable uses were in some cases not achievable without overcoming dissolved oxygen, temperature, and bacteria limitations". *Id.* at 18. Mr. Sulski stated that temperature constraints could be overcome with the use of additional effluent cooling at the five Midwest Generation power generation stations, and water aeration could be used to meet the proposed dissolved oxygen standards. Both effluent cooling and water aeration systems are technically feasible, according to Mr. Sulski. *Id.* at 19.

Mr. Sulski noted that there is an "indication" that the south branch of the Chicago River and the upper reach to the CSSC would not comply with the proposed temperature standards. 3/10/08PTr. at 84 and 85. Mr. Sulski observed that there is no evidence that the Calumet River, Grand Calumet River, Little Calumet River, and the Cal Sag experience thermal exceedances. *Id.* at 90.

Regarding DO, Mr. Sulski stated that the North Shore channel, North Branch, Chicago River south branch, and the CSSC could not currently comply with the proposed DO standards. 3/10/08PTr. at 93 and 94. Mr. Sulski further stated that there are no known issues with DO in the Calumet River, Lake Calumet, or anywhere upstream of the O'Brien lock. *Id.* at 94. He reported that there "may or may not be issues in the Little Calumet River and in the Grand Calumet River", and there "may be short-lived issues in the Cal Sag Channel". *Id.* Mr. Sulski explained that "short-lived issues" with DO were related to storm water. "In general, the DO is good [in the Cal Sag Channel] except when we have storm events". *Id.* at 96. Mr. Sulski opined that this was true for the Little Calumet and Grand Calumet as well. *Id.*

Mr. Sulski reported that there are two unique water bodies in CAWS, the Upper North Shore Channel and the south fork of the South Branch, which have limited to no flow. 3/10/08PTr. at 96. The DO problem is exacerbated in these two segments, although downstream of the wastewater treatment plants, Mr. Sulski noted, DO is generally good until a storm event occurs and the sewers overflow. *Id.* Mr. Sulski stated that this can take one to three days for these streams to recover DO levels following a storm event. *Id.* at 97.

Mr. Sulski stated that the south branch of the Chicago River and the Upper CSSC experience major temperature stressors. 3/10/08PTr. at 138. IEPA added the same was true for both segments of the LDPR. When asked what a "stressor" was, Mr. Sulski stated that it was a condition that is preventing the existing aquatic life from meeting its potential aquatic life, which has been "outlined in the proposed designated use". *Id.* at 139.

Mr. Sulski was asked to explain how temperature is a major constraint in the Brandon Pool such that its attainable use is not being achieved. Mr. Sulski stated that a report concluded that the "existing criteria is garbage, it's lethal". 3/10/08PTr. at 149. Mr. Sulski agreed that the existing temperature water quality standard could not be retained because it was not protective of the aquatic life use designation, but that the proposed temperature standard would be protective. *Id.* at 149 and 150.

When asked whether IEPA considered the presence of endocrine disruptors in the cause of non-attainment, Mr. Sulski responded that IEPA did not because there are no criteria to use as guidance. 3/10/08PTr. at 158.

Mr. Sulski was asked whether IEPA believed it was "required or compelled by the Clean Water Act to upgrade the designated uses". 3/10/08PTr. at 194. IEPA responded to say that the "legal answer is that we're only compelled to study it and look at it" but are not "compelled to upgrade if the study finds that it's not attainable". *Id.* at 195.

In response to a question as to whether CSOs contribute to a continuing source of mercury in the system, now and into the future, Mr. Sulski admitted to not knowing the answer. 3/11/08 Tr. at 163. Mr. Sulski further stated that neither of the contractors conducting the UAA analyses concluded that a UAA factor regarding contaminants in the sediments applied to this system. *Id.*

Mr. Sulski explained the reasons for the difference between the depressed IBI scores and the QHEI scores. The contractors doing the UAAs assessed the water quality, looking at chemical and physical conditions and compared them against the biological conditions, and "when they don't meet, then they try to find out the reasons, try to identify the stressors". 3/11/08 Tr. at 77 and 78. Mr. Sulski stated that the contractors found that temperature was a major stressor in the UDIP, and DO and copper were "on the edge". *Id*. at 78.

Mr. Sulski summarized the UAA conclusions regarding ammonia for the Lower Des Plaines River. He stated that "both an acute and a chronic standard would be met. In other words, they didn't identify ammonia as a stressor in the system based on their comparisons". 3/11/08 Tr. at 82.

Mr. Sulski noted that there were DO and temperature issues in the CSSC that would prevent the aquatic life use from being attained. 3/11/08 Tr. at 87. For the UDIP, Mr. Sulski said that temperature is the sole factor in this segment not achieving its attainable use. *Id.* at 88.

Mr. Sulski was asked if a temperature block at a single location in a stretch of river could affect the entire waterway, and he said it could. 3/11/08 Tr. at 101. He was further asked to identify the temperature blocks associated with the CSSC. He cited the "south branch and the upper Sanitary Ship Canal". Mr. Sulski identified the source of these temperature blocks as the power plants. He was asked to explain how DO levels might be affected by the temperature blocks of the power plants. *Id.* Mr. Sulski explained that if you raise the temperature, "you raise the activities of the decomposers…if you have food there for them, their metabolic rate will

increase and they will start to consume those organics and may extract oxygen from the waterway, so the oxygen subsequently lowers". *Id*. at 102. A second way temperature and DO are related is chemical saturation. Higher temperatures hold less DO. Limiting the excessive thermal inputs from the power plants' waste water would improve both the DO and temperature conditions of the CSSC. *Id.* at 102 and 103.

In the discussion of maintaining seasonal norms and cycles for reproduction to protect the ability to spawn, Mr. Sulski explained that if the fish reside in the waterway and their seasonal norms are disrupted, you have the "potential of morphologically disrupting their processes so that they wouldn't be ready to spawn or they wouldn't spawn". 3/11/08 Tr. at 229. While the specific temperature requirements for spawning and pre-spawning are not known, Mr. Sulski observed that "the aquatic wildlife within our area developed over thousands and thousands of years and developed in a system that had seasonal norms". *Id.* at 234.

Roy Smogor

Roy Smogor is a streams biologist for the IEPA. He has been employed there for seven and a half years. Mr. Smogor holds a Master of Science degree in Fisheries and Wildlife Sciences from Virginia Polytechnical Institute and State University in Blacksburg, Virginia. Exh. 3 at 1. Mr. Smogor also holds a Bachelor of Science degree from the University of Illinois. *Id.* Mr. Smogor has worked for both Virginia and Illinois in developing ways to use information about fish and other aquatic life to determine the ecological health of streams. *Id.* Mr. Smogor is currently a Public Service Administrator in the surface water section of the Bureau of Water. In this rulemaking, R08-09, Mr. Smogor's testimony provides an overview of the proposed DO standards to protect aquatic life in these waters. Exh. 3 at 2.

The DO standards proposed by IEPA are based primarily on criteria and corresponding justification in USEPA's national criteria document published in 1986. Exh. 3 at 4. IEPA used this document as a foundation from which to interpret and incorporate more recent information specifically applicable to the DO needs of aquatic life in Illinois waters. *Id*. Mr. Smogor noted that the DO standards being proposed for CAWS and the LDPR are consistent with the standards already recommended to the Board by IEPA in the rulemaking, Proposed Amendments to Dissolved Oxygen Standard 35 Ill. Adm. Code 302.206, R 04-25 (Jan. 24, 2008). *Id.* Two types of chronic standards are proposed. The first type is intended to apply to life stages older than 30 days; it is a seven-day average of daily minimum concentrations of DO. This type of chronic standard is designed to prevent continuous or regularly recurring exposures to DO concentrations at or near the acutely lethal threshold. Exh. 3 at 5. The second type of chronic standard, which applies to all life stages, is a daily average concentration that is averaged across seven days to protect early life stages; or averaged across thirty days to protect older life stages. *Id.* This second type of chronic standard is designed to ensure the long-term maintenance of aquatic life.

IEPA proposes different DO standards for each of the three sets of waters designated for aquatic-life uses. Exh. 3 at 5. For the UDIP ALU, the proposed standards are identical to standards recommended for the large majority of General Use waters throughout Illinois, as adopted in the previous rulemaking Proposed Amendments to Dissolved Oxygen Standard 35 Ill. Adm. Code 302.206, R 04-25 (Jan. 24, 2008). *Id.* For the ALU A Waters, IEPA proposes DO

standards similar to those for the UDIP, but designed to protect for less-optimal fish growth that is consistent with the proposed aquatic-life use designation. Because suboptimal growth of fishes is a characteristic of the lower biological potential of these waters, the proposed DO standards based on a daily minima alone provide sufficient chronic protection for all life stages in the ALU A waters. Exh. 3 at 6. For ALU B Waters, the proposed DO standards are consistent with the incrementally lower biological potential of these waters compared to ALU A Waters. *Id.* For the ALU B Waters, IEPA is not proposing standards to protect early life stages of fish because these waters do not have the potential to consistently support such early life stages. Exh. 3 at 6-7.

Howard Essig's Testimony from the March 11, 2008 Hearing

As the UDIP is downstream of Brandon Pool, which IEPA is proposing to have a lower use designation than UDIP, questions were raised about the impact on the UDIP of the upstream more lenient water quality standards. 3/11/08 Tr. at 42. Mr. Essig addressed the question of whether dischargers upstream of the Brandon Pool may result in violations of the more restrictive water quality standards that exist immediately downstream. He did not know if this scenario had been considered, but stated that it would be "handled through a TMDL [total maximum daily load] program". *Id.* Mr. Twait elaborated by saying that "if this situation does occur and we deal with it the same way as we deal with the I-55 bridge where we have a less stringent secondary contact standard going into the general use standard where we could set…an ambient station there that the upstream dischargers would have to meet at that point of compliance". *Id.* at 42 and 43.

In response to the question of whether ammonia has been identified as a "major stressor in the system", Mr. Essig stated that "ammonia was not listed as a cause of impairment for the Upper Dresden Island Pool because it was considered to be meeting its designated use". 3/11/08 Tr. at 80. However, he did say that "ammonia was identified as a potential cause in one [of] the Sanitary Ship Canal segments and also in the Grand Calumet River". He added that he "would not consider them to be major stressors" as compared to DO. *Id.*

Mr. Essig was asked whether the ammonia standards were stricter than the current secondary contact standard for the Lower Des Plaines River portion, CSSC, Brandon Pool, and UDIP. 3/11/08 Tr. at 81. Mr. Essig stated that he "believed they are more stringent than the other standards". *Id.*

Chris O. Yoder

Mr. Yoder is the Research Director for the CABB at the MBI. Mr. Yoder holds a Bachelor's of Science degree from Ohio State University and a Masters in Zoology from Depauw University. Mr. Yoder noted that a cooperative agreement between MBI and USEPA was the primary vehicle for establishing CABB as a national center of expertise for biological assessments and biocriteria within MBI. Exh. 13 at 1. According to Mr. Yoder, MBI performs applied research for USEPA, the states and other clients on biological assessment and biological criteria development and implementation of multiple water quality and natural resource management objectives. *Id.* Mr. Yoder worked for 25 years for the State of Ohio's EPA on

ecological assessments, surface water issues, biomonitoring, evaluation of water quality standards, review of thermal discharges, and development of guidelines for CWA Section 316 demonstrations. Exh. 13 at 2. Mr. Yoder stated that he has 37 years' experience with the taxonomy, distribution, ecology, and habitat of river, stream and estuarine fishes. *Id.* Mr. Yoder has provided expert testimony in proceedings before USEPA, Ohio EPA, and the State of Ohio Environmental Review Board, which is now the Environmental Review Appeals Commission. *Id.* Mr. Yoder has previously testified on thermal issues before USEPA as an employee of the Indiana Department of Health for the Wabash River Section 316(a) hearings in 1976, and as an employee of Ohio EPA regarding the development of their temperature criteria in 1978. *Id.*

Mr. Yoder was retained by USEPA via a cooperative agreement initiated in 2002 to provide technical assistance with several matters related to the use attainability analysis of the LDPR. Exh. 13 at 3. Specific to this project, MBI was retained to evaluate temperature criteria options for the LDPR in 2005 and 2006. *Id.* The focus of Mr. Yoder's testimony in this matter is the report entitled "Temperature Criteria Options for the Lower Des Plaines River" that was prepared for USEPA and IEPA and was included as Exhibit GG to IEPA's statement of Reasons. *Id.* Mr. Yoder summarized his methods in this document by saying that he applied a methodology developed in a prior thermal project to the portions of the LDPR being studied in the UAA to develop options which the State could rely on in formulating its thermal criteria proposal to the Board. *Id.* The final version of this report is included as Attachment 2 to Mr. Yoder's pre-filed testimony. Mr. Yoder noted that the report prepared was for the LDPR UAA and was developed prior to and independent of use designation determinations for the LDPR and CAWS by IEPA. Exh. 13 at 4.

Mr. Yoder briefly summarized the history of the development of the Fish Temperature Model relied on in his report. Mr. Yoder's thermal work at MBI has focused on updating the thermal methodology that was developed by Ohio EPA in 1978. Exh. 13 at 4. Mr. Yoder described this methodology as using data from the thermal effects literature to create a thermal effects database for freshwater fish. *Id.* These data are then used within a procedure that calculates four behavioral and physiological thresholds for a list of representative fish species (RAS) that is designed to represent the entire fish assemblage of a particular river or river segment. *Id.* Mr. Yoder noted that during his tenure at Ohio EPA, they used this approach in setting temperature criteria for inland waters and Lake Erie in 1978, and the Ohio River Valley Water Sanitation Commission (ORSANCO) used it to adopt the current Ohio River temperature criteria in 1984. Exh. 13 at 4-5. Mr. Yoder played a lead role in developing the methodology used to derive seasonal temperature criteria adopted by Ohio EPA in 1978. Exh. 13 at 5. While Mr. Yoder was retained by ORSANCO, he completed a project reviewing the temperature criteria for the Ohio River and included an examination of existing temperature criteria models and techniques, a review of state temperature criteria and methods, and an extensive update to the thermal tolerance database for freshwater fishes common to rivers and streams of the Great Lakes and Ohio River drainages. *Id.* The final report for that project is titled "Re-evaluation of the Technical Justification for Existing Ohio River Mainstream Temperature Criteria", dated January 27, 2006. This report is included as Attachment 3 to Mr. Yoder's pre-filed testimony. While Mr. Yoder's work for ORSANCO was ongoing, he was tasked by USEPA to use this same information to develop temperature criteria options applicable to the LDPR pilot UAA study area. *Id.* This final report is attached to Mr. Yoder's pre-filed testimony as Attachment 2.

Mr. Yoder's testimony briefly summarized the updates made for ORSANCO to the Fish Temperature Model. He then summarized two major assumptions underlying this methodology for customizing temperature criteria that include the thermal endpoints utilized in the Fish Temperature Model and representative aquatic species selections made by the user. Mr. Yoder also briefly summarized the criteria options that were included in his report.

Literature review used to update Fish Temperature Model database. Mr. Yoder noted that the original Ohio EPA methodology used thermal effects data from over 370 literature review sources that dated prior to 1978. Exh. 13 at 6. This information was updated by MBI for ORSANCO and included over 200 new and suitable thermal effects studies mostly produced after 1978. *Id.* Mr. Yoder stated that where specific thermal tolerance endpoints used in the Fish Temperature Model, discussed later in the testimony, were available, the results of these additional studies were incorporated into a master thermal effects database and classified as one of the seven thermal endpoints. *Id.* Mr. Yoder noted that these studies primarily focused on freshwater fishes, but also included some macroinvertebrate data. *Id.* Mr. Yoder also noted that an attempt was made to include thermal tolerance data on the temperature tolerance of bivalve mollusks; however, that update was not made because so few relevant studies were found at the time. *Id.*

Thermal Endpoints. Mr. Yoder explained that the seven endpoints are the UILT, ChTM, CTM, Optimum Temperature, Final Preferendum, Upper Avoidance Temperature and Growth. Exh. 13 at 6-7. Mr. Yoder noted that an additional endpoint referred to as Mean Weekly Average Temperature for growth (MWAT) can be calculated if these seven endpoints are available. Exh. 13 at 7.

Mr. Yoder stated that the original seven endpoints are condensed into four thermal input parameters for the Fish Temperature Model. The first three of these seven endpoints (UILT, ChTM and CTM) measure lethality and have been combined into a single input parameter which Mr. Yoder referred to in his report as an upper lethal temperature at acclimation temperatures of 25-30 degrees Celsius. Exh. 13 at 7. Mr. Yoder noted that the lethal endpoints are distinguished by the type of study utilized to measure lethality to fish and how realistically the testing methodology approximates conditions in the field. *Id.* Mr. Yoder noted that UILT is the primary method relied on because it is viewed as being more realistic than the CTM and numerous studies exist. *Id.* The combined lethality input parameter (relying on ChTM, UILT and CTM with a safety factor) was used in calculating the short-term and long-term survival outputs of the Fish Temperature Model. *Id.*

The remaining four endpoints (Optimum temperature, Final Preferendum, Upper Avoidance Temperature and MWAT for Growth) are considered to be sub-lethal or chronic effects endpoints. Exh. 13 at 7. Mr. Yoder noted that these were condensed into three input parameters for the Fish Temperature Model by combining Optimum Temperature and Final Preferendum into a single input parameter. Exh. 13 at 7-8. Together, these thermal input parameters are used in the Fish Temperature Model to determine period average and daily maximum temperature values in the summer season. Exh. 13 at 8.

Representative Aquatic Species List. Mr. Yoder noted that an important input variable of the Fish Temperature Model is the RAS list. Exh. 13 at 8. Mr. Yoder claimed that one finding of his research is that intolerant species are underrepresented in the thermal database, which is dominated by tolerant and intermediately tolerant species. *Id.* As a result, there is a need to rely on the available data that frequently includes single studies that do not always produce all of the thermal endpoints in the Fish Temperature Model. To address that issue, Mr. Yoder noted that they developed an extrapolation procedure to fill in these gaps in the database. *Id.* Mr. Yoder noted that this procedure is described in detail in the ORSANCO report included as Attachment 3 to this testimony. Mr. Yoder explained that using existing field and historical data, he developed potential RAS lists for three designated use options that were considered by the contractors during the LDPR UAA process. Exh. 13 at 9. Mr. Yoder stated that due to an absence of an existing tiered aquatic life use designation system in Illinois and prior to the development of the use designations for CAWS and LDPR, he chose to split the options into three categories that were respectively termed General Use, Modified Use and Secondary Contact, which range in order from least to most impacted by chemical, physical and hydrological modifications. *Id.* Mr. Yoder noted that it was left to the local and policy experts at IEPA to designate uses for the study area waters and make appropriate decisions about the RAS lists. In the Yoder Report, the modified use designation is designed to represent impounded portions of rivers similar to the Des Plaines River and includes 27 species, while the RAS list termed secondary contact consisted of 8 representative aquatic species. *Id.* Only the General and Modified RAS lists relied on sampled data from the LDPR; the Secondary Contact RAS is a general collection of typically tolerant species that are usually found in highly degraded and modified waters. *Id.* Mr. Yoder noted that he used the Fish Temperature Model to calculate period average and daily maximum summer temperature criteria. *Id.*

Temperature Criteria Options. Mr. Yoder noted that the Fish Temperature Model specifies some criteria for developing water body specific temperature criteria. Exh. 13 at 10. First, period averages should ensure the following: 100% long term survival of all representative species including Illinois' threatened or endangered fish species, growth of commercially or recreationally important species, growth of at least 50% of non-game species and consistency with the observed historical ambient temperature record. *Id.* Second, daily maxima should ensure 100% short term survival of all representative species and also be consistent with the observed historical ambient temperature record. *Id.* For the most tolerant RAS list provided (called Secondary Contact/Indigenous Aquatic Life, which represents the most physically and hydrologically modified water bodies) eight thermally tolerant species were included. Exh. 13 at 10-11. Mr. Yoder noted that the Fish Temperature model indicated that a summer daily maximum of 32.4 degrees Celsius (or 90.3 degrees Fahrenheit) and a period average of 30.4 degrees Celsius (or 86.7 degrees Fahrenheit) is needed to protect 100% of my Secondary Contact RAS list. Exh. 13 at 11. Mr. Yoder stated that the water quality standards currently in place in the waters subject to the LDPR and CAWS are a daily maximum value of 34 degrees Celsius (or 93 degrees Fahrenheit) that can be exceeded for five percent of the hours in a 12 month period up to a value of 37.8 degrees Celsius (or 100 degrees Fahrenheit) at any time. *Id.* Mr. Yoder noted that the long-term survival values of only 50% of the RAS on his Secondary Contact RAS list would be protected by a standard of 93 degrees Fahrenheit, while 100 degrees Fahrenheit exceeds the short-term and long-term survival values of more than 50% of the species on all the RAS lists developed for the LDPR. *Id.*

Mr. Yoder noted that he also provided options for calculating daily maximums and period averages for the non-summer months based on background temperatures. *Id.* Mr. Yoder suggested using the geometric mean for the period average and the 98th percentile for the daily maximum, but other statistical thresholds could also be used in setting non-summer criteria. *Id.* In establishing background temperatures, Mr. Yoder suggested using either a set of representative ambient sampling stations designed to represent background or a temperature modeling study. *Id.* The concept applied is that maintaining the normal seasonal cycles will protect essential functions such as growth, gametogeneisis and spawning. *Id.* Mr. Yoder stated that selecting a temperature representative of background temperatures in this system is complicated by the physically and thermally altered characteristics of the Upper Illinois Waterway and CAWS. *Id.*

Mr. Yoder stressed that as with other naturally occurring physical and chemical constituents, occasional exceedances of well-developed thermal criteria are inevitable and may not necessarily result in a biologically impaired use. Exh. 13 at 12. Mr. Yoder concluded that temperate excursions should be evaluated with direct biological measures in a receiving water body that is representative of references or least impacted conditions. Conversely, setting criteria to avoid the potential regulatory inconveniences of such exceedances can have potentially adverse biological consequences.

District

Adrienne D. Nemura

Adrienne Nemura is an owner and vice president of LimnoTech Inc., in Ann Arbor, Michigan. Ms. Nemura is a licensed Civil Engineer and has both a Bachelor's and Master's degree in Civil Engineering from Virginia Polytechnic Institute and State University. Exh. 116 at 1, Attachment 1 at 12. She has 24 years' experience in evaluating pollutant impacts on watersheds and waterways, particularly those of sewer overflow on water quality and the development of appropriate control measures to meet water quality standards. Most of her work with municipalities and other agencies, including the USEPA, has involved guidance and training regarding combined sewer overflow (CSO) control. Exh. 116 at 1.

Ms. Nemura's pre-filed testimony addressed what she claimed is "IEPA's failure to consider the need for wet weather water quality standards for CAWS in IEPA's proposal". Exh. 116 at 1. It is her opinion that "IEPA improperly established standards for aquatic life and recreational uses in CAWS because IEPA did not demonstrate that the uses are attainable when the system is impacted by wet weather discharges". Exh. 116 at 2. She claims that "CAWS is unique as the system was designed and is operated to receive and transport wet weather discharges including runoff from tributaries, CSO's, pump station bypasses, and stormwater runoff to prevent flooding and other impacts in the Chicago metropolitan area". *Id.*

According to Ms. Nemura, "IEPA failed to demonstrate that the proposed standards can be met despite wet weather discharges today and in the future, even if additional treatment is provided". Exh. 116 at 2. The standards are therefore "premature and if adopted, should include

a provision for exemptions to the standards due to wet weather conditions". *Id*. Ms. Nemura also claimed that "a provision is needed to inform the public that the waterways should not be used for recreation when impacted by wet weather discharges", and that "IEPA should address the impacts of these discharges on attainability of the proposed aquatic life standards". *Id*.

Ms. Nemura expressed her objection to IEPA's lack of evaluation of "the impact of wet weather discharges on aquatic life" and "whether the proposed standards could be met when CAWS are impacted by wet weather". *Id*. Ms. Nemura claimed that IEPA "did not address the effects of intermittent low dissolved oxygen as a result of wet weather discharges", and it failed to "identify the species of fish or benthic organisms that will benefit from the proposed changes". IEPA also failed to "identify the magnitude, frequency or duration of low DO events that could be tolerated by these species". Exh. 116 at 5. According to Ms. Nemura, "data from the District's continuous DO monitoring network shows that the magnitude, frequency, and duration of the CSO impacts vary from location to location and from storm to storm". *Id*. Although IEPA's proposed minimum criteria for DO levels in CAWS is 3.5 mg/L, Ms. Nemura claimed that wet weather discharges can cause dissolved oxygen to get as low as zero to 2 mg/L at times, which "can last from several days to a week at some locations". Exh. 116 at 5-6. She adds that these low DO levels are "likely to remain even if the gravity CSOs could be eliminated due to pump station discharges, sediment resuspension, stormwater runoff and tributary loads". Exh. 116 at 6.

Finally, Ms. Nemura claimed that "IEPA did not evaluate whether provisions could be designed to protect aquatic life and recreational uses when CAWS are impacted by wet weather", and that it "did not document that it considered the need to establish realistic attainable targets for wet weather conditions in its proposed rulemaking". Exh. 116 at 6. Ms. Nemura expressed the opinion that IEPA did not do its best to consider the District's approved plan for controlling CSOs, the Tunnel and Reservoir Project, which is why it proposed that DO criteria cannot be met during wet weather. Exh. 116 at 7. Ms. Nemura cited the USEPA, indicating that there are "a number of options that states can pursue in adopting standards that recognize the impact of wet weather discharges", including "segmenting the water body, adopting subclasses to recognize intermittent exceedances of criteria or physical characteristics and/or ecological systems; and high flow cutoffs". *Id*. She also cited several examples of UAAs that have been conducted in order to "allow for suspension of recreational uses due to wet weather discharges". Exh. 116 at 8.

Ms. Nemura concluded her testimony by stating that "the District has made a significant investment in developing a water quality model that can be used to assess the attainability of both proposed recreational uses and aquatic life uses, and this could readily be applied to ascertain the conditions that are caused by wet weather". Exh. 116 at 8. She believes that applying this model is the "appropriate path for establishing attainable uses for CAWS". She also claimed that it will distinguish "the effects of dry and wet weather sources", the "use of the results of human health risk assessment and epidemiological study", the assessment of "information from ongoing aquatic life and habitat research", and the assessment of "economic and social impact to identity the controls necessary to attain the proposed standards". *Id*.

Charles Melching

Charles S. Melching is an Associate Professor of Civil and Environmental Engineering at Marquette University in Milwaukee, Wisconsin. Mr. Melching has a Bachelor's of Science degree from Arizona State University and Master of Science and Doctor of Philosophy degrees from the University of Illinois at Urbana-Champaign. He is also a licensed Professional Engineer in Illinois and Arizona. Mr. Melching has more than 20 years' of post-doctorate experience in water resources and environmental engineering research and education. Exh. 169 at 1. Mr. Melching has a long history of working on CAWS, beginning in 1992, when he evaluated flow measurements at the acoustical velocity meter on the CSSC at Romeoville. He also assisted with the measurement program done in support of the U.S. Army Corps of Engineers Accounting of Lake Michigan Diversion, which led to his selection by the District to develop an unsteady flow water-quality model of CAWS (DUFLOW model) in 2000. Exh. 169 at 2.

Mr. Melching's pre-filed testimony discussed three topics. First, he described the DUFLOW model he developed for CAWS as well as its reliability. Second, he described the "unique and complex" hydraulic features of CAWS determined by the modeling studies. Third, he integrated the implications of the hydraulic features of CAWS with the results of the determination of biological potential that was reported in the UAA to discuss reasonable aquatic life use goals for CAWS. Exh. 169 at 3. Mr. Melching focused particular attention on the second and third issues. Exh. 169 at 2-3.

Mr. Melching explained that the DUFLOW model was "used to determine the ineffectiveness of pollutant removal at selected gravity combined sewer overflows (CSOs), to consider supplemental aeration in the Chicago Sanitary and Ship Canal, and to evaluate the effects of disinfection of fecal coliform concentrations on CAWS". Exh. 169 at 3. It was also used to "evaluate water-quality management scenarios involving (a) supplemental aeration on the North and South Branches of the Chicago River, (b) flow augmentation on the North Shore Channel, and (c) a combination of these water-quality improvement technologies for the South Fork of the South Branch (Bubbly Creek)". *Id*. Mr. Melching explained that the model integrates and interprets data collected for CAWS by the District, U.S. Geological Survey, and U.S. Army Corps of Engineers on the basis of hydraulic theory and "well accepted pollutant transport and transformation concepts", which is why the "model can facilitate understanding of the fundamental operations and flow and pollutant patterns in CAWS". Exh. 169 at 3.

Describing the hydraulic features of CAWS, Mr. Melching claimed that "evaluation of flow and water-surface elevation data used to apply the DUFLOW model and the hydraulic results of the modeling reveal just how stagnant CAWS is and the potential limitations to the current and future biological community". Exh. 169 at 3-4. Mr. Melching described how "large storms can create large flow reversals from CAWS to Lake Michigan". *Id*. at 4. He explained how "flow from the North Side, Stickney, and Calumet Water Reclamation Plants is substantially higher than the flow upstream of these Plants", so flow reversals are "common during dry weather flows upstream of these Plants". Mr. Melching also claimed that "for each of these Plants, the water surface elevations upstream" are frequently "lower than those downstream". Therefore the outfall of each Plant "acts as a hydraulic dam inserting effluent to the upstream reaches and then holding it and upstream flows back to truly stagnate in the

upstream reaches". Mr. Melching explained that this "bi-directional flow gives some impression of the unnatural condition of CAWS". Exh. 169 at 4.

Next, Mr. Melching described the slow travel times of CAWS. He claimed that CAWS exhibits "huge travel times and low flow velocities" because its original construction did not anticipate the Cal-Sag Channel and its impacts on the Chicago Sanitary and Ship canal cross-geometry, which is the same both upstream and downstream of the Sag Junction. The Sag-Junction therefore "acts like two lanes narrowing to one lane on the freeway", causing "large backups and long travel times". Mr. Melching claimed that "the long travel time gives further impression of the unnatural condition of CAWS". He claimed that long travel time "contributes to the lower dissolved oxygen that is observed in CAWS compared to general use rivers because of the reduced natural reaeration resulting from low velocity and very low slope", and it also "makes it challenging and costly to disperse dissolved oxygen that is contributed artificially from engineered aeration stations". Exh. 169 at 5.

Mr. Melching also addressed the effects of wet weather on CAWS. He claimed that contrary to what IEPA seemed to assume about the duration of storm effects lasting only as long as the causative rainfall, or "period of elevated flow rates", "research on CAWS shows that the effect of storm runoff and CSOs on water quality lasts substantially longer than the hydraulic effects of the storm". Rather, "once a load of pollutants is introduced to the system, it takes longer for the system to dissipate the effects of these loads than it does to pass the high flows". *Id*. He explained that the "substantial impact of storm loading on DO concentration in CAWS on average lasts one day to a few weeks depending on the location in CAWS. According to Mr. Melching, this "long storm effect is related to the hydraulic dams and other stagnant conditions in CAWS". Exh. 169 at 6-7. This "can negatively impact the aquatic life community, and these long storm effects cannot be reduced until the reservoirs of the Tunnel and Reservoir Plan are fully on line". In summary, Mr. Melching asserted that "the effects of storm flows on the ability to meet water quality standards should not be considered a trivial or insignificant problem for CAWS", and that "the long effects of storm flows on water quality also indicate that it may be appropriate to consider wet weather standards for CAWS". Exh. 169 at 7.

Describing the relationship between the hydraulic and ecological conditions of CAWS, Mr. Melching explained that "CAWS effectively is a long, narrow, moderately deep impoundment not at all similar to natural streams. Even dam impoundments on formerly natural streams have variation in habitat and substrate including shelter areas for fish, whereas these features are generally absent from CAWS". Exh. 169 at 7-8.

DO standards were addressed next. Mr. Melching claimed that "the ecological community in CAWS is substantially impaired by poor habitat", as acknowledged by IEPA. While the DO criterion established by USEPA is 3.0 mg/L for "full attainment of warmwater life uses", Mr. Melching criticized IEPA's proposal of a DO standard of 5.0 mg/L from March through July to support early life stages. He claimed that there is "no evidence that the habitat and physical characteristics of CAWS could support such a use or attain the proposed criterion". *Id*. It is Mr. Melching's opinion that the rulemaking proposal is "essentially requiring that the degraded CAWS meet in certain critical aspects the General Use standards in rule R04-25 [Proposed Amendments to Dissolved Oxygen Standard 35 Ill. Adm. Code 302.206, R04-25 (Jan

24, 2008)] that was recently adopted by the Board." Exh. 169 at 11-12. Alternative approaches to DO criteria were then addressed, and Mr. Melching cited the testimony of IEPA to explain that "partial justification for the selected DO criteria was the target fish species largemouth bass, smallmouth bass and channel catfish, whose protection is sought by the DO criteria with smallmouth bass and channel catfish as the targets for the early life stages protection". Quoting Mr. Roy Smogor, Mr. Melching explained that in order to protect for the early life stages of channel and smallmouth bass, it is best to "keep dissolved oxygen levels above a daily minimum of five". Therefore, Mr. Melching claimed that "consideration should then be given to whether CAWS offers suitable habitat for early life stages of these fish species". Exh. 169 at 12.

Jennifer Wasik

In her pre-filed testimony, Jennifer Wasik noted that she has been a biologist for the District for seven years. Exh. 187 at 1. Ms. Wasik has a Master of Science degree in Environmental Management from the Illinois Institute of Technology. She supervises the data collection process for the District's Ambient Water Quality Monitoring Program (AWQM) and manages other District aquatic research projects. *Id.*

Sediment Sampling. There are 59 AWQM sampling stations within the District's service area, 28 of which are located in CAWS, and the remaining are located in General Use, shallow-draft waterways. Exh. 187 at 2. The District began collecting sediment for testing in 2002, with samples being analyzed for total solids, total volatile solids, ammonia nitrogen, nitrate plus nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus total cyanide, phenols, total metals, and Organic Priority Pollutants. *Id.*

Ms. Wasik reported that "Sediments exceeding the Threshold Effects Concentration (TEC) are considered 'possible toxic', and those exceeding the Probable Effects Concentrations (PEC) are 'presumed toxic'." Exh. 187 at 3. Ms. Wasik provided a sediment data summary by CAWS reach:

> North Shore Channel had concentrations of trace metals below PEC, but most samples exceeded TEC levels for cadmium, copper, lead, nickel, and zinc. Total polycyclic aromatic hydrocarbon (PAH) concentrations were presumed toxic in three of the District's samples. Exh. 187 at 4.
>
> North Branch Chicago River showed silt and sludge contaminated by heavy oil deposits. *Id.* Five of six sediment samples in 2005 had PAH concentrations that were presumed to be toxic. *Id.* at 5.
>
> Chicago River showed "presumed toxic concentrations of PAHs and polychlorinated biphenyls (PCBs) in seven of eight samples. Concentrations of cadmium, chromium, copper, lead, mercury, and zinc "were always greater than either the presumed or possible toxic screening values in 2002 samples". *Id.*
>
> South Branch Chicago River had all seven samples that greatly exceeded the presumed toxic level for PAH, and six of the seven samples also exceeded the PEC for PCBs.

> Concentrations of cadmium, chromium, copper, lead, mercury, nickel, and zinc exceeded the PEC or TEC. *Id.*
>
> CSSC had the furthest upstream sampling stations. Oil was detected at a majority of these sites. According to Ms. Wasik, the "majority of the 16 samples taken from the CSSC exceeded the PEC screening level for cadmium, chromium, lead, nickel, zinc, PCBs, and PAHs". *Id.* at 6.
>
> Cal-Sag Channel displayed oil sheens and had strong petroleum odors. All sediment samples collected in 2003 were presumed toxic for PCBs, and total PAH levels exceeded the TEC, with two samples exceeding the PEC. Toxic levels of zinc, chromium, and cadmium were also reported. *Id.* at 7.

Little Calumet had sediment samples that exhibited concentrations of some contaminants at a lower level than that of the Grand Calumet River and Cal-Sag Channel. *Id.* at 8.

Ms. Wasik concluded by stating that many sampling locations in the CSSC, Cal-Sag, North Branch of the Chicago River, and South Branch of the Chicago River emitted odor or sheen of oil, and "chemical contamination with metals, PAHs, and/or PCBs was widespread in CAWS sediments". *Id*. Exh. 187 at 9. Ms. Wasik noted that the sediment analysis demonstrated that the sediments were "unsuitable for survival of a relatively tolerant species of benthic invertebrate, especially in the CSSC". *Id.*

Cyanide Standard. Ms. Wasik stated that IEPA's proposed cyanide standard is 5.2 µg/L, which is identical to the General Use standard. Exh. 230 at 1. She opined that this standard fails to recognize the site-specific chronic cyanide standard established in the Board's rulemaking, Petition of the Metropolitan Water Reclamation District of Greater Chicago for Site-Specific Water Quality Regulation: 35 Ill. Adm. Code Parts 302 thru 304, R95-14 (Feb. 1, 1996), where a chronic cyanide standard of 10 µg/L was applied to General Use waters located in Cook County. She further noted that "the General Use chronic water quality standard for cyanide does not apply in Salt Creek, Higgins Creek, the West Branch of the DuPage River, and the Des Plaines River". *Id.*

According to Ms. Wasik, one of the reasons for the site-specific cyanide standard was that "the list of indigenous species used to determine the chronically toxic cyanide concentration was not appropriate for the warmwater aquatic environment found in the waterways in Cook County". Exh. 230 at 2. She noted that the 5.2 µg/L standard was based on toxicity calculations to rainbow trout, yellow perch, and bluegill, with the rainbow trout being the most sensitive to cyanide. The rainbow trout was removed from this list because it is a coldwater fish species not found in warmwater aquatic environments. Ms. Wasik stated that by "removing the rainbow trout and adding the next most cyanide-sensitive species, black crappie, the calculated chronic standard for cyanide would be 9.8 µg/L, which was rounded up to 10 µg/L in the final ruling". *Id.*

Because a less stringent chronic cyanide standard was recommended for General Use waters in Cook County, Ms. Wasik opined that it "would be reasonable to conclude that a similar

or even less stringent standard should be applied to CAWS". Exh. 230 at 2. Therefore, Ms. Wasik states that the District recommended a chronic cyanide standard of 10 µg/L be established. *Id.*

Water Quality Standards. Ms. Wasik was asked if she believed the "general use standards are more stringent by including the seven-day mean and the 30-day mean of daily means" for DO. 12/2/08 Tr. at 222. Ms. Wasik replied that based on information from IEPA, it "would be mathematically impossible to violate one of the standards without violating the chronic standard…But, I think they're in that way essentially the same". Ms. Wasik was further asked if she would agree that "if one of the water quality standards is similar or even the same as a general use standard that automatically means the designated use must be the same as the general use designated use". *Id.* Ms. Wasik responded that "because the aquatic life use is admittedly not meeting or able to meet the Clean Water Act goals that it should not have a general use water quality standard that's reflective of an aquatic life use that is meeting Clean Water Act goals." 12/2/08 Tr. at 223. Ms. Wasik asserted that with CAWS she believes there should be "different standards than the general use standards considering they're very altered in state". 12/2/08 Tr. at 224.

Marcelo H. Garcia, PhD

Dr. Marcelo H. Garcia has been a Professor of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign (UIUC) since 1990 and Director of the Ven Te Chow Hydrosystems Laboratory since 1997. Dr. Garcia has an M.S. and a Ph.D. from the University of Minnesota, both in civil engineering. Dr. Garcia's pre-filed testimony focused on the water quality standard for DO proposed by IEPA for CAWS, specifically the South Branch of the Chicago River, or Bubbly Creek. Exh. 193 at 1.

While the majority of Dr. Garcia's testimony was related to Bubbly Creek, which will be addressed in Subdocket E, Dr. Garcia did provide insights into the effects of the use of road salts on water quality. Exh. 193 at 2. Dr. Garcia's research group at UIUC was the "first to recognize the phenomenon of density currents after the observations of bi-directional flows made by the U.S. Geological Survey in 1998. Once these density currents were known to exist, a physical model was developed to determine the conditions that lead to the development of such currents. *Id.* Dr. Garcia explained that the analysis of field observations has suggested that deicing salts used in Chicago, estimated at 300,000 metric tons during the winter months, are the "main culprit for the density differences leading to the development of density currents in the Chicago River. *Id.* Dr. Garcia noted that these density currents "could affect water quality and transport low-oxygen, sediment-laden water and contaminants for long distances". *Id.* at 3.

Dr. Garcia stated that CAWS is "very complex and the tools currently available cannot provide a complete understanding of certain local flow and water quality phenomena". Exh. 193 at 11. Dr. Garcia asserted that the one-dimensional flow and water quality model developed by Marquette University and used in development of the UAA has raised "more questions regarding the influence of site-specific effects, such as density currents, sediment oxygen demand, mixing of heated-water discharges, and water quality effects of off-channel slips and wide areas". *Id.* Dr. Garcia contended that there is a need to better understand these phenomena so scientifically

sound recommendations can be made for water quality improvements and the technologies needed to achieve them.

Dr. Garcia concluded by recommending that additional study of the "behavior and fate of sediments is essential before attainable uses can be properly evaluated and resources to improve water quality are implemented, rather than imposing measures now that may prove to be ineffective or even lead to further degradation of the system". Exh. 193 at 15.

Samuel G. Dennison

Samuel G. Dennison is a biologist employed by the District. Dr. Dennison has a doctoral degree in biology from the Illinois Institute of Technology and is a Certified Fisheries Professional. He has been employed by the District since 1974, being responsible for monitoring the fish populations in CAWS from 1974 through 2003. Since 2003, Dr. Dennison has been the Section Head of the Environmental Monitoring and Research Division, which has responsibility for the District's Continuous Dissolved Oxygen Monitoring Program. Exh. 209 at 1.

Dr. Dennison's pre-filed testimony focused on the District's continuous DO monitoring program. Exh. 209 at 2. Dr. Dennison noted that "increased pollutant loading from urbanization throughout the Chicago metropolitan area and low stream velocities in Chicago area deep-draft waterways have caused dissolved oxygen (DO) concentrations to fall below DO standards established by the Illinois Pollution Control Board". *Id.* Dr. Dennison further noted that the District had determined more than 30 years ago that existing DO standards could not be met at its three regional water reclamation plants by using only advanced wastewater treatment. In order to increase DO levels, the District constructed artificial aeration systems in the late 1970s and early 1990s. *Id.*

According to Dr. Dennison, there are 19 continuous DO monitoring stations in the "Chicago River System, Des Plaines River System, and Calumet River", measuring DO levels hourly. Exh. 209 at 2. Dr. Dennison described the process for retrieving and analyzing water samples, which demonstrated that "many waterways in CAWS do not comply with the DO standards proposed by IEPA". Exh. 209 at 3. As examples, Dr. Dennison noted that the Calumet River System demonstrated "limited compliance with the 5.0 mg/L proposed seasonal standard", and the Cal Sag Channel's annual compliance with the 5.0 mg/L seasonal standard "would have been as low as 63.8% in 2005". *Id.* at 3 and 4. Further, at Torrence Avenue on the Grand Calumet River, annual compliance with the proposed DO standard "would have ranged between 47.7-62.20% between 2005-2007". *Id.* at 4. Lastly, Dr. Dennison stated that compliance with the proposed DO standard at the North Branch of the Chicago River at Fullerton Avenue would have been only 65% between 2005 and 2007. *Id.*

Dr. Dennison opined that during wet weather, "the DO in waterways can be severely impacted and elicit DO concentrations of less than 3 mg/L". Exh. 209 at 4. Dr. Dennison illustrated the effects on DO in CAWS from combined sewer overflows (CSOs), which can last for days following a storm event. *Id.*, *see also Id.* at Attachment 3. Dr. Dennison noted that CSOs following storm events do not impact all of CAWS segments at the same time or in the

same manner, which may explain why there are not frequent fish kills. Fish are "likely to practice avoidance of the low DO segments". *Id.*

Dr. Dennison concluded by stating that due to the severe aquatic habitat limitations in CAWS, requiring a seasonal DO standard of 5.0 mg/L "will merely increase the District's energy consumption and involve construction of additional aeration systems without substantially increasing the likelihood that fish populations will become any more self-sustaining than they are now". Exh. 209 at 4 and 5.

Stephen F. McGowan

Dr. McGowan is a vice president at Malcolm Pirnie, Inc. and a licensed professional engineer in Illinois. Exh. 211 at 1. Dr. McGowan evaluated the potential environmental impacts from the operation of DO enhancement technologies in certain sections of CAWS. *Id*. These enhancement measures would be required to meet the DO standards for CAWS proposed by IEPA. *Id*. at 2.

Dr. McGowan's testimony relies on information presented by Consoer Townsend Environdyne Engineers, Inc. (CTE), which the District hired to develop an approach to meet the proposed DO standards (*see* Exh. 217). Exh. 211 at 2. Dr. McGowan relates that according to CTE, meeting the proposed DO standards at all times would require supplemental aeration or additional aeration facilities in: 1) Upper North Shore Channel, 2) North Branch of Chicago River, 3) South Branch of Chicago River, 4) Bubbly Creek, 5) Chicago Sanitary and Ship Canal, 6) Cal-Sag Channel, and 7) Little Calumet River. *Id*.

CTE also advised that meeting IEPA's proposed DO standards would require the construction of 18 supplemental aeration stations and three flow augmentation stations, as well as the operation at full capacity of existing sidestream elevated pool aeration (SEPA) and diffused air stations. Exh. 211 at 3.

Dr. McGowan stated that energy consumption is "the largest potential environmental impact for the operation of the DO technologies in CAWS." *Id*. This energy consumption "leads to greater electrical demands, resulting in increased air emissions at the coal-based" plants that supply power for the District's facilities. *Id*. He cited CTE's estimate that the DO enhancements required by IEPA's proposed DO standards would require roughly 74.2 million kWh/yr. *Id*. This would increase the District's total annual energy consumption of 550.8 million kWh/yr by 13.5%. *Id*. at 4. The increase in power generation would "increase the emissions of criteria pollutants, mercury, and greenhouse gases" at the energy facilities that supply power to run District facilities, which are "generally coal-based electric generating plants." *Id*. at 3-4.

Dr. McGowan observed that the addition of 74.2 million kWh/yr would be equivalent to the energy use of approximately 6,200 households per year, according to USEPA Greenhouse Gas Equivalencies Calculator. *Id*. at 4-5. The increased energy use would also increase greenhouse gas emissions by 58,000 tons of carbon dioxide equivalents per year, an increase of 13.5% over the District's current energy usage. *Id*. at 5. This increase is roughly equivalent to adding 9,600 additional cars to the road per year. *Id*.

At hearing, Dr. McGowan stated that further research into the District's energy sources indicated that the percentage of coal-based power supplied to the District's facilities was lower than he first thought. 3/3/09Tr. at 12. Thus, his previous estimate for greenhouse gas emissions was 13 to 14% too high. *Id*. at 15. Dr. McGowan adjusted his previous estimate, stating that the energy use from proposed DO technologies would increase greenhouse gas emissions by 49,800 tons, instead of the initial estimate of 58,000. *Id*. at 18.

David R. Zenz

Dr. Zenz is a senior associate with CTE and a registered professional engineer in Illinois. Exh. 217 at 1. In his pre-filed testimonies (Exh. 217, 463), Dr. Zenz explained CTE's efforts to "determine the technologies and costs of methods to directly increase the DO in CAWS". Exh. 217 at 2. At IEPA's request, the District commissioned CTE to study DO enhancement methods. *Id*. Dr. Zenz testified twice on behalf of the District, at the March 3, 2009 hearing (Exh. 217) and at the May 18, 2011 hearing (Exh. 463). Dr. Zenz's later testimony updated the cost information provided in his prior testimony, following improvements in the model used to determine the capacity and location of aeration facilities needed to meet the proposed DO standards. Exh. 463 at 2-3.

Exhibit 217. Dr. Zenz first addressed potential flow augmentation of the Upper North Shore Channel. Exh. 217 at 2. Flow augmentation involves the addition of water from one waterway to another to increase flow and eliminate stagnant conditions. *Id*. Dr. Zenz discussed results based on a computer model analysis known as DUFLOW developed by Dr. Melching of Marquette University. *Id*. at 2-3. The model found that pumping 100 million gallons per day of effluent flow from the District's North Side plant to the headwaters of the Upper North Shore Channel at Wilmette would bring DO levels to about 5 mg/L, 90% of the time. *Id*. at 3. The 90% compliance target was chosen because a "rigid standard for CAWS would be difficult to meet under all conditions." *Id*. The estimated expense of this project included "$60.0 million in capital costs, $0.74 million in annual operation and maintenance costs and a total present worth cost of $74.9 million." *Id*.

Next, Dr. Zenz analyzed supplemental aeration of the North and South Branches of the Chicago River. *Id*. Again using a DO target of 5 mg/L to be achieved 90% of the time, the study found that four additional supplemental aeration stations would be required, including two on the North Branch and two on the South Branch. *Id*. Technologies considered in the cost estimate included "U-tubes, ceramic disc diffusers, jet aeration, and sidestream elevated pool aeration." *Id*. at 4. The total capital costs "ranged from $35.5 million to $89.9 million and the annual operating costs ranged from $0.55 million to $2.6 million." *Id*. The total present costs "ranged from $47.4 million to $132.8 million." *Id*.

Dr. Zenz also studied the flow augmentation and supplemental aeration of the South Fork of the South Branch of the Chicago River (also known as Bubbly Creek). *Id*. at 4. To achieve the standard of 5 mg/L, 90% of the time, 50 million gallons per day of augmented flow would need to be taken through a "two mile force main from the South Branch of the Chicago River at Throop Street to the headwaters of Bubbly Creek." *Id*. Three supplemental aeration stations

would also need to be built at the headwaters, midpoint, and mouth of Bubbly Creek. *Id*. Estimated costs of these technologies ranged from $60.4 million to $102.9 million, with annual maintenance costs ranging from $1.0 to $2.8 million. *Id*. at 5. The total present worth costs ranged from $81.9 million to $145 million. *Id*.

In all, Dr. Zenz stated that meeting IEPA's proposed DO standards would require 18 supplemental aeration stations, three flow augmentation stations, and full use of existing SEPA facilities. At the time of his 2009 testimony, Dr. Zenz stated that CTE has not finished studying an integrated approach for the District to meet IEPA's proposed DO standards, but he ventured a "rough, order of magnitude, cost estimate" of about $525 million. *Id*. at 7. Total maintenance costs would be $6.9 million per year and the total present worth is roughly $657 million. *Id*. Dr. Zenz stated that his cost estimate likely understates the potential expense of the projects, and that the actual cost "might be as much as 50% higher." 3/3/09Tr. at 32.

The total cost estimate in Dr. Zenz's pre-filed testimony was based on several assumptions, including but not limited to: 1) the use of only one aeration technology (ceramic disc diffusers), 2) the use of only one aerated flow augmentation technology (U-tubes), 3) the fact that the model was run for a representative "wet year," and 4) that vacant land is available and can be purchased with little demolition costs. *Id*. at 7-8. In addition, no aeration stations were planned for the Chicago River due to their perceived ineffectiveness. *Id*. at 9. Many of the proposed stations will only be needed a few times per year during large CSO events. *Id*.

Dr. Zenz further noted that achieving 100% compliance with IEPA's proposed DO standards would "require a complex waterway DO monitoring network and an automated operation system." *Id*. A cost estimate for these "significant" costs is not provided in his testimony. *Id*. at 10. Due to the "unique and complex" conditions in CAWS, Dr. Zenz acknowledged that there are "numerous unknowns at present" that may significantly alter the total cost of the projects. *Id*.

Finally, Dr. Zenz estimated that the total time for construction of the DO technologies to meet IEPA's proposed DO standards would be "at least" 8.5 years. *Id*. at 11. This figure includes two years for design, 3.5 years for field studies, land acquisitions and further computer modeling, and at least three years for construction. *Id*.

Exhibit 463. Dr. Zenz updated the cost information provided in his prior testimony above, following improvements in the model used to determine the capacity and location of aeration facilities needed to meet the proposed DO standards. Exh. 463 at 2-3. Dr. Zenz presented two new cost estimates to construct and operate aeration facilities that would be needed to comply with IEPA's proposed DO standards as well as the District's alternate proposal. The new cost estimates were based on computer simulations conducted by Marquette University using an improved version of the DUFLOW model. Dr. Zenz explained, "Marquette University used the model to determine the number, location, aeration capacity, and operation hours of supplemental aeration and aerated flow augmentation facilities need to meet each set of standards 100% of the time…" Exh. 463 at 2-3.

Based on the improved model, Dr. Zenz found that meeting IEPA's proposed DO standards would require 28 supplemental aeration stations, three aerated flow augmentation facilities, and additional operation of existing SEPA stations. Exh. 463 at 4-5, 5/18/11 Tr. at 43. Dr. Zenz explained that most of the supplemental aeration stations would need to be run for a relatively low number of operating hours, mostly in response to CSO events. Exh. 463 at 4-5. In the alternative, to meet the District's proposed DO standards, Dr. Zenz determined two supplemental aeration stations and one aerated flow augmentation facility would be required, along with extended operating hours at the existing Devon Avenue aeration station. Exh. 463 at 11.

For both sets of proposed DO standards, Dr. Zenz enumerated the waterways, locations, additional operating hours, total capital costs including land acquisition, annual operation and maintenance costs, and total present worth costs as summarized below. Exh. 463 at 6-13, Tables 1-4, 7-9. Dr. Zenz presented costs in June 2010 dollars, noting that the estimate had an accuracy range of -30% to +50% and would be considered a Level 5 cost estimate, according to the classification system recommended by the Association for the Advancement of Cost Engineering. Exh. 463 at 3-4. The new cost estimates used similar assumptions Dr. Zenz noted in his earlier testimony and were based on waterway conditions during Water Years 2001 and 2003, representing both wet and dry water years in the waterways included in the cost estimates. Exh. 463 at 3-4, 5/18/11 Tr. at 39.

Based on the improved DUFLOW modeling, Dr. Zenz testified that to meet IEPA's proposed DO standards, AECOM estimated a total capital cost of $594,300,000 and a total annual operation and maintenance cost of $3,900,000. Exh. 463 at 7. To meet the District's proposed DO standards, AECOM estimated a total capital cost of $54,300,000 and a total annual operation and maintenance cost of $530,000. Exh. 463 at 12.

Locations and Cost Estimates for
Supplemental Aeration Stations and Aerated Flow Augmentation Facilities
Needed to Meet IEPA's Proposed DO Water Quality Standards

Station ID	Waterway[4]	Location or River Mile[5]	Total Capital (including land acquisition)	Annual O&M
A	NSC	North Side WRP	$27,400,000	$469,000
1	NSC	340.80	$18,900,000	$96,000
2	NSC	339.66	$18,900,000	$95,000

[4] North Shore Channel (NSC), North Branch Chicago River (NBCR), Chicago River Main Stem (Main Stem), South Branch Chicago River (SBCR), South Forth of the SBCR (Bubbly Creek), Chicago Sanitary and Ship Cannal (CSSC), Little Calumet River North (LCRN), Calumet-Sag Channel (Cal-Sag). Exh. 463 at 2.

[5] "River miles for CAWS are often relative to the Illinois and Mississippi River confluence at Grafton, IL. For this study, river miles (RM) are based on a RM of 291 at Lockport." Exh. 463 at 8.

3	NSC	339.12	$18,900,000	$86,000
4	NSC	338.53	$18,900,000	$87,000
5	NSC	336.55	$18,900,000	$95,000
6	NBCR	332.99	$18,900,000	$94,000
7	NBCR	331.82	$18,900,000	$86,000
8	Main Stem	326.90	$18,900,000	$84,000
9	SBCR	325.57	$18,900,000	$107,000
10	SBCR	324.09	$18,900,000	$85,000
11	SBCR	323.52	$18,900,000	$91,000
12	SBCR	321.90	$18,900,000	$92,000
B	Bubbly Creek	Throop St.	$8,300,000	$117,000
13	Bubbly Creek	N/A	$18,900,000	$150,000
14	Bubbly Creek	N/A	$18,900,000	$97,000
15	Bubbly Creek	N/A	$18,900,000	$80,000
16	CSSC	321.10	$23,300,000	$106,000
17	CSSC	320.60	$18,900,000	$82,000
18	CSSC	319.82	$18,900,000	$86,000
19	CSSC	318.26	$18,900,000	$86,000
20	CSSC	317.21	$18,900,000	$85,000
21	CSSC	308.60	$18,900,000	$84,000
22	CSSC	305.04	$18,900,000	$81,000
23	CSSC	296.74	$18,900,000	$82,000
C	LCRN	Calumet WRP	$20,600,000	$360,000
24	LCRN	326.50	$18,900,000	$86,000
25	LCRN	320.50	$18,900,000	$91,000
26	LCRN	320.10	$23,300,000	$121,000
SEPA #2	LCRN	State St.	NONE	$34,000
27	Cal-Sag	309.40	$18,900,000	$100,000
28	Cal-Sag	304.57	$18,900,000	$91,000
SEPA #3	Cal-Sag	Western Ave.	NONE	$90,000
SEPA #4	Cal-Sag	Harlem Ave.	NONE	$111,000
SEPA #5	Cal-Sag	CSSC Junction	NONE	$90,000
TOTALS			**$594,300,000**	**$3,900,000**

Exh. 463 at 6-13, Tables 1-4.

Locations and Cost Estimates for
Supplemental Aeration Stations and Aerated Flow Augmentation Facilities
Needed to Meet District's Proposed DO Water Quality Standards

Station ID	**Waterway**	**Location or River Mile**	**Total Capital (including land acquisition)**	**Annual O&M**
A	NSC	North Side WRP	$16,500,000	$281,000
N/A	NSC	Devon Ave	NONE	$5,000

1	SBCR	1.5 miles downstream of Jackson Blvd.	$18,900,000	$151,000
2	SBCR	Throop St.	$18,900,000	$94,000
TOTALS			**$54,300,000**	**$530,000**

Exh. 463 at 6-13, Tables 7-9.

When asked at hearing whether the completion of TARP would affect the analysis of the facilities needed to meet the proposed DO standards, Dr. Zenz replied that it would, but modeling such conditions before the completion of TARP would be "a very difficult and complex assignment" 5/18/11 Tr. at 68. Generally speaking, Dr. Zenz explained that since Dr. Melching indicated the need for some of the aeration stations were simply for CSO events, the completion of TARP "would probably reduce the number of stations if they weren't built yet or possibly if they were built, they wouldn't have to be operated at all." 5/18/11 Tr. at 69-70.

John Mastracchio

Mr. Mastracchio is a senior associate with Malcolm Pirnie, Inc. and has been a financial management, engineering, and rate consultant for 18 years. Exh. 223 at 1. Mr. Mastracchio examined the potential economic impacts of building and operating facilities necessary to meet IEPA's proposed DO standards. *Id*. at 2. He based his economic assessment on Dr. Zenz's estimated total expenses of $525 million for construction and $6.9 million in annual maintenance costs (*see* Exh. 217). *Id*.

Mr. Mastracchio observed that the District's primary source of operation revenue is the property tax, although the District also generates revenue through user charges, interest income, and a personal property replacement tax. *Id*. at 3. He emphasized, however, that the District has "several financial limitations and restrictions" that "impact its ability to take on additional projects." *Id*. One restriction is the Property Tax Extension Limitation Law, which limits the District's ability to adopt increases in the aggregate tax levy. *Id*. Another limitation is the District's inability to issue non-referendum bonds for projects initiated after 1991. *Id*. In 2003, however, Public Act 93-279 gave the District authority to issue $150 million of non-referendum bonds during any budget year. *Id*. at 4.

After reviewing a baseline scenario prepared by the District, Mr. Mastracchio stated that the District "would be able to generate sufficient revenues" to meet the District's projected revenue requirements within the constraints of the District's "legal limitations." *Id*. He also testified, however, that "the District does not have sufficient financial resources to fund the capital expenditures and maintenance costs necessary" to meet IEPA's proposed DO standards. *Id*. The District would not be able to generate sufficient revenues "within the constraints of the Property Tax Extension Limitation Act," and the remaining funds needed would go beyond the District's "Tax Cap and non-referendum bonding authority." *Id*.

Mr. Mastracchio concluded that fully funding the projects needed to meet IEPA's proposed DO standards would require: 1) "an act of the state Legislature to amend the Property

Tax Extension Limitation Act and provide additional non-referendum bonding authority," 2) a voter referendum in support of extra bonding authority, or 3) "drastic reductions in the funding of other District programs." *Id*. at 5-6.

Paul L. Freedman, P.E., BCEE

Paul L. Freedman is the founder and President of Limno Tech, an environmental consulting firm. He is an environmental engineer with 35 years of experience on water quality projects across the country. Mr. Freedman's expertise is focused on "surface water quality issues, including water quality analysis, watershed management and TMDLs, pollutant fate and transport, computer water quality modeling, Use Attainability Analysis (UAA), and environmental regulations and compliance". Exh. 204 at 1.

Mr. Freedman provided comments on both the proposed aquatic life use designations as well as their corresponding water quality standards. While the former were addressed in Subdocket C, Mr. Freedman's comments on water quality standards are relevant to the discussion in Subdocket D, so they will be summarized here. Exh. 204 at 2.

It was the opinion of Mr. Freedman that the proposed aquatic life standards for CAWS were inappropriate because "in certain critical aspects employ the same dissolved oxygen criteria as the General Use water classifications recently adopted in Illinois". Exh. 204 at 2. Mr. Freedman opined that IEPA did not adequately consider the unique characteristics of CAWS, the significance of wet weather impacts, and the unique flow factors in developing the proposed water quality standards. *Id.* Mr. Freedman further stated that "the proposed standards (both uses and criteria) for CAWS are inadequately justified and therefore premature". *Id.*

Of particular concern to Mr. Freedman was that the proposed minimum DO criteria for CAWS are in most respects identical to that of General Use standards, which does not "reflect the dramatic differences between CAWS and other General Use waters". Exh. 204 at 3. Mr. Freedman contended that these differences have a significant impact on attainable uses and water quality. *Id.* at 4. Mr. Freedman further noted that General Use waters are designed to protect "communities predominantly composed of pollution sensitive species" as compared to CAWS proposed aquatic life use that is designed to "protect tolerant or intermediately tolerant species, which presumably could be supported by less stringent criteria". *Id.* at 5.

Also of concern to Mr. Freedman, was that IEPA had not included relevant exceptions to standards that are included in the R08-9 standards for General Use waters, specifically, the exception for the General Use DO criteria for stagnant and stratified waters, which have been documented in CAWS. Exh. 204 at 5. Mr. Freedman further contended that IEPA did not document whether it considered the significant impacts to CAWS from wet weather impacts, and how flow variations would affect achieving the proposed aquatic life uses and related DO standards. *Id.*

Mr. Freedman noted that IEPA had not documented that it considered alternative classifications or DO criteria for CAWS that are used in other states where severely modified waters exist. Exh. 204 at 6. Mr. Freedman asserted that "wet weather water quality standards, or

variance provisions, would have been an important approach for IEPA to consider, but no mention is made of this as an alternative component of the proposed standards". *Id.* He pointed to the States of Indiana, Maine, and Massachusetts that have wet weather provisions that consider the challenges in controlling CSO impacts on water quality. *Id.* at 6 and 7.

Mr. Freedman stated that IEPA did not document that it had considered alternative classifications or criteria for CAWS that are used in other states for severely modified waters. Exh. At 7. As an example, he noted that the UAA described the Cuyahoga River Ship Channel as being similar to CAWS, yet IEPA did not propose the use of a similar classification or associated criteria. Ohio created a "unique limited resource water dissolved oxygen criterion for the Cuyahoga River Ship Channel of 1.5 mg/L". Mr. Freedman pointed to other similar examples. Louisiana created criteria for "man-made water bodies" that has a minimum DO "warm weather criteria of 2.0 mg/L for the New Iberia Southern Drainage Canal". In Texas, the minimum criterion for the "1007 HSC/Buffalo Bayou Tidal segment is 1.0 mg/L. *Id.*

While IEPA relied on Ohio's biological assessment methods, Mr. Freedman noted that IEPA should have considered Ohio's DO criteria for modified limited resource waters. Exh. 204 at 8. As an example, he pointed to Ohio's daily minimum criterion for limited resource waters is 2.0 mg/L, and for modified warmwater habitat waters the minimum criterion is 3.0 mg/L. Mr. Freedman opined that "these examples highlight reasonable criteria for significantly altered waterways that should be considered by IEPA". *Id.*

Mr. Freedman raised a question of "how IEPA links the proposed dissolved oxygen standards for CAWS to objectives for protection of the target biology". Exh. 204 at 9. Without these connections, Mr. Freedman contends, "there is not a clear structured and scientific justification that the beneficial uses and criteria are appropriate". *Id.* at 10. According to Mr. Freedman, IEPA did not document whether the proposed rules will result in "attainment of the aquatic life uses and corresponding dissolved oxygen criteria". In establishing a new standard, Mr. Freedman asserted that it was important to determine whether there was a "realistic potential that this proposed standard can be attained, hence the term "use <u>attainability</u> analysis" (emphasis in original). *Id.*

Mr. Freedman concluded his pre-filed testimony with two recommendations related to the proposed water quality standards. Exh. At 13. First, he recommended to consider alternative DO criteria used in other states for severely modified waters such as CAWS; and second, "create a wet weather standard that reflects the wet weather conditions in CAWS, which are expected to continue for the foreseeable future". *Id.*

At the hearing, Mr. Freedman reiterated his opinion that the proposed daily minimum and seven-day minima for CAWS is unjustified and premature. 2/17/09PTr. at 35 and 36. In response to the question as to what DO standard he would have proposed, Mr. Freedman stated that "in order to support a specific number, you need more information on those studies that are, as we speak today, ongoing". *Id.* at 36. Mr. Freedman further explained that to develop a DO standard, it is important to "look at what the suitable habitat is; what the ambient species are…what the other chemical constituents are…and what is actually attainable in terms of water quality criteria". *Id.*

Mr. Freedman discussed the complications in establishing a wet weather standard, which include "the rising and lowering of flow, the existence of storm water loads, what might be happening with combined sewer overflows and pump stations, scour and sediment deposition as a result of changes in flow and the stagnation conditions". 2/17/09PTr. at 46.

In discussing the fact that General Use water quality standards "seem to recognize that there are some conditions that are different in these different kinds of protection", Mr. Freedman recommended the Board consider that "certain waterways in CAWS system are stagnant and stratified…and that they naturally might have lower dissolved oxygen and different biologic conditions, and special provisions should be made for those conditions". 2/17/09PTr. at 75. Mr. Freedman reiterated his position that stagnant conditions need to have special consideration in establishing water quality standards and that IEPA had failed to do so in their proposal. *Id.* at 76.

Stepan Company

Robin L. Garibay and Carl E. Adams, Jr. testified concerning the economic and environmental impacts of complying with the water quality standards. Exh. 318 at 1. Ms. Garibay also testified on behalf of Citgo/PDV regarding aquatic life uses. *See* Exh. 420. Ms. Garibay and Mr. Adams are employed by ENVIRON International Corporation and testified together. Therefore, the prefiled testimony will be summarized using "Environ".

Background on Millsdale Plant

Stepan Company is a global manufacturer of specialty and intermediate chemicals used in consumer products and industrial applications. Exh. 318 at 2. Stepan mainly produces surfactants that are a key ingredient in cleaning compounds. *Id*. Stepan's Millsdale plant was initially constructed in 1954 and is located in the southern half of Will County. The plant employs about 400 people and produces 1,200 to 1,500 different products according to consumer specifications. *Id*. at 2-3.

The plant has a wastewater treatment system that involves over 15 tanks and numerous processes, including decantation, equalization, two aeration stages, clarification, two aerobic digestion stages, and activated sludge with dual media filtration. Exh. 318 at 3. The treatment system generates sludge that is land applied in accordance with a permit, and effluent outflow is discharged into a buried pipeline that opens to the UDIP. *Id*. The plant results in an average discharge of 0.88 million gallons per day of treated process wastewater, sanitary wastewater and stormwater. *Id*. The discharge quality is monitored for 68 parameters, and a majority of the discharge limits are based on the use of best available treatment technology. *Id*.

Temperature

IEPA's proposed standard revises temperature standards, both seasonal period average and daily maximum temperatures in the UDIP. Exh. 318 at 3. Stepan's current discharge is not subject to temperature limitations in its NPDES permit and the applicable water quality standard is a maximum 93º F not to be exceeded more than five percent of the time, with an absolute

maximum of 100º F. *Id*. IEPA's proposed standards would reduce the daily maximum temperature to 88.7º F and would establish period averages ranging from 85.1ºF during most summer periods to 53.6º F during the month of February. *Id*., citing SR at 85. Environ stated that Stepan's Outfall 001 would be subjected to these proposed temperature standards and likely would not have an option for a mixing zone, as the upstream sources discharge a warm effluent. Environ opined that if implemented as proposed, the IEPA water quality standards would be imposed as an NPDES permit discharge limits on the plant's outfall and would necessitate radical temperature reduction/control efforts. *Id*.

Environ developed options to control temperatures using the following conditions:

1. Due to upstream river temperatures and sources of heated discharges, it is assumed that a mixing zone will not be available for implementation of the temperature standards; i.e., the temperature standards will apply at end-of pipe.

2. Due to Stepan Company policy to always be in compliance with an adequate margin of safety and the inability to significantly vary the temperature conditions during the wastewater treatment process, engineering will be such that the daily temperature will be at the proposed period average temperature standards. Therefore, the potential Outfall 001 temperature discharge limits are equal to the proposed 'period average temperature standards'. For engineering design, a margin-of-safety of 3ºF would be applied. Exh. 318 at 4.

Environ opined that from a technological/economical standpoint, reducing wastewater temperature prior to biological treatment is most efficient. *Id*. However, the heat is necessary for maximum biological activity, and therefore, heat reduction methods must be on the treated discharge. *Id*.

Environ determined that heat reduction would be required as the discharge limits proposed by IEPA would be met only 22% of the time. Exh. 318 at 5. The seven end-of-pipe technologies or processes most commonly considered are:

1. Cooling ponds with surface aerators/sprayers,

2. Flow augmentation, using a cooler water (such as ground water) to dissipate the heat,

3. Cooling towers: 1) Open direct contact, 2) Closed circuit

4. Heat exchange: 1) Plate and frame, 2) Tube and shell,

5. Chillers (either directly or to supplement another option)

6. Cooling Air (from Blowers)

7. Surface Aeration in Tanks. *Id.*

Environ touched on the feasibility of each option.

Cooling Ponds with Surface Aerators/Sprayers. Environ explained that cooling ponds rely on the interaction between water surface and ambient air to cool water, and the larger the water surface the greater the cooling. Exh. 318 at 5. To meet the proposed temperature standard in Stepan's effluent, the minimum amount of land necessary to achieve the cooling required would be about 2.5 acres of land. *Id.* This area would include the addition of five surface aerators. Environ noted that the area around the plant's wastewater treatment plant is severely restricted, and given safety concerns, this option is not feasible for Stepan. *Id.*

Flow Augmentation. This method is achieved when the final treated effluent is mixed with cooler waters from another source. Exh. 318 at 6. The current water source for Stepan is groundwater and the temperature of groundwater ranges from 55º F to 65º F. Thus, using groundwater to cool the effluent is not feasible. *Id.*

Cooling Towers. Cooling towers expose the water to the air to promote evaporation and can be open contact or closed circuit. Exh. 318 at 6. Evaporation is extremely effective in low humidity conditions; however it is ineffective on high humidity days. *Id.* Environ opined that cooling towers would not be effective as the treatment would not consistently achieve the discharge limits. Exh. 318 at 7. In addition, Environ questioned whether or not increased air emissions would pose a difficulty. *Id.*

Heat Exchangers. Plate and Frame heat exchangers transmit heated effluent to cooler water from a different source. Exh. 318 at 7. Environ explained that like flow augmentation, the groundwater is not cool enough to meet temperature standards. *Id.*

Chillers. This option uses a water chiller to cool down the effluent from cooling towers. Exh. 318 at 7. Environ stated that since the water chiller utilizes a medium other than water, such as propylene glycol or ammonia, cooler water temperatures can be achieved than from the groundwater used for a heat exchanger or with a cooling tower alone. Environ indicated that the water chiller would be operated integrally with a heat exchanger and would remove heat from a cooling tower during those times of the year when discharge temperatures from a cooling tower alone would not be successful in meeting the proposed temperature standards. *Id.* Environ opined that this option may be feasible. *Id.* at 8.

Cooling Air. Cooling air consists of using cooled air in blowers which supply air to certain tanks in the wastewater treatment plant. Exh. 318 at 8. Environ opined that this is technically infeasible as the cooling of the air would be limited by the need to maintain optimal biological performance and the estimated cooling air is less than the required cooling. *Id.*

Surface Aeration in Tanks. This treatment option would install aerators in the final effluent tank that would promote air-water interaction to promote cooling. Exh. 318 at 8. The

number and size of surface aerators necessary to accomplish adequate cooling cannot be accommodated by the tank. Therefore, Environ stated this option is infeasible. *Id*.

Financial Impact. Environ offered that the technically feasible option to achieve consistent and adequate cooling is using a cooling tower in connection with a heat exchanger. Exh. 318 at 8. The capital cost for this treatment option is $1,640,000 with operating and maintenance costs of $1,300,000 per year. *Id*. In addition, Environ claimed that there would be increased electrical usage. *Id*. at 9.

Dissolved Oxygen

Environ acknowledged that a DO standard applies to the UDIP; however, Environ took issue with IEPA's failure to develop data to assess the assimilative capacity of the UDIP for DO. Exh. 318 at 11. Environ noted that absent this data, they assumed that IEPA will implement the proposed DO standard as end-of-pipe limits. *Id*. Environ explained that the discharge from the Stepan plant would meet the proposed DO standards only 10% of the time without further treatment. *Id*. at 12.

Environ explained that the following technologies were considered:

1. Pressurized Air Diffusers

2. Stair-step aeration

3. Surface aerators

4, Direct injection of oxygen

5. Hydrogen peroxide. Exh. 318 at 12.

Environ touched on the feasibility of each option.

Pressurized Air Diffusers. Environ explained that air diffusers are a good solution to adding DO; however there is a concern about causing foaming. Exh. 318 at 12.

Stair-Step Aeration. Environ opined that this type of treatment would be difficult as it is normally incorporated in a natural feature. Exh. 318 at 12. Here, the routing of the effluent is through an underground pipe. *Id*. There is not land available to construct a stand-alone unit, plus this system would also be likely to foam. *Id*.

Surface Aerators. Environ described surface aerators as being a physical system that adds oxygen to the effluent. Exh. 318 at 13. Like step aeration systems, there can be issues with foam creation. *Id*. Another limitation is that the plant's system cannot accommodate this technology. *Id*.

Direct Injection of Oxygen. The direct injection of oxygen requires specific safety features as oxygen is a fire accelerant. Exh. 318 at 13. Environ opined that this option is not technically feasible for the plant. *Id*.

Hydrogen Peroxide. Environ stated that the addition of hydrogen peroxide is the most technically feasible method to achieve compliance with the DO standards proposed by IEPA. Exh 318 at 13.

Financial Impact. The capital cost to install a system to add hydrogen peroxide is $25,000 with operating and maintenance costs of $650,000 per year. Exh. 318 at 13. The installation of such a system would require 100 square feet of land and result in increased electrical use. *Id*.

Conclusion

Environ opined that the standards proposed by IEPA will result in significant financial and cross-media environmental impacts. Exh. 318 at 14. Environ further opined that to comply with the standards, Stepan would be required to install and operate technologies that are beyond treatment considered "best" for Stepan's processes. *Id*.

CITGO/PDV

Bruce Nelson

Bruce Nelson is the Citgo Lemont Refinery's Fire and Safety Supervisor and Training Coordinator. Mr. Nelson has worked for the Lemont Refinery since 1987 and has attained numerous Illinois State Fire Marshal and national emergency response certifications. Mr. Nelson's testimony consists of the transcript of a video presented as an exhibit to his testimony, in which he is the narrator and participated in its creation. Exh. 489 at 1. The video shows details of the CSSC and highlights the electric fish barrier, safety zone, and regulated navigation zone. *Id.*

In the video, Mr. Nelson begins by noting that Citgo/PDV's Lemont Refinery is situated in the CSSC, just north of the electric fish barrier that is operated by the U.S. Army Corps of Engineers. Exh. 489 at 2. Mr. Nelson explained that the "fish barrier was constructed to prevent the migration of invasive fish species in both directions between the Great Lakes and the Mississippi River basins. *Id.* Further, in order to protect anyone passing through the fish barrier, the U.S. Coast Guard established a regulated navigation area (RNA) around the barrier. *Id.* While in the RNA, vessels passing through must follow specific safety requirements, including a prohibition from loitering in the area. Exh. 489 at 2, 4. Further, vessels are only allowed to enter the area for the purposes of transiting to the other side. *Id.* at 4. Only one vessel is permitted to cross the RNA at a time, and while in transit, personnel on the open decks of the vessel must wear a floatation device. *Id.*

Mr. Nelson then continues to describe the RNA, fish barrier, and safety zone as the vessel in the video passes through each. Exh. 489 at 2-6. Mr. Nelson describes the numerous warning

signs throughout the RNA reminding personnel that they are approaching the fish barrier. Exh. 489 at 3. Because of the fish barrier, safety precautions within the RNA have been altered. *Id.* Mr. Nelson noted that Citgo/PDV Facility Response Plan had to be changed in order "to explain how our oil spill team would capture a spill that passed through our primary containment collection site since our response boat was too short to pass through the electric fish barrier." *Id.* In response to this change, the refinery had to obtain a new boat, as well as choose a new site to launch the boat. *Id.*

While approaching and passing through the fish barrier, Mr. Nelson described it as consisting of electrode arrays that are perpendicular to the water flow, which create strong electric fields in the water. Exh. 489 at 3-4. Due to an Army Corps of Engineers study that concluded that the effects of the fish barrier on a human immersed in the water can be life threatening, the Coast Guard established a "Safety Zone" within the RNA. *Id.* at 4. Mr. Nelson then noted that the fish barrier's strength is measured in volts per inch. Exh. 489 at 5. There are two permanent barriers – Barrier 2A and Barrier 2B – and both can produce up to 4 volts per inch in their electric fields. *Id.* Lastly, when the vessel approached Citgo/PDV's effluent outfall location, Mr. Nelson noted that "[w]hile the Safety Zone was installed to avoid the outfall, Citgo/PDV had to make several other changes to its operations in order to accommodate the Safety Zone and the RNA." Exh. 489 at 6.

Roger Klocek

Roger Klocek is the senior biologist at Huff & Huff, Inc., an environmental consulting firm. Mr. Klocek has been involved in approximately 18 environmental impact studies during the last four years, and most have involved stream surveys, including one on the CSSC. Exh. 491 at 1. Huff & Huff has been retained by the Citgo/PDV Lemont Refinery to "develop winter chloride water quality limits for the CSSC." *Id.* Mr. Klocek's testimony includes information on the aquatic life in the CSSC, as well as water quality criteria for chloride. Exh. 491 at 2.

After describing the purposes of the RNA and the fish barriers, Mr. Klocek stated that there are "three separate recent data bases for fish species in the CSSC: the rotenone event from 2009, the multi-task force sampling in 2012, and the periodic sample collections conducted from 2001 to 2009 by MWDGC [District]." Exh. 491 at 2-3. The rotenone event showed that the CSSC is comprised of a limited fish community, and the species within this community are widespread and tolerant. Exh. 491 at 3. The most abundant fish found was the common carp, a tolerant, non-native species. *Id.* Mr. Klocek noted that fish collected from the site nearest to the Lemont Refinery showed the same conditions as the overall rotenone event. *Id.*

Mr. Klocek's testimony then turned to discuss macroinvertebrates in the CSSC. Exh. 491 at 4. Mr. Klocek noted that none of the species collected through various samples are considered to be intolerant organisms. *Id.* Mr. Klocek then explained why macroinvertebrate samples are so important: "Macroinvertebrate samples of aquatic species can give information about stream health based on the type, tolerance, and abundance of aquatic invertebrates." *Id.* The CSSC at the Lockport location has the highest diversity of organisms from any location of the CSSC. *Id.* Mr. Klocek also noted that during 2001 to 2003, no Ephemoptera, Plecoptera, Trichoptera (EPT)

taxa, which are known to be the more sensitive organizations to pollution, were collected and in the remaining years, the collection contained less than one percent EPT. Exh. 491 at 4-5.

Mr. Klocek then noted that mayflies, a moderately intolerant organism, were taken in the combined 2001-2009 catch at a mean of 0.1%. Exh. 491 at 5. Mr. Klocek further noted that USEPA is currently evaluating one type of mayfly, *Centroptilum*, for chloride tolerance. *Id.* This mayfly is an intolerant organism and is rarely found in Illinois. *Id.* Mr. Klocek suggested that the *Centroptilum* "would not make a good surrogate for the more tolerant mayflies that are occasionally found in the CSSC." *Id.* Further, low winter temperatures in the CSSC would protect the mayflies from winter chloride spikes. Exh. 491 at 6. When discussing plankton in the CSSC, Mr. Klocek highlighted that during a June 2013 plankton collection, *Bosmina*, Diaphanosoma, and Cyclopoid copepods were the three plankton taxa that emerged. *Id.* at 7.

Next, Mr. Klocek's testimony turned to discussing the winter chloride limit and recalculation procedure. Exh. 491 at 7. Huff & Huff used USEPA's procedures when calculating the recommended criteria for chloride with respect to the CSSC, focusing on the RNA. Exh. 491 at 7, 12, *citing to* "Delos, Charles G. 2013. Revised Deletion Process for the Site-Specific Recalculation Procedure for Aquatic Life Criteria, USEPA, EPA-823-R-13-001. Mr. Klocek noted that USEPA's procedures require attention to the actual species in the stream segment. *Id.* The core of USEPA's procedure is the "Deletion Process, which involves removing tested species that do not reside at the site from the national data set." *Id.* Mr. Klocek stated that the goal of this analysis is to develop winter chloride water quality recalculation based on the species present during the winter season. *Id.* Three fish species (American eel, threespine stickleback, and guppy), one amphibian (chorus frog), and two invertebrates (*Ceriodaphnia* and *Sphaerium*) were eliminated from the CSSC list. Exh. 491 at 8-9.

The calculations concluded a Criterion Maximum Concentration (acute value) of 991 mg/L and a Criterion Continuous Concentration (chronic value) of 624 mg/L. Exh. 491 at 9. Mr. Klocek proposes a winter chloride criteria "on a site specific basis for the CSSC that is based on a limited aquatic fauna present in the Lower Ship Canal. A Criterion Maximum Concentration (acute value) of 990 mg/L and a Criterion Maximum Concentration (chronic value) of 620 mg/L would be protective to the more sensitive fauna present." Exh. 491 at 10.

Larry Tyler

Larry Tyler is the Environmental Advisor for the Water Compliance Programs for the Citgo Lemont Refinery. Mr. Tyler has worked for the Lemont Refinery for thirty-one years in a number of positions. The Lemont Refinery is located approximately thirty-five miles southwest of Chicago. Exh. 492 at 2. A variety of different products are produced at the Lemont Refinery, including gasolines, diesel fuels, and turbine fuels. *Id.* Mr. Tyler's testimony includes general refinery information, an overview of prior variance proceedings, as well as water quality information from the ship canal with respect to total dissolved solids and chloride. Exh. 492 at 2-13.

First, Mr. Tyler provides general refinery information regarding the Lemont Refinery. Exh. 492 at 2. Due to the topographical conditions surrounding the refinery, the Lemont

Refinery takes stormwater from a variety of locations, including Oxbow, ExxonMobil Terminal, Oneok, Seneca, and Linde, as well as nearby residential developments. Exh. 492 at 3. Furthermore, through the refinery's lease agreement with the District, the refinery draws from and discharges effluent to the CSSC. *Id.* The Lemont Refinery withdraws approximately 6.4 million gallons daily and discharges back to the CSSC approximately 4.9 million gallons daily. *Id.* Wastewater collection consists of three refinery-wide sewer systems: the Sanitary Wastewater System, the Storm Water System, and the Process Water Sewer System. *Id.*

Mr. Tyler explained that the Lemont Refinery "has invested in excess of $45 million over the past 15 years" and that "[t]his investment goes beyond the 'Best Available Treatment' (BAT) as decided by the Board . . . ." Exh. 492 at 4. The Lemont Refinery operates under a NPDES permit issued by IEPA. Exh. 492 at 5. Mr. Tyler explained that the Lemont Refinery "is not planning to seek further relief from the Board, provided the appropriate special condition is included in the NPDES permit which is pending." *Id.* Furthermore, the wastewater effluent contains Total Dissolved Solids (TDS) from the intake water, the purge stream from the Wet Gas Scrubber operation, as well as the water softening processes. Exh. 492 at 4-5. Mr. Tyler also noted that the Lemont Refinery has had to adjust to the practices of the electric fish barrier, which is now generally accepted as a permanent feature of the CSSC. Exh. 492 at 6.

Next, Mr. Tyler provides an overview of prior variance proceedings involving the Lemont Refinery. Exh. 492 at 6-11. Mr. Tyler explained that the processes involved in the Wet Gas Scrubber, a device required by a Consent Decree, result in increased levels of TDS. Exh. 492 at 6. It was determined during project development that a variance was necessary, since the CSSC already exceeded the TDS standard during substantial snow deicing periods. Exh. 492 at 6-7. Due to different obligations imposed on the Lemont Refinery by IEPA and USEPA, Mr. Tyler stated that the only viable option was for the refinery to obtain a variance. Exh. 492 at 7.

The Board has granted the Lemont Refinery three variances. Exh. 492 at 8-11. The first variance, granted on April 21, 2005, was a five-year TDS variance. Exh. 492 at 8. The Board granted the second variance on May 15, 2008, after the refinery filed an amended petition with IEPA's recommendations with stipulations. *Id.* The second variance required the refinery to prepare a "TDS Water Quality Management Plan/Best Management Plan," which was more flexible than the first variance's "TDS Water Quality Management Plan." Exh. 492 at 8-9. The Board granted a third variance on October 18, 2012, after the refinery sought an extension of the previous variance. Exh. 492 at 9. After the third variance was issued to the Lemont Refinery, IEPA submitted it to USEPA for review. *Id.* On March 20, 2013, the refinery learned that USEPA had rejected the third variance, as well as the refinery's NPDES permit. Exh. 492 at 10. IEPA's motion to vacate the third variance, as well as the refinery's petition for modification, remain pending[6]. *Id.* The Lemont Refinery "urges the Board to take note of the Proposed Rule published by USEPA to amend its rules for reviewing state water quality regulations." *Id.*

Mr. Tyler then discusses the water quality information from the CSSC with respect to TDS and chloride. Exh. 492 at 11-13. Mr. Tyler noted that because of the variances, the Lemont

[6] That case name and number are Citgo Petroleum Corporation and PDV Midwest Refining, L.L.C. v. IEPA, PCB 14-4.

Refinery has collected over eight years of water quality data for TDS and chloride from the CSSC. Exh. 492 at 11. Several conclusions can be drawn from this data, including: 1) TDS levels are present during winter months at levels above the current standards for TDS; 2) these high levels are episodic and are associated with snow-melt run-off; and 3) there is a possibility of elevated mercury levels. *Id.* Mr. Tyler stated that the data also concluded that the Lemont Refinery "has no control over the chemicals or the practices of upstream sources of snow-melt run-off." The refinery has a very small Mixing Zone, and the refinery believes that BMP could be useful and effective in reducing chloride levels in the CSSC. *Id.*

Mr. Tyler suggested that "[i]t does not seem appropriate to require the Lemont Refinery to 'clean up' the TDS and chloride levels discharged by upstream sources." Exh. 492 at 12. Further, the Lemont Refinery urges the Board to amend the existing mixing zone rules in order to provide relief for the refinery. Exh. 492 at 13. Finally, Mr. Tyler stated that the Lemont Refinery is willing to institute BMP in order to offset the amount of chloride it discharges into the CSSC, during certain periods. *Id.*

James Huff

James Huff is the Vice President of Huff & Huff, Inc., an environmental consulting firm. Mr. Huff has testified several times in this proceeding including appearing three times on behalf of Citgo/PDV. Mr. Huff testified both to aquatic life uses and water quality standards. Only the testimony regarding water quality standards necessary to protect the designated uses will be summarized here.

Exhibit 285. Mr. Huff opined that the objective to increase DO and reduce temperatures implies that the fish quality will improve if the water quality standards are revised. Exh. 284 at 8. Mr. Huff further opined that all of the proposed changes have an economic cost, and the benefits are "merely assumed to occur". *Id*. Mr. Huff testified that the economic impact of the proposed changes to thermal, chloride, sulfate, and mercury standards will be significant, and industrial dischargers will lose mixing zones during periods of water quality violations. *Id*. at 9. As a result, industries may be required to shut down for periods. *Id*.

Mr. Huff identified four constituents that exceed the proposed ALU B water quality standards. Those are thermal, chloride, sulfates, and mercury. Exh. 285 at 10. Mr. Huff noted that mixing zones are not allowed for constituents where the water quality standard is exceeded. Even if that prohibition applies only when the stream exceeds that standard, there will be times when discharges will have to shut down. *Id*. Mr. Huff pointed out that IEPA conceded that the chloride standard will be exceeded during the winter months, but no solution for the loss of mixing zones was offered by IEPA. *Id*.

Mr. Huff noted that chloride levels have been recorded at 998 mg/L and stayed above the 500 mg/L proposed for long periods of time during the winter months. Exh. 285 at 10. This exceedance is attributed to the run-off from de-icing of roadways in a dense population center. *Id*. Mr. Huff opined that the 500 mg/L standard is not practicable, and it penalizes point source dischargers. *Id*.

For mercury, IEPA has proposed the human health standard of 12 µg/L for the ALU B waters. Exh. 285 at 11. Mr. Huff argued that IEPA needed to address the issue of mixing zones regarding the mercury human health standard. *Id*.

Exhibit 493. Mr. Huff has been retained by Citgo/PDV Lemont Refinery in order to review the water quality standards proposed by IEPA for ALU B waters in CSSC. Exh. 493 at 1. Mr. Huff has previously testified in this matter, testifying on the proposed chloride, sulfate, and mercury water quality standards. *Id*. This testimony expands on those areas, and includes Mr. Huff's insight on alternative regulatory approaches that the Board might consider. *Id.*

Mr. Huff's testimony begins by commenting on USEPA involvement with respect to Board granted variances. Exh. 493 at 2. Mr. Huff noted that under the criteria of the Act, the Board has historically granted variances where compliance would impose an arbitrary or unreasonable hardship. *Id.* The Lemont Refinery has sought a variance from the Board in order to exceed the 1,500 mg/L TDS standard because the refinery had to install a wet gas scrubber to remove sulfur dioxide pursuant to a USEPA consent order. *Id.* Mr. Huff explained that because of the delay in these proceedings in adopting water quality standards, the Lemont Refinery has had to seek two extensions, which the Board approved. *Id.* Mr. Huff further explained that USEPA objected to the refinery's draft NPDES permit and has stated that all water quality standard variances must be approved by USEPA and must comply with 40 C.F.R. 131.10(g). *Id.* Mr. Huff noted that USEPA's objection came as a surprise to the refinery since IEPA has supported these variances. *Id.* Mr. Huff explained that it can be very difficult to meet the conditions set out in 40 C.F.R. 131.10(g) under USEPA's interpretation. *Id.* Mr. Huff urges the Board to carefully consider the economic feasibility and technical reasonableness of these proposed standards, especially given the unique conditions of the CSSC. Exh. 493 at 3.

Mr. Huff then testified as to how the TMDL process takes a long time and that in the interim, IEPA will likely impose water quality standards as permit effluent conditions. Exh. 493 at 3. Mr. Huff "urge[s] the Board to be cautious before adopting any proposed water quality standard when it is known that the stream currently violates that proposed standard." *Id.* Mr. Huff noted that proposed standards for mercury and chloride are "serious problems for affected dischargers." *Id.* Mr. Huff explained that once on IEPA's "303(d) list," a TMDL is established for that stream segment. *Id.* However, because of the large amount of impairments on the list, Mr. Huff expects that a TMDL for the proposed chloride and mercury water quality standards would not be completed for years. Exh. 493 at 4 (noting that the CSSC and other CAWS waterways on the list are listed as "low priority"). Mr. Huff then explained that, based on his experience, IEPA "would begin to impose an effluent limit equal to the water quality standard, even where the discharger is a very minor source of the pollutant and upstream dischargers are causing the exceedance of the water quality standard." *Id.* Mr. Huff explained that water quality based effluent limits are more restrictive than Illinois effluent standards or any of the categorical standards. 12/17/13 Tr. at 133. Mr. Huff noted that this is why the Lemont Refinery sought a variance in the past, but obtaining a variance now will be very difficult. Exh. 493 at 4. Mr. Huff continued that any variance that might be granted would require Citgo/PDV to achieve compliance with the water quality based effluent limit within five years, which would be very difficult to achieve if a standard of 500 mg/L is adopted, 12/17/13 Tr. at 132. Mr. Huff stated

that the 500 mg/L standard as proposed by IEPA would result in the inability to get a NPDES permit without the expenditure of literally tens of millions of dollars. 12/17/13Tr. at 122.

Mr. Huff then testified about mercury water quality data. Exh. 493 at 4. Huff & Huff conducted mercury sampling in 2008 and 2011, using USEPA's Ultra Clean Sampling Protocol Method 1669. *Id.* The results concluded that the dissolved mercury levels were low within the CSSC and that the total mercury averaged 9.59 nanograms per liter (ng/L). *Id.* Mr. Huff explained that "67% of the time of high flows, there was an exceedance of the proposed standard. The exceedances are likely caused by re-suspension of sediment during higher flow periods." *Id.* Furthermore, Mr. Huff noted that the proposed standard for mercury would be violated due to existing sediment contamination. Exh. 493 at 5. Mr. Huff explained that if the standards are exceeded, USEPA is required to conduct a TMDL study; however, IEPA would begin by issuing NPDES permits based on an annual average effluent mercury limit. *Id.* Mr. Huff suggested that "imposing the point source effluent limits will have little-to-no effect on the existing mercury concentrations in the Chicago Area Waterways." *Id.* Mr. Huff urged the Board to consider the implications of adopting a 12 ng/L mercury water quality standard for ALU B waters. *Id.*

Mr. Huff's testimony then turned to chloride water quality data. Exh. 493 at 5. Mr. Huff noted that, pursuant to the winter chloride data, chloride concentrations above 500 mg/L occur nearly every winter for an average of 18.36 days per year in the CSSC, with the longest consecutive period being over three weeks at a time. *Id.* at 8. Mr. Huff explained that the dense population center on an effluent dominated stream, like the CSSC, "makes achieving a 500 mg/L chloride standard not practicable without changing de-icing practices upstream of the Lemont Refinery." *Id.* at 6. Mr. Huff added, "[T]here is probably not a stream in any urban area in the northern part of the country that does not exceed 500 mg/L during deicing events." 12/17/13 at 197. Mr. Huff suggested that using a portion of the District's discretionary diversion from Lake Michigan would be a logical outcome of a TMDL study for chloride because the District already uses the diversion for low DO in the summer months. *Id.* Mr. Huff explained that if IEPA's proposed 500 mg/L chloride standard is adopted, "a 500 mg/L effluent chloride limit would become routine for the point source dischargers on CAWS, preceding any TMDL study. Facilities that use once-through cooling water would not be allowed to add chlorine (increase in chloride) to control microbial growth at least during the periods that Chicago Area Waterway is over 500 mg/L chloride." *Id.* Mr. Huff noted that if the proposed chloride standard is adopted, there will be severe hardships on the dischargers to the CSSC. *Id.* at 7.

Mr. Huff testified about chloride mass balance. Exh. 493 at 7. Mr. Huff explained that the Illinois State Water Survey report concluded that highway de-icing salts are the largest single source of chloride being introduced into the Illinois environment, contributing 518,000 short tons per year. The second largest contributor is fertilizer (KCl) at 410,000 short tons followed by the District's treated wastewater at 192,000 short tons per year and other separate storm sewers at 138,000 short tons per year. *Id.* Mr. Huff stated that "[i]t is clear that literally hundreds of thousands of tons of chloride per year are discharged into the CSSC upstream of the Lemont Refinery." *Id.* at 8. Mr. Huff then explained that when the CSSC exceeds the proposed 500 mg/L chloride standard, the Lemont Refinery contributes less than 0.18% of the total chloride loading. *Id.* Mr. Huff noted that there is sufficient assimilative capacity in the CSSC to handle

the Lemont Refinery outfall without exceeding the proposed standards. *Id.* Additionally, Mr. Huff noted that where the water quality standard is violated, 35 Ill. Adm. Code 302.102(b)(9) does not allow for any mixing zone. *Id.* Further, the draft NPDES permit for the Lemont Refinery allows for a mixing zone for TDS, except when the CSSC exceeds 1,500 mg/L TDS. *Id.*

Mr. Huff discussed the economic impact of the proposed chloride and mercury water quality standards for the Lemont Refinery. Exh. 493 at 9. Mr. Huff explained that the Lemont Refinery has three options: (1) install reverse osmosis equipment on the high chloride wastewater streams with a multi-effect evaporator on the reverse osmosis reject stream; (2) hold the two streams that contribute chloride: the crude unit desalter and the zeolite regeneration stream; and (3) store the entire effluent until there is sufficient assimilative capacity in the CSSC to discharge. *Id.* at 9-10. Mr. Huff explained that the problem with the first two options is that during periods where the CSSC is above 500 mg/L chloride, no chloride would be allowed to be added. *Id.* at 9. With regard to the third option, Mr. Huff explained that there is no room for such retention basin on the Lemont Refinery property. *Id.* at 10. The construction costs for such a basin near the property would be about $21 million, and this expenditure would not remove any chloride from the CSSC, but only postpone any contribution from the refinery. *Id.* From a cost benefit perspective, Mr. Huff stated that spending $21 million in capital costs to reduce peak chloride in the CSSC by 0.2% made little sense. 12/17/13 Tr. at 138. Furthermore, Mr. Huff noted that most of the mercury in the refinery's effluent is in particulate form. Accumulation of it is a problem because it is not known whether the mercury will ultimately pass through the filter when conditions change in the incoming water. Exh. 493 at 9. Mr. Huff suggested that it is necessary to find a better way to address mercury and chloride because relief may be very difficult to secure due to USEPA's position on variances. *Id.* at 11.

Finally, Mr. Huff testified about a suggested alternative regulatory approach. Exh. 493 at 12. Mr. Huff explained that mercury contained in sediment is a problem that is not addressed through the NPDES process. *Id.* Further, Mr. Huff explained that chloride cannot be effectively regulated through point source NPDES permit limits. *Id.* Roger Klocek developed alternative winter chloride standards based on actual species present in the CSSC. *Id.* Mr. Huff recommended that a BMP approach for chloride be adopted until the TMDL on chloride is completed and before numeric limits are adopted by the Board. *Id.* Mr. Huff noted that a "goal could be to reduce chloride discharged from point sources by the equivalent of the chloride contribution over 500 mg/L, whenever the Ship Canal is over 500 mg/L." *Id.* at 12-13. Mr. Huff suggested that such a commitment would essentially offset a discharger's contribution to water quality exceedances and then would be eligible for a mixing zone for chloride. *Id.* at 13. Mr. Huff noted that IEPA already has the authority to issue storm water permits to impose BMPs on highway deicing practices. 12/17/13 Tr. at 139.

In addressing specific BMPs for chloride at the Lemont Refinery, Mr. Huff stated that safety is a priority at the refinery to prevent accidents during icy conditions. Mr. Huff explained that this leads to the mindset that "if a little salt is good, more salt is better." 12/17/13 Tr. at 157. For Lemont Refinery's BMPs, Mr. Huff described training as the first thing to change the way people think and understand that safe conditions can exist with the use of less salt. Second is implementing "anti-icing", where a saturated brine solution is applied before the snow storms to

prevent adhesion of ice to the pavement. Third is pre-wetting the rock salt so that it doesn't bounce off the roadway and into the grass. Fourth is calibration of the equipment. Fifth is improved tracking of storms and pavement temperatures to determine applications rates. Mr. Huff stressed that with all these steps, lessons learned from each storm should be applied going forward. 12/17/13 Tr. at 157-158.

As for alternatives to chloride, Mr. Huff described the use of beet juice and other carbohydrate products on the market. With such alternatives, Mr. Huff indicated that 10% in the anti-icing mixtures is becoming the industry accepted concentration, because the transportation sector has found that any more than that tends to cause slippery road conditions. 12/17/13 Tr. at 157-159.

To quantify chloride reductions, Mr. Huff suggested that data from purchasing records for salt would be used as a baseline condition to gauge offset goals over a period of 5 years which would be documented in annual reports to Agency as part of the NPDES permit. 12/17/13 Tr. at 182-183. Mr. Huff described Citgo/PDV's BMP plan as very aggressive, cutting deicing salts by 50% and at the outer extreme of where technology is today. Mr. Huff also described Citgo/PDV's efforts to reach out to two local communities about a potential offset. In preliminary talks, Mr. Huff indicated the community response was still "tepid", stating, "Maybe because they don't really understand what we're offering them…" 12/17/13 Tr. at 190.

When asked by IEPA about a willingness to participate in a salt reduction goal throughout the watershed, Citgo/PDV responded affirmatively. 12/17/13 Tr. at 159. Mr. Huff also addressed BMPs in the context of USEPA's trading policy. 12/17/13 Tr. at 181. Speaking of his experience with the construction of the Elgin O'Hare extension, Mr. Huff testified regarding negotiations between the tollway and USEPA and IEPA on a chloride offset program that has received all the appropriate permits. In order to achieve the offsets for the increased lane miles, the BMP plan involved the local communities and funding brine tanks, training, and calibration of equipment. Mr. Huff testified that a similar approach over the past seven years has already shown progress in the DuPage River and Salt Creek. As for the future of the ALUB waters, Mr. Huff believes that the BMPs will lead to fewer exceedances of the 500 mg/L chloride level, perhaps as much as by 80 to 90% over the next five to ten years. 12/17/13 Tr. at 193-197.

Mr. Huff opined that a BMP approach could also be taken for mercury: a Special Condition could be added to NPDES permits requiring a BMP plan for identifying and reducing mercury released into the environment. Exh. 493 at 13. Such BMPs could include collection of mercury vapor lamps, responding to mercury spills immediately, replacement of all mercury switches with the facility over a period of time, minimizing mercury in the laboratories, and providing collection points for employees and contractors. 12/17/13 Tr. at 187-188.

In his conclusion, Mr. Huff suggested that adoption of IEPA's proposed standards for chloride and mercury would result in widespread hardships on all point source dischargers that contribute either pollutant. *Id.* at 14. Mr. Huff opined that "[u]ntil the TMDL studies are completed, a BMP approach is a better approach, and will lead to a greater improvement in water quality." *Id.*

Corn Products

James E. Huff

In addition to testifying on behalf of Citgo/PDV, Mr. Huff testified on behalf of Corn Products (Exh. 304). That testimony will be summarized here along with the testimony of other witnesses from Corn Products. Mr. Huff testified both to aquatic life uses and water quality standards. Only the testimony regarding water quality standards necessary to protect the designated uses will be summarized here.

Mr. Huff testified that the ALU B designation for the CSSC would result in significant changes to the thermal water quality standards for the waterways. Exh. 304 at 5. Mr. Huff noted that the existing thermal water quality standard has been in place in the CSSC for 36 years. Because of the industrial users on the CSSC, special consideration should be given. *Id.*

Mr. Huff noted that the UAA relied on data analysis by Mr. Yoder and that analysis was used by IEPA to establish the proposed thermal water quality standards. Exh. 304 at 5. Eight fish species were used as RAS; however, Mr. Huff opined IEPA "discounted" Mr. Yoder's analysis and set thermal standards such that the District would not be required to install cooling towers. *Id*. at 6. Mr. Huff testified that implicit in IEPA's decision is that the cost of installing cooling towers is prohibitive for the District, but Mr. Huff asked about industrial users on the CSSC. *Id.*

Mr. Huff claimed that if IEPA had factored in thermal loadings to the CSSC, instead of setting thermal standards at the District's effluent temperatures, a different regulatory proposal would have resulted. Exh. 304 at 7. Mr. Huff further claimed that if IEPA's standards are adopted, the CSSC would be impaired for temperature. As a result, this will require all dischargers whose discharge exceeds the thermal limits to reduce thermal loading. *Id*. Mr. Huff argued this would impact Corn Products. *Id*.

Joseph Idaszak

Joseph Idaszak is the General Manager, Indiana Operation of Ambitech. Ambitech is a full service engineering, procurement, and construction management company specializing in retrofits and revamps projects. Exh. 305 at 1. Ambitech was retained by Corn Products to evaluate options to allow Corn Products to maintain the current use of non-contact cooling waters from the CSSC under the proposed ALU B designation. Exh. 305 at 1-2. Ambitech studied options for end of the pipe compliance, as Corn Products believes that is what will be required under the proposed standards. Exh. 305 at 2, citing Exh. 303.

Ambitech evaluated four options:

1) Current use;

2) Single CSSC water cooling tower;

3) Unit specific closed loop cooling with several smaller cooling towers; and

4) Mechanical cooling in conjunction with option 2. Exh. 305 at 2.

With the first option, Ambitech found that Corn Products could not meet the proposed standard during some averaging periods as well as some daily maximum periods during a typical year. Exh. 305 at 3.

The second option was the focus of Ambitech's evaluation and would require installation of a cooling tower at a point after the process heat has been transferred to the cooling water but before the cooling water's return to the CSSC. Exh. 305 at 3. To install such a cooling tower, Corn Products would need a suitable physical location for peak flow of 45,000 gallons per minute, with structural support for the tower as well as pumps and piping. *Id*. Mr. Idaszak noted that cooling towers rely on evaporative cooling along with some sensible heat removal due to intimate contact with air for removal of heat. *Id*. Mr. Idaszak opined that there is a practical limit on the ability of a cooling tower to remove heat, and the assessment of that limit is made using the wet bulb temperature[7]. *Id*.

Ambitech determined which area at Argo was best suited for a new cooling tower and then selected a design for the cooling tower. Exh. 305 at 4. The capital cost to purchase and install a new cooling tower was $23,645,000. *Id*. Mr. Idaszak testifies that there is a 90% confidence level that the installation would not exceed this cost. *Id*. This cost does not include any redundancies that would need to be included at an additional cost of $2,000,000. *Id*. Mr. Idaszak noted that there would still be times of the year when the period averaging for the proposed rule would be exceeded. Exh. 305 at 5. Mr. Idaszak testified that for this reason the second option was not considered technically feasible. *Id*.

The third option is a closed loop cooling system that would consist of multiple cooling towers. Exh. 305 at 5. Mr. Idaszak testified that the costs for this system would be higher than option two because of the need to purchase multiple towers. *Id*. The maintenance and operation costs would also be higher than option two. *Id*. Mr. Idaszak stated that for these reasons option three was eliminated. *Id*.

The fourth option was considered as an addition to the cooling tower considered in option two. Exh. 305 at 6. This option would require the addition of a refrigerant compressor and evaporator system. *Id*. Mr. Idaszak offered that 12,375 tons of mechanical cooling would be required and the cost would be greater than $20,000,000. *Id*. Mr. Idaszak opined that the fourth option may be technically feasible, but is not economically reasonable. *Id*.

Mr. Idaszak concluded that none of the four technologies evaluated individually provide for the continuation of the existing use of cooling water in compliance with the proposed thermal water quality standard. Exh. 305 at 6. Mr. Idaszak conceded that combining the second and fourth option might achieve the required compliance but this would cost at least $43,645,000. *Id*.

[7] Wet bulb temperature is the temperature above which there is 100% saturation.

ExxonMobil

Lial Tischler

Lial Tischler is a partner in Tischler/Kocurek. Tischler/Kocurek is an environmental engineering firm that provides consulting engineering services to industry and municipalities. Exh. 488 at 1. Tischler/Kocurek practices in the areas of wastewater treatment and disposal, water quality assessment and monitoring, waste management, and air emissions estimation and permitting for wastewater management facilities. *Id.* Mr. Tischler was retained by ExxonMobil to evaluate and provide comments on the water quality criteria that will be adopted in Subdocket D. Exh. 488 at 5. While some of Mr. Tishcler's testimony was relevant to Subdocket C, and was summarized there, the remainder of his testimony is discussed in this Subdocket.

Mr. Tischler addressed several specific topics relevant to establishing the water quality criteria:

1) Recognition of sources of chloride in the Upper Dresden Island Pool (UDIP) and adoption of appropriate numeric criteria;

2) Importance of WQS variances due to the uncertainty as to the existing water quality in the UDIP;

3) Importance of compliance schedules for discharges subject to new or more restrictive water quality criteria adopted in Subdocket D;

4) Need for multi-discharger/water body water quality standards variance provisions for numerous constituents;

5) Importance of including provisions in the temperature standards for UDIP ALU to account for existing upstream thermal sources that have water quality standards variances or Clean Water Act (CWA) thermal variances; and

6) Whether or not the proposed temperature standards will be correctly derived to represent the relevant temperature regime. Exh. 488 at 5-6.

In regards to chloride, Mr. Tischler suggested that chloride criteria for the UDIP aquatic life use that are based on the existing ambient water quality would be protective of the aquatic environment, as well as scientifically justified. Exh. 488 at 12. Mr. Tischler suggested the Board adopt a seasonal chloride criteria for UDIP or an annual average chloride standard to address the variable concentrations throughout the year. Mr. Tischler noted that it is clear from the record that the use of salt as a deicer for roadways in the Chicago area results in large concentrations of chloride in the months from November through April. *Id.* Mr. Tischler stated that IEPA has not determined how to effectively address this seasonal chloride issue. Exh. 488 at 10. Mr. Tischler suggested that in order to address the issues relating to the proposed chloride water quality standards, the Board and IEPA should also look to USEPA's approach regarding

combined sewer overflows and the resulting DO issues. *Id.* Among the options to consider, Mr. Tischler stated that the Board could either adopt criteria that can be achieved now or criteria that are goals with a streamlined variance or regulatory relief procedure. Whatever numeric standards are adopted, Mr. Tischler pointed out that the Board can revisit what is appropriate for chloride during the triennial review process as efforts to reduce salt usage for deicing improve chloride water quality over time. 12/1713 Tr. at 19-21.

Mr. Tischler stated that USEPA has acknowledged that there is an opportunity "to potentially claim that a human-caused source of pollution prevents attainment of the [dissolved oxygen] criterion for a portion of the [Chicago Area Waterways System]." *Id.* Road salting for the purpose of de-icing is a human-caused condition that results in excessive, seasonal chloride concentrations. Exh. 488 at 11. Thus, Mr. Tischler stated that "the Board should adopt an aquatic life water quality criterion for chloride that is consistent with these current conditions, relying on the human-caused conditions [Use Attainability Analysis] factor." *Id.*

Under the topic of variances, Mr. Tischler suggested that because of the uncertainty whether or not all criteria can be achieved, it is important for the Board to provide a set of procedures for a discharger to obtain a water quality standards variance from the numeric criteria. Exh. 488 at 18. Mr. Tischler stated that the UDIP aquatic life use gives the Board "more flexibility to craft numeric water quality criteria" specific to the unique characteristics of the UDIP. Exh. 488 at 13. However, Mr. Tischler stated that while IEPA testimony indicates that it believes that General Use criteria should be applicable to UDIP for most water quality constituents, there are concerns regarding temperature, chloride, copper, DO, and mercury. *Id.* Mr. Tischler opined that "[d]epending upon the particular constituent that is causing the impairment, it may or may not be technically feasible or economically reasonable to achieve the numeric criterion in the discharge." Exh. 488 at 14. Therefore, Mr. Tischler suggested that variances are essential to assure that permittees can continue to operate their facilities in compliance. Exh. 488 at 15. Further, Mr. Tischler suggested that USEPA essentially vacated the existing variance provisions in Illinois by requiring compliance with 40 C.F.R. § 131.14, and thus, it is important for the Board to consider how to authorize variances that comply with that section of the code. Exh. 488 at 17.

In regards to compliance schedules, Mr. Tischler stated that USEPA's proposed Clarifications Rule illustrates the importance of compliance schedules for NPDES permittees in order to achieve compliance. Exh. 488 at 18. Mr. Tischler further stated that the Clarifications Rule indicates that compliance schedules up to the 5-year life of the permit are approvable. *Id.* Because some dischargers may have to request compliance schedules in order to achieve compliance, Mr. Tischler suggested that the "Board should assure that its adoption of numeric criteria in Subdocket D do not in any way affect the ability of dischargers to obtain compliance schedules . . . ." Exh. 488 at 19.

Under the topic of multi-discharge/water body variances, Mr. Tischler stated that USEPA's proposed Clarifications Rule illustrates that states may issue multi-discharger and water body variances from water quality criteria when justified by existing conditions. Exh. 488 at 19. Presently, there is substantial evidence to suggest that the criteria proposed for UDIP aquatic life use for temperature, chloride, and other constituents are currently exceeded. Exh.

488 at 20. Further, Mr. Tischler suggested that "[a]chieving water quality criteria end-of-pipe may be technically infeasible or economically unreasonable for some constituents and/or discharges and, equally important, would not have any measurable effect on the surface water quality if the sources of those constituents are principally non-point sources or are dominant point sources with extended compliance schedules." *Id.* According to Mr. Tischler, the "only available regulatory mechanisms" for achieving water quality criteria end-of-pipe are Part 131 variance procedures and the CWA Section 304 TMDL program, but the most efficient of these would be the multi-discharger/water body variance. Exh. 488 at 20-21.

Mr. Tischler suggested that the Board should adopt regulations that allow these multi-discharger/water body variances for at least temperature, mercury, and chloride. Exh. 488 at 21. Mercury and chloride are good examples of the need for these variances. *Id.* Under rulemaking R06-25, IEPA determined that "the total of all wastewater discharges to receiving streams and rivers in Illinois provide an average annual loading of 45 pound of mercury per year." Exh. 488 at 23, quoting Testimony of Marcia Willhite, *In the Matter of: Proposed New 35 Ill. Adm. Code 225 Control of Emissions from Large Combustion Sources (Mercury),* R06-25 at 3 (Apr. 27, 2006). Further, Mr. Tischler stated that, with regard to chloride, USEPA's proposed Clarifications Rule allows numeric criteria that differ from USEPA Section 304 criteria. Exh. 488 at 25.

Under temperature criteria and implementation, Mr. Tischler began by explaining that the reason for the multiple temperature standards already in place is that Midwest Generation operates multiple coal-fired steam electric power generation stations, and each uses a cooling water system. Exh. 488 at 26. The Midwest Generation thermal discharges flow into the UDIP, and the average amount of cooling water flow that enters the UDIP is 1,388 million gallons per day. *Id.* These facts are important to note because the river temperature in the UDIP is a function of the discharges from the power stations. Exh. 488 at 27. Further, Mr. Tischler stated that even with the existing temperature standards for the UDIP, Midwest Generation has needed provisional variances from the standards due to lows flows, extremely hot weather, and high demand for electricity. Exh. 488 at 27-28.

After providing background information, Mr. Tischler suggested that the current proposal would apply temperature standards for UDIP that would "be substantially more restrictive than the General Use standards that apply downstream of I-55." Exh. 488 at 31. Mr. Tischler identified three options the Board has in establishing temperature standards for the UDIP aquatic life use: (1) adopt the existing UDIP temperature standard; (2) adopt the General Use temperature standard; or (3) adopt another set of UDIP aquatic life use-specific temperature standards. Exh. 488 at 32. Mr. Tischler suggested that the first option is viable since the existing aquatic life biota is already adequately protected. *Id.* Alternatively, in regard to the second option, Mr. Tischler stated that the record clearly reflects that the General Use temperature standards will not be met. *Id.* Before revisions could be made to these standards, dischargers on the UDIP would be subject to limitations that could not be met immediately. Exh. 488 at 33.

Additionally, Mr. Tischler noted that "[a]lthough [IEPA] had a comprehensive study and long-term monitoring records on which it based its proposed temperature criteria for the UDIP, there are several assumptions that it made that underlie the proposed criteria in the [Statement of

Reasons]." Exh. 488 at 36. Mr. Tischler explained that these assumptions make a substantial difference in the summer period temperatures. Exh. 488 at 37. Mr. Tischler recommended that when the Board is adopting temperature criteria, it consider the following factors: (1) the standards should be based on protecting aquatic life that is representative of existing uses of UDIP; (2) the standards do not have to protect 100% of the species 100% of the time; (3) the 95th percentile, which USEPA recommends, is the appropriate percentile on which to base a maximum period temperature average; and (4) the Cold Shock provisions should be removed from the proposed rule. Exh. 488 at 39.

In his conclusion, Mr. Tischler urged the Board "to consider all the potential implications, not only on the water quality of the UDIP, but also on the point source dischargers to the waterbody." Exh. 488 at 40. Further, Mr. Tischler believes that it is clear that physical characteristics and upstream sources influence achievable water quality; thus, he disagrees with the Board's decision that none of the 40 C.F.R. § 131.10(g) factors apply to the UDIP. *Id.* Mr. Tischler also recommended that the Board include procedures for single and multi-discharger/water body variances from the final numeric criteria. Exh. 488 at 41. Ultimately, Mr. Tischler suggested that the "Board needs to carefully consider the basis for each numeric criterion that it will adopt in Subdocket D and the effects that immediate implementations of such criteria will have on dischargers to the UDIP." Exh. 488 at 40.

Midwest Generation

Julia Wozniak

Julia Wozniak testified twice on behalf of Midwest Generation where she is employed as an Environmental Project Manager. *See* Exh. 364 and Exh. 425. Ms. Wozniak first testified regarding Midwest Generation's operations as they relate to the rulemaking that is summarized in this section. She later testified on the issue of Asian carp..

Ms. Wozniak worked for ComEd beginning in 1982, and later Midwest Generation. Exh. 364 at 1. Ms. Wozniak has a Bachelor of Science degree in Environmental Science from the University of Illinois. For the past 24 years Ms. Wozniak was "involved in overseeing, coordinating and implementing water quality related biological and physicochemical monitoring and analytical sampling activities for all Midwest Generation facilities, modeling the complex thermo-hydrodynamics of power plant and waterway interactions, and participating in state and federal policy and rulemakings". Exh. 364 at 1.

Ms. Wozniak's testimony focused on four key issues: 1) providing an overview of Midwest Generation's generating stations along CAWS and the LDPR, 2) describing the existing thermal water quality standards applicable to Midwest Generation, 3) describing the procedures used by Midwest Generation to achieve compliance with existing thermal water quality standards, and 4) describing Midwest Generation's involvement in the public participation process related to IEPA's proposed UAA Rules. Exh. 364 at 2.

An Overview of Midwest Generation's Generating Stations Along CAWS and the LDPR. Midwest Generation owns and operates seven electric generating stations in Illinois with

three of these stations located on CAWS: Fisk, Crawford, and Will County stations. Ms. Wozniak reported that the "generating units at each of Midwest Generation's CAWS Stations are coal-fired, and each utilizes an open cycle, once-through condenser cooling system. The Midwest Generation Stations are steam electric generating processes that require the use of large volumes of surface water." Exh. 364 at 2. None of the three generating stations located on CAWS is equipped with cooling towers. Exh. 364 at 3. Ms. Wozniak stated that Fisk discharges into the South Branch Chicago River, and both Crawford and Will County stations discharge to the CSSC. 11/09/09Tr. at 11.

Ms. Wozniak stated that Midwest Generation has two separate generating stations on the LDPR, Joliet Unit 6 along the east bank and Joliet Units 7&8 along the west bank. 11/09/09Tr. at 10. The two stations (three units) are located approximately one mile southwest of the City of Joliet, adjacent to the LDPR in the UDIP. Exh. 364 at 3. Both the Joliet 6 and Joliet 7&8 stations are steam electric coal-fired generating facilities, and utilize open-cycle once through cooling systems. Exh. 364 at 3 and 4. She reported that cooling towers for the generating station at Joliet Units 7&8 were installed in 1999. Ms. Wozniak reported that the "purpose of the towers is to minimize potential thermal impacts to the river ecosystem and maintain compliance with existing thermal water quality standards, while optimizing Midwest Generation's ability to produce needed power during critical weather conditions." Exh. 364 at 4. Ms. Wozniak explained that the towers "are used when the circulating water discharge temperature exceeds 93º F for an extended period of time." Exh. 364 at 5.95.

Existing Thermal Water Quality Standards Applicable to Midwest Generation. Ms. Wozniak stated that the five Midwest Generation stations located on CAWS and LDPR "are currently subject to Secondary Contact and Indigenous Aquatic Life Water Quality Standards on a near-field basis". This means that the point of compliance for thermal discharges from each of the stations is the edge of the allowed mixing zone, which is currently the maximum area of 26 acres. All five stations are also subject to the Interstate 55 Adjusted Thermal Standards (Adjusted Standards). Exh. 364 at 5[8]. She reported that "extensive multi-year biological, physical, and chemical monitoring and modeling work was performed as part of the Upper Illinois Waterways Studies to support the Adjusted Standards, which were adopted by the Board in 1996." Exh. 364 at 6.

Ms. Wozniak stated that IEPA and the Board "agreed to the Adjusted Standards based on a number of factors, including the fact that ComEd had successfully demonstrated that the heat discharges from the Joliet facilities did not cause nor could be reasonably expected to cause significant ecological damage to the waters of the Five-Mile Stretch (the Lower Des Plaines below I-55)". Exh. 364 at 6. She said that it was also agreed that "heat was not a factor limiting the quality of the aquatic habitat of the Five-Mile Stretch, but rather other factors such as the loss of habitat due to channelization, disruption of habitat due to barge traffic, and the presence of heavy metals and other pollutants in the system, were overriding the effect of temperature on the waterway". Exh. 364 at 6. When recommending the issuance of the Adjusted Standard in 1996, IEPA believed that while the installation of cooling towers may be technically feasible in

[8] This is the adjusted standard the Board granted in Petition of Commonwealth Edison Company for Adjusted Standard from 35 Ill. Adm. Code 302.211(d) and (e), AS 96-10 (Oct. 3, 1996).

reducing the temperature of the effluents, the cost of providing this cooling was not economically reasonable when compared to the likelihood there would be no improvement in the aquatic community. *Id*.

Ms. Wozniak reported that the Adjusted Standards "are in-stream temperature limits applicable specifically to the Interstate 55 Bridge location and consist of a set of monthly/semi-monthly temperature limits that vary on a seasonal basis", from a low of 60 degrees F to a high of 90 degrees. Exh. 364 at 7. She elaborated that these standards "may be exceeded by no more than 3º F during two percent of the hours in the 12-month period ending December 31, except that at no time shall Midwest Generation's plants cause the water temperature at the Interstate 55 Bridge to exceed 93º F". Exh. 364 at 7. She also noted that the "Adjusted standards are identical to the existing General Use numeric thermal standards during the months of January and February, and are within 1º F of the General Use numeric thermal standards during June, July and August." *Id*. Further, she noted, during the transitional months of the year, the Adjusted Standards limits at the Interstate 55 Bridge are more stringent than the corresponding General Use Standards. Exh. 364 at 7. She noted that based on her "experience and first hand observations through the Upper Illinois Waterways Studies, the Adjusted Standards provide an adequate level of protection for the aquatic community below Interstate 55, and provide a more representative normal, seasonal fluctuation than either the Secondary Contact or the General Use numeric standards". Exh. 364 at 8 and 11/09/09ATr. at 29.

Midwest Generation's Compliance with Applicable Thermal Water Quality Standards. Ms. Wozniak reported that since the Adjusted Standards became effective in 1996, Midwest Generation has been in compliance with thermal water quality standards. She noted, "maintenance and compliance of I-55 thermal limits is controlled by the operations of the Joliet Station." 11/09/09ATr. at 26. She said this has been achieved by use of supplemental cooling towers at Joliet Facilities Units 7&8; by lowering the megawatt load for one or more of the Joliet Facilities' units; or a combination of both. Exh. 364 at 9. Maintaining compliance with thermal standards is complicated in that ambient stream temperature is largely associated with the volume of flow in the river. *Id*.

She stated that Midwest Generation's compliance efforts are largely dictated by upstream flow manipulations and conditions that in turn affect the volume of flow to the UDIP. Exh. 364 at 9. The flow of the river in CAWS can fluctuate greatly depending upon weather or regulated flow, stemming from the artificially controlled nature of the flow of the LDPR, which includes upstream wastewater effluents, storm events, and flood control measures instituted by the U.S. Army Corps of Engineers (USACE) at the two existing upstream lock and dams. Exh. 364 at 10 and 11/09/09Tr. at 13-14. She detailed the complexity of the modeling required to meet the thermal standards, particularly during critical periods when river flows are low and the demand for power is high. Exh. 364 at 11. She reported that the "model is constantly updated with real-time data and manually run in an iterative, continuous manner during critical periods, in order to gauge compliance and provide continuing operating guidance to Joliet station personnel in order to both optimize station load, as well as maintain thermal compliance." Exh. 364 at 12 and 11/09/09Tr. at 15-16.

Regarding compliance measurements, Ms. Wozniak explained that "in-stream monitoring location at the edge of the mixing zone isn't feasible, effective, or practical, because the edge of the mixing zone changes depending on the effluent temperature, ambient weather conditions." and the presence of barge traffic. 11/09/09ATr. at 18. She noted that the barge traffic also prevents the location of a monitor in the middle of the river. Therefore, Midwest Generation is required by NPDES permits to monitor and report discharge temperature. *Id.*

Midwest Generation's Participation in the LDPR UAA Stakeholder Process. Ms. Wozniak reported that Midwest Generation was invited to participate in the LDPR UAA Workgroup in 2000 in part because, aside from the District, Midwest Generation had the most extensive biological monitoring database in the Upper Illinois Waterways system, particularly for the LDPR portion of the Upper Illinois Waterways. She stated that she had participated in every meeting held. Exh. 364 at 12. Midwest Generation also participated in CAWS stakeholders advisory committee that began in 2002. Ms. Wozniak stated that the primary purpose of the LDPR UAA was to "bring all interested parties together on a regular basis to discuss use designation and water quality issues and to help develop the basis and support for the conclusions of the UAA Report." Exh. 364 at 13.

Ms. Wozniak explained that during the first two years of the workgroup, "major differences existed between IEPA and the stakeholders regarding what the appropriate thermal and bacterial standards should be for the waterway". Exh. 364 at 13. These two issues were set aside until the August 2003 draft LDPR UAA Report was released. She noted this draft concluded that General Use thermal standards could be applied to the LDPR without providing supporting data or justification that such standards would be appropriate. She reported that Midwest Generation "provided extensive comments showing that the potential applicability of the General Use thermal standards to the LDPR was not warranted or justified based on the lack of adequate habitat to support an aquatic community that needed such stringent thermal standards". Exh. 364 at 13. The issues related to thermal standards were not resolved with the release of the LDPR UAA report in December 2003, at which time meetings of the LDPR UAA stakeholder workgroup ceased. Exh. 364 at 14. Ms. Wozniak reported that USEPA and IEPA continued working on the issues related to thermal standards, and in "January 2007, Midwest Gen[eration] and the other stakeholders were presented with IEPA's proposed numeric thermal water quality standards for CAWS without the benefit of stakeholder participation". Exh. 364 at 15.

Ms. Wozniak concluded by saying over an 8-year period, "Midwest Gen[eration] has expended substantial time and effort in helping to inform the UAA process, including providing key, long-term biological monitoring program data and comprehensive Upper Illinois Waterways Study information". Exh. 364 at 15. Despite this effort, she believed that IEPA had "ignored an overwhelming amount of information and data that if fairly considered", would not support IEPA's current proposal. *Id*. Ms. Wozniak opined "that the physical features of the waterway are the primary factors limiting further biological improvements, and (2) that the current contribution of heat from Midwest Generation's generating station discharges is not having an adverse impact on the biological communities of the CSSC or the LDPR". Exh. 364 at 15 and 16.

Greg Seegert

Greg Seegert is the Senior Scientist and Chief Ichthyologist with EA Engineering, Science, and Technology, where he has been involved in aquatic life field studies in the Upper Illinois Waterway. Mr. Seegert has over 35 years of experience in the areas of aquatic ecology and ichthyology. Mr. Seegert testified on behalf of Midwest Generation. Exh. 366 at 1. Mr. Seegert's prefiled testimony was generally summarized in R08-9(C) First Notice. R08-9(C), slip op. at 97-100 (February 21, 2013).

Speaking specifically of the impact of thermal influences, Mr. Seegert described a 2-year study done in 1993-1994 by EA Engineering along a 53-mile stretch of the Upper Illinois Waterway. Over 25,000 adult and juvenile fish representing 82 species were captured from sampling locations in Lockport Pool, Brandon Pool, Upper Des Plaines River, Dresden Island Pool, and downstream of the Dresden Island Lock and Dam. EA Engineering found that at all life stages from egg through adult, the fish community was dominated by highly tolerant and pelagic fishes (*e.g.*, gizzard shad and emerald shiner), which Mr. Seegert attributed to the severe habitat limitations within the system. In terms of the thermal influences, EA Engineering found that, "results at thermally-influenced sampling stations were comparable to those at other stations." Additionally, the study found, "none of the measures used in this study to evaluate the individual or community health indicated that ComEd [the previous owner] power plants were contributing to the poor fauna observed in much of the [Upper Illinois Waterway]." EA Engineering stated that, "based on the lack of impacts and habitat-imposed constraints, it was concluded that the aquatic community of the [Upper Illinois Waterway] would essentially be the same as it is currently if ComEd plants were load-restricted or even taken off line." Exh. 366 at 18-20, Att. 1 at 1.

EA Engineering conducted additional fish studies from 1993 through 2005 in the UDIP and the 5-mile stretch below the I-55 Bridge to its confluence with Kankakee River. Exh. 366 at 20-21, Att. 1 at 5. The surveys produced over 143,000 fish representing 82 species and four hybrids. Although fish abundance showed improvement over the 1993 to 2005 period, the same ten species of moderately and highly tolerant fishes continued to dominate the community, while 1.7% of the fish collected were intolerant or moderately intolerant. Mr. Seegert concluded that, "the preponderance of moderately tolerant and highly tolerant fishes reflects the degraded habitat of Dresden Pool, and not the effects of thermal discharges." Exh. 366 at 20-21. Mr. Seegert went on to testify that, "any of the biological responses that we've seen like dominance by highly tolerant fish, high levels of [deformities, erosion, lesions, or tumors] deformities, erosion, lesions, and tumors (DELT) anomalies, and all the other ones I've mentioned, they all are completely consistent with habitat limitations. And if you have poor habitat or in the case for the DELT anomalies, contaminated habitat, contaminated sediment, those factors just by themselves will produce all the responses that we saw and regardless of what thermal discharge is doing." 11/9/09PTr. at 51-52.

Based on his years of experience and firsthand knowledge of these waters, Mr. Seegert testified that the limiting physical and biological conditions of the CSSC and UDIP, "conditions wholly unrelated to thermal discharges", preclude the attainment of CWA aquatic life goals. Exh. 366 at 2, 21-22. EA Engineering stated that, "the contention that lowering the ambient

temperature of the CSSC and [UDIP] will significantly improve the quality of the aquatic community is simply not supported by the results of the fish surveys conducted from 1993 to the present." Exh. 366, Exh. 2 at 16.

When asked how Ohio EPA distinguishes temperature criteria between different aquatic life use designations, Mr. Seegert clarified that temperature criteria in Ohio is "really not use driven, it's species composition driven." 11/9/09PTr. at 89. Mr. Seegert explained that in setting temperature standards, Ohio looks at particular basins and the species assemblage needing protection. Based on these species, Ohio then sets their temperature limits accordingly. 11/9/09PTr. at 89.

In a July 2008 study, EA Engineering found that, "the [UDIP] does not resemble an Illinois General Use water. . .Other General Use waters in Illinois do not have the combination of commercial navigation, receipt of wastewater from a city of three million people, a much altered winter temperature regime because of those wastewater inputs, extensive urbanization, channelization, reversal of flow, periodic but irregular flow alterations, electric barrier, extensive sedimentation, and an almost complete loss of riffles and fast water. The Illinois EPA has acknowledged the uniqueness of the waterway and justified its site-specific use classification approach (e.g. "Upper Dresden Island Pool"…)…[The UDIP] clearly does not have the extent of good or great habitat that is characteristic of General Use Waters and it will not in the foreseeable future." Exh. 366 with Exh. 2 at 4-5.

G. Allen Burton

At the time of his testimony, G. Allen Burton, PhD served as the Director of the National Oceanic and Atmospheric Administration's (NOAA) Cooperative Institute for Limnology and Ecosystems Research as a Professor in the School of Natural Resources and Environment at the University of Michigan. Dr. Burton stated that over the past 30 years, his research has focused on "developing methods for identifying significant effects and stressors in aquatic systems where sediment and storm water contamination is a concern." Exh. 369 at 1. Dr. Burton testified on behalf of Midwest Generation. Exh. 369 at 1. Dr. Burton's prefiled testimony was generally summarized in R08-9(C) First Notice. R08-9(C), slip op. at 100-101 (February 21, 2013).

Specifically, regarding thermal water quality standards, Dr. Burton noted that of the 800[9] causes and sources of impairment identified by IEPA in the Integrated Water Quality Report and Section 303(d) List, "thermal modification" has never been identified as a cause of impairment in the Des Plaines River. Exh. 369 at 3, Att. 1 at 4. According to Dr. Burton, the LDPR UAA inaccurately portrays a study that he directed at Wright State University. Contrary to the LDPR UAA assertion that high temperatures increase toxicity, Dr. Burton stated that, "there is no simple relationship between temperature and aquatic toxicity." Exh. 369 at 11-12. Dr. Burton stated that both low and high temperatures can increase or decrease toxicity from chemical stressors found in both the waters and sediment of the Upper Illinois Waterway. The key

[9] Dr. Burton testified that the figure of 800 is based on "the total number of individual causes and sources of impairment that were listed for the Des Plaines River…in the 2004 305-B" report. 1/13/10PTr. at 3.

findings of the study showed "acute toxicity exists in short-term exposures for multiple species in waters and sediments of the [Upper Illinois Waterway] without any water temperature elevation…Both cold and hot temperatures accentuate toxicity originating from [Upper Illinois Waterway] waters and sediments." Exh. 369 at 12, Att. 1 at 16. Dr. Burton found that, "the most reliable indicator of the *in situ* conditions are the indigenous communities actually present in the waterway. These are the most reliable data for evaluations of thermal impacts." Exh. 369 at 13, Att. 1 at 17. Dr. Burton followed by stating that, "acute toxicity of water and sediments, unrelated to temperature, is and will remain a major limitation on the potential of [the Upper Illinois Waterway] to achieve CWA aquatic life goals." Exh. 369 at 15.

Regarding the LDPR UAA, Dr. Burton testified that, "with respect to temperatures above 93, I note that Midwest Gen's long-term field monitoring data of the fish community in the Upper Dresden Pool demonstrates fish species which are [sic] the UAA report author's claim cannot survive in the Lower Des Plaines because of the lethal secondary contact thermal standard are, in fact, found in abundance." 1/13/10ATr. at 116-117. From the 1990s to the time of his testimony, Dr. Burton stated that under the secondary contact standards in the UDIP, "[T]here have been no reported fish kills and the species referred to in the UAA all maintained reasonable populations." 1/13/10ATr. at 117.

Dr. Burton noted that, "the ambient winter temperatures of these waterways are largely dictated by POTW [publicly owned treatment works] effluent temperatures rather than typical seasonal change of a natural waterway. The effluent dominated nature of the waterway results in warmer ambient temperatures than you would encounter in natural streams during the winter months. The effects of this on fish reproduction in the [Upper Illinois Waterway] are not clear." 1/13/10ATr. at 119-120. However, Dr. Burton continued, "To the extent that higher ambient temperatures are present in this system as compared to natural, the relative stress that they place on the aquatic community really pales in comparison to the other stressors like lack of habitat, siltation[,] modified flow, sediment toxicity, and other urban run-off effects. Thermal inputs are not a barrier to the recovery of the Lower Des Plaines because these other stressors are." 1/12/10ATr. at 124.

SUMMARY OF PUBLIC COMMENTS

PC 289, Honorable John Fritchey

The Honorable John Fritchey, 11th District State Representative at the time of his comment, supports the recommended water quality standard improvements proposed for CAWS and LDPR. PC 289 at 1. Representative Fritchey opines that these "changes are long overdue and recommended only after five years of study". Specifically, he supports requiring the District to disinfect sewage treatment plant effluent and for temperature and dissolved oxygen standards to be implemented that "protect fish and help them flourish". *Id.*

Representative Fritchey noted that over the years, CAWS has changed dramatically, once being "full of raw sewage and industrial filth", but now greatly improved through the leadership of agencies such as the District. In addition, he stated that local governments have incorporated these rivers into their master plans and spent millions of dollars to allow access for paddling and

fishing. He further noted that "so much work has been done to improve habitat and control pollution that in the Chicago River system, species of fish have climbed from under 10 to nearly 70, including game fish favorites like large mouth bass and bluegill and yellow perch". *Id.*

Representative Fritchey opines that there is no "magic bullet" or "all-in-one measure" that can eliminate pollution in the Chicago River, but "if we want to continue to improve and serve our communities as a recreational, natural and economic resource, disinfection and the rest of Illinois EPA's recommendations are essential for doing that". *Id.*

IEPA

PC 286

On January 29, 2010, IEPA received written comments from the USEPA concerning IEPA's original October 2007 version of proposed water quality standards revisions for CAWS and LDPR. PC 286 at 2. IEPA had previously filed comments received from USEPA, and then filed the following comments with the Board "in an attempt to keep an up-to-date record in this matter." *Id.*

USEPA's comments include input from both "Region 5 and [US]EPA headquarters" and focus on the following specific areas:

1. The proposed aquatic life use goal for CAWS and LDPR;

2. Temperature criteria derived to protect aquatic life;

3. Chemical criteria for the protection of aquatic life;

4. Criteria for the protection of human health. PC 286 at 3.

USEPA notes that its comments regarding human health standards are new, and resulted from a recent review of the proposed rule and Statement of Reasons. *Id.*

Designated uses were addressed first. PC 286 at 5. USEPA points out that in IEPA's Statement of Reasons, the UDIP was said to be "capable of maintaining a biological condition that minimally meets the CWA's aquatic life goal." USEPA suggested that IEPA "confirm whether [it] intends for the proposed use for that water body to be consistent with the uses specified in section 101(a)(2) of the Clean Water Act. . . and, if not, to explain and justify an alternative position." *Id.*

For protection of human health, USEPA focuses primarily on fishing. PC 286 at 5. According to USEPA, fishing was "one of the most common activities observed during the recreation use survey" for CAWS, as it was "either [the] most common or second most common activity following power boating in 9 of 10 waterbodies surveyed. . .". Fishing was also documented as an "actual use" in the LDPR UAA. The Statement of Reasons indicates that "human health exposure to environmental conditions of the waterway is primarily, if not

exclusively, attributable to exposure through consumption of fish from the system." USEPA notes that although fishing was "banned in certain waterbodies," (*i.e.* CSSC) it was witnessed in "all waters, including the South Fork of the Chicago River." USEPA cites its "numerous published human health criteria recommendations" that were derived to "protect human health from the exposure of contaminated fish (organism-only exposure criteria)." USEPA therefore recommends that IEPA "review available information on fishing use in CAWS and LDPR and consider revising the proposed designated uses and criteria to include protection of human health via fish consumption." *Id*.

Next, USEPA addresses the temperature criteria for the protection of aquatic life. PC 286 at 5. USEPA claims that there was a "lack of detail in the description of the temperature criteria presented in the statement of reasons." USEPA questions "what information was used to support the choice of the 8 RAS, 8 RAS plus white sucker, and 27 RAS as the basis of summer maximum and period average criteria (for Aquatic Life Use B, Aquatic Life Use A, and UDIP Aquatic Life Use, respectively)." USEPA recommends that IEPA include "additional analysis regarding whether these criteria are protective of existing and designated uses." *Id*.

USEPA also finds fault with how the statement of reasons "does not state which of the six thermal input parameters serves as the basis of the summer temperature criteria." PC 286 at 5. USEPA notes that "it appears that the summer period criteria were derived based upon survival endpoints." *Id*. USEPA therefore recommends that IEPA "update the statement of reasons to state that the survival endpoints were used for criteria derivation (if this is correct) and explain why the period average criteria [were] derived from survival endpoints when available information was presented to show that these temperatures may lead to avoidance or reduced growth." PC 286 at 5-6.

USEPA also wants to know how the District data were summarized and used for the November-February timeframe "(*i.e.*, which data were included and what statistic was used for criteria derivation)." PC 286 at 6. USEPA questions why the District's data were used for the October 1-15th and November-February timeframe. *Id*.

USEPA also addresses IEPA's year round acute criterion of 88.7ºF or 90ºF, which is dependent on "designated use." PC 286 at 6. USEPA explains that such a proposal does not take into account seasonal temperature differences, and USEPA therefore questions whether the criterion will be protective of aquatic life during the winter months. USEPA claims that IEPA should "provide justification to demonstrate that year-round application of these acute criteria, without considering seasonal effects in the winter months, is protective of resident aquatic life and/or fish passage through the system." USEPA explains that "if [IEPA] is unable to do so, [it] should consider revising the proposed standards to include seasonally-based acute criteria based upon an appropriate analysis of ambient background temperature conditions present in these waters." This rational, according to USEPA, could also be used for "derivation of both period average and daily maximum criteria." USEPA advises IEPA to "consider revising the daily maximum criteria to be consistent with the recommendations presented in Attachment GG and HH of [IEPA]'s initial submission to the Board." USEPA notes that the proposed period average criteria would appear, in some time periods, to be based upon the data summarized in the column labeled "RAS 1 Option E." USEPA therefore recommends that IEPA "consider deriving

seasonally-based daily maximum criteria based upon the information provided in Option E or other adequately-justified and scientifically-defensible methods." *Id.*

USEPA questions IEPA's use of the monitoring location on the CSSC at Route 83 to set the background temperature for periods of March 1-June 15, September 16-30 and October 16-31. PC 286 at 6. USEPA acknowledges IEPA's assertion that this location was "representative of background conditions not influenced by Lake Michigan or thermal sources." However, according to USEPA, the MBI report "states on pages 16-17 that this location appears to be affected by thermal discharges and instead relied upon the monitoring location on the Cal-Sag at Route 83." This raises questions for USEPA regarding the "appropriateness of using the CSSC location as a basis for temperature criteria during the time periods listed above." Therefore, USEPA recommends that IEPA "consider revising the proposed criteria using the Route 83 Cal-Sag station ambient temperatures for the aforementioned time periods". *Id.*

USEPA then addresses how IEPA used the District effluent temperature data to define ambient temperatures, which serves as the "basis of the proposed criteria for October 1-15th, and the months of November through February since District effluent makes up most of the flow system". PC 286 at 6. USEPA questions "whether this sets artificially-high winter temperatures for the segments upstream of the North Shore Channel upstream of the Northside water reclamation plant, Chicago River, Calumet River, Grand Calumet River, and Little Calumet River upstream of the Calumet WRP." USEPA is concerned that the proposed criteria "may not result in ambient temperatures sufficient to support fish reproduction," and therefore recommends that IEPA "consider revising the criteria applicable to aforementioned segments for the non-summer months based upon data from monitoring locations upstream of the wastewater treatment plants." PC 286 at 6-7. USEPA explains that this alternative would "result in different temperature criteria for segments based upon whether or not the ambient temperatures are influenced by wastewater treatment plant discharge during the non-summer months." PC 286 at 7.

USEPA recommends revision to Section 302.408 subsections (b) through (d) of the proposed rules, which contain tables of applicable year-long temperature criteria, to "clearly state how compliance will be determined." PC 286 at 7. This is recommended because the proposed rules state that "instream temperatures "…shall not exceed the period average limits in the following table during any period on an average basis," but USEPA claims that "what is meant by 'an average basis'" is "unclear." *Id.*

USEPA acknowledges that Section 302.408 "allows for exceedances to the thermal standards." PC 286 at 7. However, USEPA questions IEPA's proposal allowing an increase of 3.6º F above the proposed standards for two percent of the hours in the year. USEPA questions the "adequacy of this provision," and notes that it is "greater than Illinois criteria for General Use waters (increases of 3º F for one percent of hours)." USEPA claims that it is "not clear that this provision. . .will be protective of aquatic life," and therefore recommends that IEPA "provide a rationale for its proposal of these allowed excursions, including information with regard to how these provisions protect aquatic life." USEPA suggests that IEPA "analyze information on the survival of species included in the applicable RAS for each designated use at the temperatures allowed by this provision, or. . .consider deleting this provision." *Id.*

USEPA then addresses the chemical criteria for the protection of aquatic life, including criteria for unnatural sludge, ammonia, dissolved oxygen, cadmium, chloride, lead, silver, fluoride and manganese, and selenium. PC 286 at 7.

Concerning unnatural sludge, USEPA recommends that IEPA "either ensure that section 302.403 is included in the adopted water quality standards, or provide a justification for deleting it." PC 286 at 7. This recommendation is made because the Statement of Reasons stated that "no changes are being proposed in the narrative criteria" for Section 302.403, but according to USEPA, this is "not shown in the proposed rule." *Id.*

Next, USEPA questions "whether the ammonia criteria that [IEPA] is proposing for Aquatic Life Use B waters would protect larval fish during periods when early life stages are present (defined as the months of March through October)." PC 286 at 7. USEPA notes that there is "no proposed ammonia criteria for the protection of early life stages," yet "available data" suggests that "larval fish are present in the waters during these times." USEPA therefore questions "whether a sufficient justification has been given to support the decision to omit criteria necessary to protect this life-stage." USEPA also does not approve of IEPA omitting the statement from its General Use standards that "provided for the application of early life stage criteria outside of [a] March through October timeframe if these life stages were documented to be present." The Statement of Reasons stated that "this heightened level of conservatism is not needed in waters in CAWS and LDPR," but according to USEPA, "no monitoring data are provided to support that statement." *Id.* USEPA therefore recommends that IEPA "consider revising the proposed ammonia criteria for Aquatic Life Use B waters to ensure protection of the larval fish that are present in these waters during March through October. USEPA also suggests that IEPA "consider including a narrative statement that would extend the early life stages criteria to other parts of the year when these stages are present." PC 286 at 7-8.

USEPA then discusses the criteria for DO. PC 286 at 8. USEPA questions "whether the proposed criteria for Aquatic Life Use B waters would protect larval fish during periods when early life stages are present (defined as the months of March through July)." According to USEPA, there are "no proposed daily minimum dissolved oxygen criteria for the protection of early life stages," and as a result, "less stringent criteria are applicable to Aquatic Life Use B waters during summer months." USEPA claims, however, that "larval fish are present in the waters during these times," and it is therefore questionable as to whether "sufficient justification ha[d] been given to support the decision to omit criteria necessary to protect this life-stage." USEPA also questions "whether the proposed dissolved oxygen criteria for Aquatic Life Use A and B waters. . .protect against 'chronic, sub-lethal effects such as inhibited growth'." *Id.*

USEPA acknowledges that the "omission of the 7-day and 30-day mean of daily means criteria" was explained in the Statement of Reasons. PC 286 at 8. The Statement of Reasons claimed that these criteria "allow considerable loss of production," and therefore the proposed criteria "may not provide for the long-term maintenance of the aquatic community." USEPA therefore questions whether the statement of reasons "provides sufficient justification for how these criteria would be protective of the designated uses," and recommends that IEPA "consider revising the proposed dissolved oxygen criteria to ensure protection of larval fish that are present

in these waters during the summer months." USEPA also recommends a "review of the chronic dissolved oxygen criteria," and suggests that IEPA consider "either including the 7-day and 30-day mean criteria or providing additional justification as to the protectiveness of the proposed criteria." *Id*.

Concerning the cadmium criteria, USEPA recommends that IEPA "consider revising the proposed criteria to be as protective as the 2001 [USEPA] national 304(a) cadmium criteria recommendations." PC 286 at 8. USEPA explains that despite IEPA's assumption that the current USEPA national 304(a) recommendation cannot be met "due to suspension of contaminated sediments from barge traffic and proposed cadmium criteria that is less stringent than the current recommendation," there is no information to suggest that "dredging or capping the contaminated sediments would not be effective to remedy the human-caused condition or would be too costly." Therefore, USEPA questions whether "adequate justification" was given to support applying the 40 C.F.R. 131.10(g) factor to this criterion. USEPA explains that "if the 2001 cadmium criteria cannot be met instream or dischargers cannot meet the criteria, site-specific criteria or variances could be proposed at a later date." USEPA also notes that IEPA could "present information to support the decision that cadmium sediment contamination is a human-caused condition that *cannot be remedied*" (emphasis was the USEPA's). USEPA mentions, however, that this information must be submitted to them for review to "ensure that such justification is appropriate and consistent with applicable laws and regulations." *Id*.

Concerning the chloride criteria, USEPA recommends that IEPA either consider revising the proposed criteria "to be as protective as the existing 304(a) criteria" or to "utilize the newest information available in the [USEPA] draft chloride criteria." PC 286 at 8-9. These recommendations were made because USEPA questions the adequacy of IEPA's rational for proposing a chloride standard of 500 mg/L for CAWS and LDPR. PC 286 at 8. According to USEPA, IEPA's rational was that 500 falls between USEPA's current criteria of 230 mg/L and 860 mg/L. *Id*. USEPA explains that the newest available chloride criteria was "forwarded to Illinois EPA on May 22, 2009 in an email from E. Hammer to R. Sulski and others, [in order] to derive appropriate criteria." PC 286 at 9.

The lead criteria are addressed next. PC 286 at 9. USEPA claims that IEPA's criteria for lead are less stringent than their 304(a) recommendation. USEPA questions whether "sufficient justification" was provided in the Statement of Reasons for the proposed criteria and claimed that "better justification" was provided in IEPA's testimony to the Board in October of 1994. USEPA explains that it wished to review Exhibits N and O from that testimony, but claimed that those documents are not in its files. USEPA claims that these exhibits contain the data that IEPA used to derive the lead criteria, and therefore their review and the addition of data made available since 1994 will be "needed in order to evaluate the appropriateness of the proposed criteria." USEPA therefore requests that IEPA provide "information summarized above in order to adequately justify the criteria or revise the proposed criteria to be consistent with [USEPA's] latest recommendations." *Id*.

USEPA then addresses the silver criteria, which it claimed were less stringent than its 304(a) recommendation. PC 286 at 9. USEPA also claims that IEPA "inaccurately state[d] that it is adopting a water quality standard that is exactly the same as the October 1980 Ambient

Water Quality Criteria for Silver." USEPA explains that IEPA's proposed dissolved metal criteria for silver has a "different y-intercept (presented as [USEPA's] bA and [IEPA's] A terms)." This difference is, according to USEPA, what makes IEPA's proposal less stringent than USEPA's recommendations. As a result, USEPA recommends that IEPA review the criteria and its justification for "accuracy" and suggests that it propose changes to "either the criteria or its justification to ensure that the proposed criteria are appropriate." *Id.*

Next, USEPA discusses IEPA's proposal to delete the water quality criteria for fluoride and manganese as outdated standards. PC 286 at 9. USEPA acknowledges that IEPA is currently working on deriving and adopting aquatic life criteria for these standards and also for boron to protect aquatic life for General Use waters. USEPA also notes that there are no "national EPA recommended numeric criteria for fluoride and manganese for the protection of aquatic life." USEPA claims that "if the adoption of fluoride and manganese aquatic life criteria is necessary to protect designated uses in other waters in Illinois, it would appear that such criteria should also be applicable to CAWS and LDPR." USEPA therefore recommends that "when aquatic life criteria for fluoride, manganese, and boron are adopted for the state, [IEPA] should also apply these criteria to CAWS and LDPR." USEPA adds that "if these new aquatic life criteria are not adopted prior to the completion of CAWS rulemaking," IEPA should "consider keep[ing] the existing fluoride and manganese criteria until a time when the new criteria can be adopted in their place." *Id.*

For the selenium criteria, USEPA recommends that IEPA "consider revising [them] to be consistent with either the current chronic criteria recommendation of 5 µg/L or the draft fish tissue-based selenium criteria." PC 286 at 9-10. This recommendation is made because IEPA had proposed a total selenium water quality criterion of 1 mg/L (1000 µg/L), which according to USEPA is less stringent than its recommended chronic criterion of 5 µg/L. PC 286 at 9. USEPA acknowledges, however, that IEPA was still in the process of "determining whether or not to update the selenium criterion to a fish tissue-based criterion." *Id.*

USEPA next addresses IEPA's omission of criteria for which USEPA has published recommendations. PC 286 at 10. USEPA explains that CAWS and LDPR "must have criteria to protect the adopted designated uses," and it notes that USEPA publishes new and revised criteria "from time to time" in order to ensure this protection. Therefore, USEPA recommends that IEPA "review new [USEPA] 304(a) criteria recommendations and consider revising, as necessary, the proposed water quality standard for CAWS and LDPR." USEPA suggests that IEPA "conduct a review of whether or not it is necessary to adopt numeric criteria for recently published 304(a) recommended criteria" including copper, diazinon, methyl tertiary-butyl ether (MTBE), nonylphenol, and tributyltin." IEPA is also instructed to "provide a detailed description of this review and its conclusions in the statement of reasons and [to] revise its current standards proposal to include these parameters if such action is determined to be necessary." It is further recommended that regular reviews of new information regarding criteria deemed necessary to protect the designated uses of CAWS and LDPR be conducted in future in order to update the proposal as needed. *Id.*

Next, USEPA addresses the criteria necessary for the protection of human health. PC 286 at 10. These criteria included "fishing as a documented activity," the mercury human health standard, and the benzene human health standard. *Id*.

As USEPA explained earlier in its introduction, CAWS and LDPR are both used for fishing, and it is presumed that fish are "then eaten." PC 286 at 10. USEPA therefore recommends that IEPA "determine if additional human health criteria are warranted to adequately protect human health from the consumption of contaminated fish caught in CAWS and LDPR based upon review of all [USEPA] recommended criteria for the protection of human health (for consumption of organism only)." USEPA also recommends that "if the proposed water quality standards are revised to include protection of human health," IEPA should "consider revising (rather than deleting) the water quality criteria for phenol and barium to be as protective as [USEPA]'s current human health water quality criteria recommendations for these parameters (860 mg/L and 1 mg/L, respectively)." *Id*.

USEPA then addresses the mercury human health standard. PC 286 at 10. USEPA acknowledges that IEPA is proposing to adopt a mercury human health criterion "equivalent to [USEPA]'s 1984 ambient water criterion for mercury (0.012 µg/L)," but it notes that its current 2001 mercury human health criteria recommendation is "to adopt fish tissue –based methyl-mercury criteria (0.3 mg/kg)." USEPA therefore recommends that IEPA "consider adopting the fish tissue-based methyl-mercury criterion and/or translating the methyl-mercury tissue criterion into a water column criteria that is applicable to CAWS and LDPR to replace the proposed mercury human health criterion." This recommendation is made because USEPA questions "whether this criterion adequately considers bioaccumulation." *Id*.

Finally, for the benzene human health standard, USEPA recommends that IEPA "consider revising the proposed. . .criterion to be as protective as [USEPA]'s 304(a) criterion or provide justification as to the appropriateness of the proposed criterion for consistency with [USEPA]'s current human health methodology" (as published in 2000). PC 286 at 11. This is recommended because, much like other criteria, IEPA's proposal to adopt a benzene human health criteria (310 µg/L) is not as stringent as [USEPA]'s recommended 304(a) criteria for the protection of human health. This was based on "organism-only exposure criterion of 51 µg/L at a risk factor of $1*10^{-6}$, which is the same risk factor as used in Illinois' approved human health procedure in Subpart F." PC 286 at 10-11. USEPA explains that "justification has not been given to support the derivation of the proposed criteria," and therefore, IEPA "has not shown whether or not the criterion is appropriate." PC 286 at 11.

PC 1401

On April 30, 2014, IEPA submitted pre-first notice comments "to summarize the relevant portions of the Record for the Board's consideration in developing a First Notice Opinion on the issue of what water quality standards should apply" to CAWS and LDPR waters. PC 1401 at

3.[10] In these comments, IEPA reviews its initial and amended proposal; addresses the proposals submitted by ExxonMobil and Citgo/PDV, and argues in favor of the water quality standards proposed by IEPA. IEPA also asks that the Board delay action on chloride water quality standards at this time. *Id.*

IEPA notes that the specific water quality standards from the initial IEPA proposal that are ripe for consideration in Subdocket D are: proposed Sections 302.101, 302.102, 302.401, 302.402, 302.404, 302.405, 302.407, 302.408, 302.409, 302.410, 302.412, 302.601, 302.648, and 302.657. PC 1401 at 4. IEPA states that it attempted to use the most current criteria available in developing the proposed water quality standards. PC 1401 at 4. IEPA notes this was accomplished for all parameters except cadmium, copper, selenium, mercury (human health standard), ammonia, and chloride. *Id.*

For pH, IEPA indicates that it is proposing the General Use standard, which is consistent with the most recent federal criteria. PC 1401 at 5. With ammonia IEPA notes that the proposed standards are based on the most recent national criteria document at the time of the proposal. PC 1401 at 5. IEPA states that USEPA adopted a new ammonia criterion in April 2013; however, IEPA will address the new criteria on a statewide basis, so their current proposal remains the same as originally proposed. *Id.*

IEPA states that in the original proposal, IEPA indicated it was awaiting USEPA approval for the General Use water quality standards for benzene, ethylbenzene, toluene, xylene, nickel (dissolved) and Zinc (dissolved). PC 1401 at 6. USEPA approved the General Use water quality standards for these parameters on July 25, 2007. IEPA is proposing that the General Use water quality standards for these parameters be adopted for CAWS and LDPR. *Id.*

IEPA investigated the potential causes of exceedances of the national criteria for cadmium and found that the contaminated sediment was the likely reason for the exceedances. PC 1401 at 7. IEPA states:

> Based on an analysis of the data, the Agency believes that a legacy of contaminated sediment prevents full attainment of the Clean Water Act aquatic life use in these waters and is the primary reason that the chronic national criterion cannot be met in the segments of CAWS. The Agency also investigated the Cadmium National Criteria document. The most sensitive species for the chronic criteria was an amphipod (*Hyalella azteca*). The Agency has concerns about the test results from this species, as chronic *Hyalella azteca* test methods are currently being reevaluated due to inconsistent and often overly sensitive test results with this species. The Society of Environmental Toxicology and Chemistry has recently formed the *Hyalella azteca* Advisory Group (HAAG), which is working towards standardizing the diet, culture water, and test water to be utilized in chronic testing with this species. The Agency's concerns regarding

[10] The Board appreciates IEPA's summaries of the evidence in the record, but will not repeat the summaries here as the Board previously summarized IEPA's arguments in earlier sections of this opinion. The Board will include updated information in this section.

> the chronic dataset used in the Cadmium National Criteria Document, including, but not limited to *Hyalella azteca*, have been brought to USEPA's attention and they have put together a committee to reevaluate the chronic cadmium dataset. *Id*. at 8.

IEPA concludes that the General Use dissolved cadmium water quality standards will fully protect the aquatic life uses in CAWS and LDPR. *Id.*

IEPA offers that sulfate and chloride are the key toxic components of dissolved solids, and as a result of the improvements to the sulfate water quality standard, the IEPA proposed elimination of the total dissolved solids standard in R07-09. PC 1401 at 10. IEPA is now proposing elimination of a TDS standard for LDPR and CAWS. *Id*. In addition to TDS, the IEPA is proposing elimination of the barium, oil/fats/grease, and phenols water quality standards as unnecessary, inappropriate or outdated. However, the IEPA is proposing to include human health criteria for phenols. Barium, oils and phenols will be protected by the effluent standard found in 35 Ill. Adm. Code 302.124. *Id.*

IEPA proposes DO standard consistent with the standards adopted by the Board in Proposed Amendments to Dissolved Oxygen Standard 35 Ill. Adm. Code 302.206, R04-25 (Jan 24, 2008). PC 1401 at 18. IEPA claims that proposed DO standards represent minimum concentration thresholds intended to protect aquatic organisms from acutely lethal effects and from chronic, sublethal effects of low dissolved oxygen. *Id*. IEPA made minor changes by reorganizing the subsections to have the any time level before the daily minimum averarged over 7 days.

IEPA proposes removing from Section 302.407(c) language prohibiting the exceedance of the human health standard when the flow is above the harmonic mean. PC 1401 at 21. This change is based on questions raised by Citgo/PDV at hearings. Also being proposed for change is that the phrase "annual average" be replaced with "a 12-month rolling average". *Id*. IEPA proposed change is:

> The human health standard (HHS) for the chemical constituents listed in subsection (f) shall not be exceeded ~~when the stream flow is at or above the harmonic mean flow pursuant to Section 302.658 nor shall an annual average~~,on a 12-month rolling average based on at least eight samples, collected in a manner representative of the sampling period, ~~exceed the HHS~~ except as provided in subsection (d). PC 1401 at 55.

For selenium, IEPA offers that it did not use USEPA's criteria for selenium as there is "uncertainty surrounding the science used in developing" the most recent draft rules. PC 1401 at 29. If a national criteria document is finalized, IEPA will review the document and may propose statewide modifications. *Id.*

IEPA clarifies a statement made on the record at hearings in 2008. PC 1401 at 37. At that time, IEPA stated that "a 316(a) demonstration (alternative thermal effluent limitations) was not applicable since the receiving stream was not meeting the Clean Water Act (CWA) goals".

After discussions with USEPA, it was made clear that "a 316(a) demonstration can be made regardless of meeting the CWA goals if the facility can make a showing that all of the 316(a) requirements are met". *Id.*

IEPA notes that issues remain regarding what water quality standards would be in place for Bubbly Creek, which was moved to Subdocket E on February 21, 2013. PC 1401 at 37. IEPA recommends that Secondary Contact water quality standards remain in place for Bubbly Creek until Subdocket E issues are resolved. *Id.* at 38.

IEPA observes that Citgo/PDV and ExxonMobil testified before the Board regarding the water quality standards proposed by IEPA for ALU B waters. PC 1401 at 38. ExxonMobil raised issues of temperature, chloride, and mercury, and identified the need for a variance, assuming the Board adopts IEPA's proposed standards. IEPA agrees with ExxonMobil on the potential need for a variance but is still working with USEPA on an approvable variance. *Id.*

According to IEPA, Citgo/PDV proposed a water quality standard for chloride of 991 mg/L for the acute standard and 624 mg/L for the chronic standard for ALU B waters. PC 1401 at 38. IEPA raises concerns with these proposals in that USEPA has outstanding issues and concerns with this proposal. IEPA opines that it would be "premature at this point for the Board to propose Citgo/PDV's chloride standard knowing outstanding issues still exist". *Id.* IEPA raises the additional question of whether USEPA would approve Citgo/PDV's proposal. *Id.* at 39.

IEPA does not support the Citgo/PDV's suggested removal of *Ceriodaphina dubia* from the chloride criteria dataset, and "believes the removal of this species results in a criteria that may not be protective of other resident species". PC 1401 at 39. While Citgo/PDV argues that *Ceriodaphina dubia* has not been found in these waters during the winter months, IEPA states that few studies have attempted to verify the presence of this species in winter months. IEPA further notes that even if *Ceriodaphina dubia* does not exist in these waters during winter months, organisms closely related to it may be present, which exhibit similar chloride sensitivity. *Id.* IEPA concludes by saying "Given the limited research on the winter residency of *Ceriodaphnia dubia* in these waters, and the suitability of this species as a surrogate for other planktonic crustaceans, the IEPA believes that the elimination of this species from the chloride dataset is not appropriate." *Id.*

IEPA does not support Citgo/PDV's proposed amendments to the mixing zone rules "because it appears this proposal is contrary to federal law". PC 1401 at 40. Because of these concerns, IEPA encourages the Board to reject Citgo/PDV's proposals and to delay adopting chloride water quality standards until an approvable standard can be developed with USEPA, and IEPA has had time to work with stakeholders. *Id.*

PC 1409

On May 14, 2014, IEPA submitted comments in response to proposals submitted by both Midwest Generation and the Environmental Groups. PC 1409 at 1. IEPA notes that testimony was not offered for either proposal, nor were "parties given an opportunity to cross examine

witnesses with respect to these proposals". *Id.* IEPA opines that Subdocket D was created specifically to address issues related to water quality standards to meet the aquatic life uses designated. IEPA notes it did not anticipate a proposal from either group because no testimony was provided in Subdocket D. *Id.* As a result, IEPA asks that the Board not consider the proposals provided by Midwest Generation and the Environmental Groups. *Id.* However, IEPA did provide comments for each proposal should the Board consider them. *Id.* at 2.

IEPA explains that the Environmental Groups propose "to remove the excursion hours because they believe that the excursion allowance of 3.6º F for two percent of the time was not protective". PC 1409 at 2. IEPA states that Mr. Yoder indicated in testimony that "exceedances of well-developed thermal criteria are inevitable and may not necessary [*sic*] result in a biologically impaired use". *Id.* However, Mr. Yoder also noted that "setting criteria to avoid the potential regulatory inconveniences of such exceedances can have potentially adverse biological consequences". *Id.*

According to IEPA, Mr. Yoder was also asked during the January 31, 2008 hearing whether fish could detect high temperatures and then avoid them. PC 1409 at 2. Mr. Yoder reported that "they could, provided that they have somewhere to go". *Id.* Mr. Yoder reportedly also stated in testimony that "short term survival is something they [fish] can withstand for short periods of time". *Id.* at 3. Short-term avoidance, according to Mr. Yoder, is avoiding a segment of the river for a short time, such as an excursion period; whereas long-term avoidance is "where a thermally sensitive fish avoids a segment of the river because it is too hot". *Id.*

IEPA raises concerns with the Environmental Groups' downward adjustment of the UILT by 2º C (35.6º F) after Mr. Yoder adjusted the CMT downward by 2º C (35.6º F). PC 1409 at 3. IEPA feels that this methodology "may be applying the same safety factor twice and was proposed without any expert testimony to support it". *Id.*

IEPA notes that the Environmental Groups' thermal proposal for ALU A and ALU B waters "adds an arbitrary 5º F to the period average to determine the daily maximum temperature that would apply". PC 1409 at 4. IEPA explains that this was done to insure that the cooling of sewage effluent would not be required. IEPA expresses concern that the arbitrary 5º F added would be insufficient to ensure sewage treatment plants meet the Environmental Groups' proposed daily maximum. *Id.*

IEPA's last concern with the Environmental Groups' proposal relates to the period average and maximum non-summer months being based on the Geometric Mean and 98th percentile temperature data from the Rt. 83 Cal-Sag Channel station. PC 1409 at 4. IEPA states that the Environmental Groups proposed to eliminate IEPA's proposed exceedance hours of two percent, yet the method the Environmental Groups propose using will exceed their standard two percent of the time – before any heat is added. IEPA elaborates by saying that based on historical data at the Cal-Sag Channel station, the Environmental Groups' proposed thermal standard will be exceeded 35 periods out of 117 in 9 years. *Id.* IEPA asserts this is why it proposed using the 90th percentile to represent the period average. *Id.* at 5.

IEPA next discusses the three proposals submitted by Midwest Generation. PC 1409 at 5. The first was offered in 2003. IEPA's review of this proposal demonstrated that it "was not consistent with how one would go about establishing water quality standards, so rejected this proposal". IEPA notes that the second proposal by Midwest Generation was submitted in 2007. This proposal was not discussed in Subdocket D, so there was no opportunity for cross examination. IEPA states it is also unclear if USEPA reviewed the 2007 proposal. For these reasons, IEPA suggests the 2007 proposal be rejected. *Id.*

The third proposal submitted by Midwest Generation, according to IEPA, was an alternative to consider if their 2003 and 2007 proposal was not considered. This proposal is to keep the temperatures adopted by the Board in Petition of Commonwealth Edison Company for Adjusted Standard from 35 Ill. Adm. Code 302.211(d) and (e), AS 96-10 (Oct. 3, 1996). PC 1409 at 5. IEPA raises concerns with this proposal. First, Midwest Generation provided no information in the record as to what changes may have occurred to the receiving stream or Midwest Generation since AS 96-10 was granted. *Id.* IEPA notes, for example, that helper cooling towers have been installed at the Joliet 9 facility. *Id.* at 6. Second, the thermal limits that apply in AS 96-10 at the I-55 bridge do not apply for the entire stretch of the UDIP. IEPA asks that the Board reject this third proposal as well. *Id.*

IEPA lastly suggests that the Board designate the Lower CSSC and Brandon Pool as Incidental Contact Use as one of two recommendations proposed by USEPA for these waters. PC 1409 at 6. USEPA had recommended either deleting the proposed designation for the Lower CSSC and Brandon Pool waters and adopting Incidental Contact Use or reinstating the previous Secondary Contact Use. *Id.*

USEPA

PC 1337/1338

The USEPA filed PC 1337, which the Board received on May 14, 2012. That document contained inadvertent typographical errors, which USEPA corrected and refilled as PC 1338, received on May 22, 2012. USEPA states that PC 1338 supersedes PC 1337 and that the documents are identical, but for the inadvertent errors. PC 1338 at 2. Therefore, all references are made to PC 1338.

PC 1338 contains USEPA's decision after reviewing IEPA's new and revised water quality standards for seventeen specific segments of CAWS and LDPR. PC 1338 at 2. IEPA submitted the water quality standards to USEPA on September 26, 2011, pursuant to Sec. 303(c) of the CWA (33 U.S.C. 1251 *et seq.*). On October 26, 2011, the Illinois Attorney General's Office submitted a letter to USEPA in accordance with 40 C.F.R. 131.6(e), certifying that the standards were duly adopted pursuant to Illinois law. PC 1338 at 2, 9. These standards are the product of the rulemaking proceeding R08-9, Subdocket A. *Id.*; *see* Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(A) (Aug. 18, 2011). Subdocket A is one of four proceedings to update all aspects of Illinois' water quality standards for CAWS and LDPR. *See* R08-9(A), slip op. at 18 (Mar. 18, 2010) (listing the issues addressed

in the four subdockets). This proceeding pertained to recreational use designations for CAWS and LDPR. *Id.*

On November 3, 2011, USEPA approved a portion of the revised standards, namely 35 Ill. Adm. Code 301.282, 301.323, and 303.220(a)-(b) and (d)-(f). PC 1338 at 9. These revised rules established definitions of "Primary Contact Recreation" and "Incidental Contact Recreation," and established a Primary Contact Recreational use designation for five segments of CAWS. *Id*. These approved revisions are not at issue in PC 1338 decision. *Id*.

In PC 1338, USEPA further approves some, but not all, of the standards affecting the remaining twelve segments addressed in IEPA's submission. PC 1338 at 3, 9. USEPA rejects some of the submitted standards – for instance, those revisions affecting aquatic life use designations. *Id*. at 2-3. USEPA notes that the aquatic life use designations are properly part of Subdockets C and D, an unfinished proceeding. *Id*. At the completion of Subdockets C and D, Illinois might be able to resolve the disapprovals at issue here. *Id*. at 3. However, these changes are not yet supported by sufficient data and analysis, according to USEPA. *Id.*

Approval of Five Primary Contact Recreation Water/Disapproval of Criteria Deletion for Lower North Shore Channel. USEPA approves Illinois' revisions concerning i) the Indigenous Aquatic Life Standards in 35 Ill. Adm. Code 302, Subpart D and ii) the removal of the Secondary Contact recreational use designation for the following five segments of CAWS: 1) the Lower North Shore Channel from the North Side Water Reclamation Plant to its confluence with the North Branch of the Chicago River; 2) the North Branch of the Chicago River; 3) the South Branch of the Chicago River; 4) the Little Calumet River; and 5) the Cal-Sag Channel. PC 1338 at 3. In accordance with 40 C.F.R. 131.5(a)(2) and (5), USEPA disapproves the removal of the site-specific dissolved oxygen criteria previously applied to the portion of the Lower North Shore Channel listed above (1). *Id.* USEPA states that no adequate rationale has been provided for the removal of the criteria, as required by 40 C.F.R. 131.6(b), (c), and (f) and 131.11(a). *Id*. To remedy this, Illinois must reinstate its DO criteria or, as part of Subdockets C or D, present a sound scientific rationale for adoption of less stringent criteria than those in 35 Ill. Adm. Code 303.441(j) for the Lower North Shore Channel. *Id.*

In this decision, USEPA affirms revisions affecting the five segments from its November 3, 2011 action. *Id*. Of the seventeen total segments of CAWS and LDPR, fourteen had previously been designated as Secondary Contact and Indigenous Aquatic Life Waters. *Id*. at 22. IEPA's revised standards (in Section 303.204) changed this designation to Incidental Contact or Non-Contact Recreational uses. *Id*. The proposed language stated: "These waters are required to meet the secondary contact and indigenous aquatic life standards contained in 35 Ill. Adm. Code 302, Subpart D, but are not required to meet the general use standards or the public and food processing water supply standards of 35 Ill. Adm. Code 302, Subpart B and C." *Id*. USEPA notes that the changes had no substantive effect on the fourteen segments, with the exception of the Lower North Shore Channel. *Id*. In that segment, the revision eliminated the site-specific aquatic life DO criteria at 35 Ill. Adm. Code 303.441(j), which mandated baselines of 4 mg/L of dissolved oxygen at any time, and a 5 mg/L for sixteen hours in a given twenty-four hour period. *Id*. at 22-23. USEPA disapproves the revision to the extent it removed the DO criteria. *Id*. at 3, 25.

Approval of Changing the Name of the Primary Contact Recreation Use Designation for the Chicago Rive/Disapproval of Removal of Other Uses and Criteria. USEPA approves Illinois' revisions to change the name of the primary contact recreation use designation for the Chicago River from "General Use" to "Primary Contact Recreation." *Id*. at 4. In accordance with 40 C.F.R. 131.5(a)(1), (2), (4) and (5), USEPA disapproves Illinois' removal of the General Use designation to the extent that it removed the aspects of the General Use designation that "protect the State's water for aquatic life . . . ; wildlife, agricultural use, . . . and most industrial uses and ensure the aesthetic quality of the State's aquatic environment." *Id*. USEPA also disapproves Illinois' removal of the General Use criteria set forth as 35 Ill. Adm. Code 302, Subpart B that previously applied to the Chicago River. *Id*. USEPA states that no adequate rationale has been provided. *Id*. To address the disapprovals pertaining to the Chicago River, Illinois must revise its standards to adopt 1) designated uses that protect the state's water in the previously-stated manner, and 2) criteria that protect the newly adopted Primary Contact Recreational use designation. *Id*. Alternatively, as part of Subdockets C or D, Illinois could provide to USEPA methods, analyses, scientific rationale, and other information demonstrating the appropriateness under federal law of 1) the removal of the aspects of Illinois General use designation that protect the State's water for aquatic life in the above-stated manner, and 2) adoption of criteria for the Chicago River that differ from those specified at 35 Ill. Adm. Code 302, Subpart B. *Id*.

While fourteen segments had previously been designated Secondary Contact Waters, the remaining three were without classification, which automatically designated them as General Use. *Id*. at 16-17; *see* 35 Ill. Adm. Code 303.201, 302.202. Under Sec. 302.202, the Purpose of the General Use standards is to "protect the State's water for aquatic life . . . ; wildlife, agricultural use, . . . and most industrial uses and ensure the aesthetic quality of the State's aquatic environment." 35 Ill. Adm. Code 302.202. One of the three segments designated General Use (by default, *see* Sec. 303.201) was the Chicago River running east-west from Lake Michigan to the confluence with its North and South Branches. PC 1338 at 17. To the extent that the name change from "General Use" to "Primary Contact Recreation" removes the General Use criteria and protective language for non-recreation purposes, for which USEPA disapproves. *Id*. at 4, 11, 24.

Approval of Changing the Name of Secondary Contact Recreational Use Designation for Seven Incidental Contact Water Segments. USEPA approves Illinois' revisions i) changing the name of the secondary contact recreation use designation and ii) ensuring the applicability of the previously-approved Indigenous Aquatic Life standards in 35 Ill. Adm. Code 302, Subpart D for the following seven segments: 1) the South Fork of the South Branch of the Chicago River (Bubbly Creek); 2) the upper portion of the Chicago Sanitary and Ship Canal from the South Branch to the Cal-Sag Channel; 3) Lake Calumet; 4) the lake Calumet Connecting Channel; 5) the Grand Calumet River; 6) the lower portion of the LDPR from the Brandon Road Lock and Dam to the Interstate 55 Bridge; and 7) the Calumet River from the O'Brien Locks and Dam to its confluence with the Grand and Little Calumet Rivers. *Id*. at 4-5.

IEPA's revisions for these seven segments change the designation from "Secondary Contact" to "Incidental Contact Waters." *Id*. at 45, 12-13, 23-24. For all of the segments, USEPA finds that the designations are "substantively identical." *Id*. at 24.

Disapproval of Removal of the General Use Designation and General Use Criteria for the Upper North Shore Channel. Illinois designated the Upper North Shore Channel as an Incidental Contact Recreation water. *Id*. at 5. In doing so, it removed the General use designation and criteria for this segment and made Illinois' less stringent Indigenous Aquatic Life designated use and criteria applicable. *Id*. USEPA disapproves of this removal in accordance with 40 C.F.R. 131.5(a)(1), (2), (4), and (5) because no adequate rationale has been provided as required by 40 C.F.R. 131.5(a), (b), (c), and (f), 131.10(g) and 131.11(a). *Id*. To remedy this, Illinois must revise its water quality standards to either 1) reinstate the General Use designation and applicable criteria, or 2) adopt standards that are as protective as Illinois' General Use standards for both recreation and other uses. *Id*. Alternatively, as part of Subdockets C or D, the state could develop and provide to USEPA methods, analyses, scientific rationale, and other information demonstrating the appropriateness of 1) the removal of the General Use designation, and 2) adoption of different criteria which nonetheless adequately protect the applicable designated uses. *Id*.

As with the Chicago River (from Lake Michigan to the North and South Branches), the Upper North Shore Channel was without designation, making it a General Use water. *Id*. at 17; *see* 35 Ill. Adm. Code 303.201. The Board concluded that the "recreation in and on the water" General Use designation for the Upper North Shore Channel cannot be attained, due to the meager flow and reduced discretionary diversion from Lake Michigan. PC 1338 at 27. However, USEPA insists that the record in Subdocket A has not shown that "recreation in and on the water" is not attainable for this segment. *Id*. at 28. Therefore, USEPA disapproves the removal of the "General Use" designation for the designation "Incidental Contact Recreation," which also removes General Use criteria and protective language for non-recreation uses. *Id*. at 5, 14, 25.

Disapproval of Removal of the General Use Designation and General Use Criteria for the Calumet River from Lake Michigan to the O'Brien Locks and Dam. Illinois altered the recreational use designation of the Calumet River from Lake Michigan to the O'Brien Locks and Dam. *Id*. at 5. The portion south of the Torrence Ave. crossing is now designated Incidental Contact Recreation water, while the northern portion is designated Non-Contact Recreation water. *Id*. Thus, Illinois removed the General Use designation and criteria, making its less stringent Indigenous Aquatic Life designated use and criteria applicable to this entire segment. *Id*. USEPA disapproves of this removal in accordance with 40 C.F.R. 131.5(a)(1), (2), (4), and (5) because no adequate rationale has been provided as required by 40 C.F.R. 131.6(a), (b), (c), and (f), 131.10(g) and 131.11(a). *Id*. To remedy this, Illinois must revise its water quality standards to 1) reinstate the General use designation and applicable criteria from 35 Ill. Adm. Code 302, Subpart B, or 2) adopt standards that are as protective as the General Use standards. *Id*. at 6. Alternatively, as part of Subdockets C or D, the state could develop and provide to USEPA methods, analyses, scientific rationale, and other information demonstrating the appropriateness of 1) the removal of the General Use designation, and 2) adoption different criteria which nonetheless adequately protect the applicable designated uses. *Id*.

Like the Chicago River and Upper North Shore Channel, the 6.8 mile segment of the Calumet River from Lake Michigan to the O'Brien Locks and Dam was a default General Use water. *Id*. at 17; *see* 35 Ill. Adm. Code 303.201. Illinois' revisions alter this designation to Incidental Contact Recreation water for the portion south of the Torrence Ave. crossing and Non-Contact Recreation water north of the Torrence Ave. crossing. PC 1338 at 5. Like the Upper North Shore re-designation, the Board concluded that the "recreation in and on the water" General use designation for the segment cannot be attained, due to human caused conditions (such as barge traffic) and sources of pollution, coupled with the impacts of physical barriers and hydrological modifications. *Id*. at 29. However, USEPA insists that there is insufficient evidence to show that hydrological modifications, barge traffic, and chemical composition make "recreation in and on the water" unattainable for this segment. *Id*. at 28. Therefore, USEPA disapproves the removal of the "General Use" designation for this segment. *Id*. at 5-6, 14, 28-31.

Approval and Disapproval of Actions Regarding the : (1) CSSC from the Calumet-Sag Channel to the Des Plaines River, and (2) LDPR from the CSSC to the Brandon Road Lock and Dam. Illinois revised standards for: 1) the CSSC from the Cal-Sag Channel to the Des Plaines River, and 2) the LDPR from the CSSC to the Brandon Road Lock and Dam. *Id*. at 6. USEPA approves the revisions to these segments that ensure the continued applicability of the previously-approved Indigenous Aquatic Life standards in 35 Ill. Adm. 302, Subpart D. *Id*. USEPA disapproves the removal of the Secondary Contact recreational use designation from these segments and their designation as Non-Recreational waters, in accordance with 40 C.F.R. 131.5(a)(1), (4), and (5) because no adequate rationale has been provided under 40 C.F.R. 131.6(a) and 131.10(g). *Id*. To remedy this, Illinois must 1) reinstate the Secondary Contact recreational use, or 2) adopt a recreational use that is substantively the same – such as Incidental Contact. *Id*. Alternatively, as part of Subdockets C or D, the state could develop and provide to USEPA methods, analyses, scientific rationale, and other information demonstrating that the Secondary Contact designation for these segments is not attainable and that Non-Recreational water is the appropriate designation. *Id*.

The Board concluded that Primary Contact and Secondary Contact recreation use designations cannot be attained for these two segments. *Id*. at 31. The Board noted that there is no shoreline access to the segments, and it is not safe to engage in Secondary Contact recreation activities due to fluctuating water flow. *Id*. This happens when the District draws down water levels during rain events to prevent flooding. *Id*. In addition, barge and power boat traffic make the area too dangerous for such recreational activities, according to the Board. *Id*. at 32. However, USEPA argues that people have been engaging in such activities at these areas via access points at the Prairie Trail or I&M Corridor Trail in the vicinity of Lemont. *Id*. The Brandon Pool at the Joliet Bicentennial Park allows fishing access as well. *Id*. Furthermore, USEPA argues that there is no evidence on the frequency of the drawdowns, nor is there any evidence to suggest that dangers to recreational activity could not be remedied with structures such as docks, ladders, or other safety mechanisms. *Id*. at 32-33. Therefore, USEPA disapproves the change in designation from "Secondary Contact" to "Non-Recreational" for these segments. *Id*. at 6, 15, 28-31.

USEPA Takes No Action on the Following Two Provisions. Illinois repealed the procedural requirements for designating Secondary Contact and Indigenous Aquatic Life uses at 35 Ill. Adm. Code 303.102. *Id*. This is not a revision of water quality standards. *Id*. It therefore is not subject to USEPA review under Section 303(c)(3) of the CWA (33 U.S.C. 1251 *et seq.*). *Id*. Likewise, USEPA takes no action regarding the definitions of the terms "Non-Contact Recreational" or "Non-Recreational" waters, as USEPA disallowed the Illinois proposal to designate three of its waters under these categories. *Id*. at 7. USEPA will address the definitions in the future should Illinois submit new or revised standards for PC 1338 disapprovals and adequately show that they are appropriate. *Id*.

PC 1367

On November 15, 2012, IEPA submitted a variance for USEPA review and approval, pursuant to Section 303(c) of the CWA (33 U.S.C. 1251 *et seq*.) The Board granted this relief for Citgo/PDV, allowing them a variance from the TDS criterion at 35 Ill. Adm. Code 302.407 protecting Illinois' Indigenous Aquatic Life designated use for the CSSC. CITGO Petroleum Corp. and PDV Midwest Refining, L.L.C. v. IEPA, PCB 12-94 (Oct. 18, 2012). USEPA disapproved the variance in a March 15, 2013 decision, filed with the Board as PC 1367. PC 1367 at 1.

Legal Background for Water Quality Standards and Variances. Section 101(a)(2) of the CWA provides an interim goal of achieving water quality standards for the protection and propagation of aquatic life wherever attainable. PC 1367 at 4. The water quality standards are further elucidated in Section 303 of the CWA, which requires states to adopt water quality standards for waters within their jurisdictions. *Id*. Section 303(c) requires that those standards include designated uses, as well as water quality criteria based upon those uses. *Id*. Section 303(c)(2)(A) further mandates that the standards "protect the public health or welfare, enhance the quality of water and serve the purposes" of the CWA. *Id*. USEPA's regulations give effect to this mandate. PC 1367 at 4; *see* 40 C.F.R. 131.

Part 131 implements both Section 101(a)(2) and Section 303 of the CWA to require that water quality standards include the previously-mentioned uses, unless shown to be unattainable. PC 1367 at 5; *see* 40 C.F.R. 131. At this point, the state can adopt subcategories of the uses which require less stringent criteria. PC 1367 at 5; *see* 40 C.F.R. 131.5(a)(4), 131.6(a), 131.10(j), and 131.20(a); *see also* Idaho Mining Assoc. v. Browner, 90 F. Supp. 2d 1078, 1092 (D. Id. 2000); 68 Fed. Reg. 40428, 40430-31 (July 27, 2003). Once a state designates the use or subcategory of use, the state can only remove the designated use if, among other things, "the [s]tate can demonstrate that attaining the designated use is not feasible" for one of six reasons found in Part 131.10(g). PC 1367 at 5; *see* 40 C.F.R. 131.10(g).

When adopting this designated use, the state must also adopt water quality criteria protecting the use, based on sound scientific rationale. PC 1367 at 5; *see* 40 C.F.R. 131.11(a). Nothing in the CWA or USEPA regulations allow a relaxation of these criteria to points below the level necessary to protect the designated use, even for issues of attainability. *Id*. If a use is unattainable, the state can remove it (for one of the six valid reasons under 40 C.F.R. 131.10(g)) and replace it with a subcategory of use, then adopt less stringent criteria necessary to protect the

new designated use. *Id*. If a state satisfies the requirements under 40 C.F.R. Part 131 for removing a designated use, a variance is permissible to limit the applicability of the use removal to a single discharger. *Id*. Conversely, states have the right to develop more stringent standards under Section 510 of the CWA. *Id*.; *see* 58 FR 20802, 2092122 (Apr. 16, 1993).

Board Variance for Citgo/PDV. In 1974, Illinois demonstrated that providing for protection and propagation of fish – pursuant to Section 101(a)(2) of the CWA – was not attainable for the CSSC, and the state adopted a subcategory of aquatic life use called "indigenous aquatic life," with water quality criteria to protect this use. PC 1367 at 6; *see* 35 Ill. Adm. Code 302.Subpart D. Waters under this designated use are supposed to be capable of supporting an indigenous aquatic life limited only by the physical configuration of the body of water, characteristics and origin of the water, and the presence of contaminants in amounts that do not exceed the water quality standards in Subpart D. PC 1367 at 4; *see* 35 Ill. Adm. Code 302 Subpart D. The criteria to protect this use included the TDS criterion of 1,500 mg/L, under 35 Ill. Adm. Code 302.407. PC 1367 at 6-7.

The Board initially granted a variance to Citgo/PDV in April 2005, which it extended in May 15, 2008 and again in October 18, 2012. *Id*. While Illinois did not submit the 2005 and 2008 variances to USEPA, it did so on November 15, 2012 for the 2012 extension. *Id*. The Board based its variance decision on Section 35 of the Illinois Environmental Protection Act, which allows relief when "compliance with any rule or regulation, requirement or order of the Board would impose an arbitrary or unreasonable hardship." *Id*. at 1, 7; *see* 415 ILCS 5/35(a); CITGO v. IEPA, PCB 12-94, slip op. at 20 (Oct. 18, 2012). This temporarily removed the Indigenous Aquatic Life use and TDS criterion, which USEPA argues is not allowed under the CWA or federal regulations merely for "arbitrary or unreasonable hardship." PC 1367 at 8. Rather, the removal of a designated use is only allowed if, among other things, the state demonstrates that the designated use is unobtainable for one of the six reasons from Part 131.10(g). *Id*. Furthermore, USEPA notes, the state can only modify the accompanying criteria if it provides an adequate scientific rationale for the revised criteria. *Id*.; *see* 40 C.F.R. 131.5(a)(4).

USEPA Disapproval and IEPA Part 131 Arguments. IEPA put forward two primary arguments in its November 15, 2012 submission – both from Part 131.10(g) – in support of the variance. PC 1367 at 8; 40 C.F.R. 131.10(g). It first relied on Part 131.10(g)(3), which provides that designated uses can be removed "if the [s]tate can demonstrate that attaining the designated use is not feasible because . . . [h]uman caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place." 40 C.F.R. 131.10(g)(3). USEPA counters that Part 131.10(g)(3) requires that the state show such human caused conditions or pollution sources with a degree of specificity that is absent in this record. PC 1367 at 8. Illinois has not provided, USEPA claims, specific information on the locations and causal relationships between deicing activities with road salt and the inability to comply with TDS criteria. *Id*. Therefore, according to USEPA, the state has not adequately identified the "human caused conditions or sources of pollution" that prevent attainment of the use. *Id*. at 9.

Furthermore, USEPA notes that once a state has identified these conditions or sources preventing attainment, the state must also demonstrate either that these cannot be remedied or that implementation would cause more harm than good to the environment. *Id*. USEPA insists that, once again, there is nothing in the record to conclusively show either proposition. *Id*.

IEPA also relied on part 131.10(g)(6), which requires a state to demonstrate "that attaining the designated use is not feasible because . . . [c]ontrols more stringent than those required by sections 301(c) and 306 of the [CWA] would result in substantial and widespread economic and social impact." 40 C.F.R. 131.10(g)(6). While IEPA did provide limited information regarding the costs of an alternative for reducing TDS discharges, USEPA insists that the record does not provide an evaluation or demonstration that such controls "result in substantial and widespread economic and social impact." PC 1367 at 10.

USEPA also states that the record for the variance decision lacks sufficient scientific rationale as required by 40 C.F.R. 131.6(b), (c), and (f) and 131.11(a) as to why removal of the TDS criterion would protect the current Indigenous Aquatic Life. *Id*. at 10. The extant evidence regarding the TDS criteria from this and earlier administrative records does not address the question of whether there is a sound scientific rationale for removing the TDS criterion when chloride and sulfate criteria do not replace the existing criterion. *Id*. at 11.

In summary, USEPA argues that IEPA's submission did not contain appropriate technical and scientific data and analysis to support such a use removal, as required by 40 C.F.R. 131.5(a)(4). PC 1367 at 1, 9. Absent this data, USEPA disapproves the designation removal because Illinois did not submit designations "consistent with provisions of sections 101(a)(2) and 303(c)(2) of the Act" as required by 40 C.F.R. 131.6(a). *Id*. at 1-2. To the extent the Board's relief modified the criteria for protection of Indigenous Aquatic Life designated use by removing the TDS criteria, USEPA disapproves the variance under 40 C.F.R. 131.5(a)(2) and (5). *Id*. at 11.

USEPA states that Illinois must ensure that the Indigenous Aquatic Life designated use and TDS criterion are fully effective under Illinois law with respect to the CSSC, including with respect to the Citgo/PDV discharges. *Id*. at 2. Until then, the PC 1367 decision accomplishes this effect, notwithstanding the Board's decision. *Id*. The use and criterion will apply for CWA purposes until USEPA approves a change to the water quality standards for the segments impacted by this disapproval, or promulgates standards for those segments. *Id*.; *see* 40 C.F.R. 131.21(e). Illinois can account for the effects of deicing activities in the Chicago area on water quality standards in the Board's docket R08-9(C) and (D), then submit the revisions to USEPA for review under Section 303(c) of the CWA. PC 1367 at 2.

PC 1404

To assist the Board in its review for Subdocket D, USEPA provided five documents that comprise PC 1404. USEPA filed PC 1404 with the Board on April 30, 2014. The first document, Enclosure 1, addresses four proposed revisions in this subdocket to the water quality standards for CAWS and LDPR. *See* PC 1404, Enclosure 1. Enclosure 2 consists of a report by the U.S. Geological Survey revising the description of toxicity data on cadmium as it affects

aquatic life, particularly the amphipod *Hyalella azteca* and the midge *Chironomus tentans*. *See* PC 1404, Enclosure 2. Enclosure 3 is a table listing the fish species, species size and population, and mercury content for various CAWS-LDPR segments. *See* PC 1404, Enclosure 3. Enclosure 4 is a brief memorandum from USEPA relating to winter zooplankton populations in the Chicago Sanitary and Ship Canal (CSSC). *See* PC 1404, Enclosure 4. Finally, Enclosure 5 consists of a December 1992 environmental assessment by Huff & Huff, Inc. environmental consultants on wastewater ammonia discharge from the UNO-VEN refinery in Lemont, Illinois. *See* PC 1404, Enclosure 5.

Enclosure 1 – USEPA Comments on Issues Raised in R08-9, Subdocket D. USEPA submitted four individual comments bundled as Enclosure 1, each of which responds to other comments or proposed revisions filed with the Board. *See* PC 1404, Enclosure 1. USEPA generally advises that, if the Board adopts criteria not based on 304(a) Guidance (*see* 33 U.S.C. § 1314), the record should show that the criteria were derived using scientifically defensible methods. *Id*.; *see* 40 C.F.R. 131.11(b)(1)(iii). One such method is described in Chapter 3.7 of USEPA's Water Quality Standards handbook.

IEPA's Amended Proposal. IEPA's amended proposal includes revisions that address concerns that USEPA raised in PC 286. Exh. 481 at 2. USEPA affirms that, pursuant to the requirements of 40 C.F.R. 131.11, each of IEPA's proposed revisions comports with 304(a) Guidance, with two exceptions: a) exceedance hours for temperature, and b) criteria for ammonia, selenium, and copper. PC 1404, Enclosure 1 at 1.

USEPA's first concern in this comment relates to IEPA's proposal to allow an increase of 3.6˚F above the proposed temperature standards to occur for two percent of the hours of the year. PC 1404, Enclosure 1 at 2. It insists that this would allow for temperatures above the UILT and would be lethal to fish. *Id*. USEPA notes that the Board could remedy this by removing Sec. 302.408(a) of its regulations. *Id*.; 35 Ill. Adm. Code 302.408(a). In addition, USEPA insists that IEPA's proposed ammonia, selenium, and copper criteria are not consistent with the most recent 304(a) criteria toxicity datasets. PC 1404, Enclosure 1 at 2. As such, IEPA's revision does not comply with 40 C.F.R. 131.11(b)(1) and should be updated with the newest 304(a) Guidance, according to USEPA. *Id*.

Beyond these two calls for correction, the comment addresses narrower concerns related to cadmium acute and chronic aquatic life criteria, mercury human health criterion, chloride acute aquatic life criterion, attainability of these criteria, and miscellaneous issues related to scientific methods, and concerns over the form of the criteria. *Id*. at 2-9.

USEPA reviews prior submissions on cadmium acute and chronic aquatic life criteria, concluding that IEPA's latest revision appears to be consistent with 40 C.F.R. 131.11(a)(1) and 131.(b)(1). PC 1404, Enclosure 1 at 2. USEPA recommends that, while it is working to release a new 304(a) Guidance for cadmium within the next year, the Board should move forward to adopt an appropriate cadmium criteria without waiting for the new release. *Id*. at 3.

With respect to mercury human health criterion, USEPA concludes that IEPA's proposed 12 ng/L mercury criterion could potentially be scientifically defensible and protective of the use

designation. *Id*. This despite IEPA's foregoing a prior USEPA recommendation to adopt criteria consistent with the fish-tissue based methyl-mercury criterion. *Id*. USEPA provided guidance to its January 2001 methyl-mercury criterion in the form of a 2010 Guidance document. *Id*. This document included bioaccumulation factors (BAF) and further instructions for gathering mercury samples. *Id*. However, IEPA indicated that no local entities performed this type of low-level mercury sampling, negating the efficacy of this method. *Id*. IEPA relied on another method from the 2010 Guidance, the results of which USEPA analyzed with draft national BAF and conversion factors for analogous rivers. *Id*. From this, USEPA concludes that IEPA's criterion could be defensible. *Id*. USEPA recommends that, when Illinois submits its water column criterion to USEPA, it should include information addressing the feasibility of site-specific BAFs, conversion factors, and bioaccumulation models, as well as documentation of CAWS-LDPR characteristics and applicability of the 12 ng/L criterion. *Id*. at 4.

On the issue of the chloride acute aquatic life criterion, USEPA notes that IEPA's proposed cap of 500 mg/L chloride would likely be sufficient to prevent acute toxicity to aquatic organisms in CAWS-LDPR, making it consistent with 40 C.F.R. 131.11(b)(1). *Id*. at 4-5. While USEPA is working to release a new 304(a) Guidance for chloride, it recommends that the Board move forward to adopt appropriate chloride criteria without waiting for the new version. *Id*. at 5. USEPA notes that there have been suggestions for the Board to allow a multi-discharger or water body variance for chloride because of the difficulties in abiding by the criteria due to winter deicing. *Id*. Such variances require USEPA approval under Sec. 303(c) of CWA (*see* 33 U.S.C. § 1313), provided the state can show that attaining the designated use and criteria is infeasible under 40 C.F.R. 131.10(g). *Id*. USEPA listed documents pertinent to variances from water quality standards for the Board's consideration. *Id*. Based on its discussion with IEPA, USEPA believes such a chloride variance could be a viable option, although there are numerous complex legal and technical issues. *Id*. Concerning potential variances to other discussed criteria, USEPA cautions that the record should demonstrate that any variance is limited in its scope and duration, in accordance with federal law. *Id*. at 6.

Following the clarifications to IEPA's proposed criteria, USEPA makes several other recommendations. *Id*. First, it advises that the Board remove minimum sampling requirements from Illinois' water quality standards, for the sake of clarity. *Id*. Second, USEPA expresses concern that IEPA's proposed duration for its chronic criteria in Sec. 302.407(b) could be of unlimited scope, which is not based on sound scientific rationale. *Id*. USEPA recommends that the Board adopt appropriate duration and frequency for its water quality criteria consistent with USEPA's guidance. *Id*. at 6-7. Third, USEPA advises that the Board ensure that mixing zones not result in lethality to organisms passing through the mixing zone or in significant human health risks considering likely pathways of exposure. *Id*. at 7. If, for example, the Board intends to allow mixing zones for human health criteria for bioaccumulative pollutants, USEPA insists that the Board explain how it intends to insure that such mixing zones will not result in significant human health risks. *Id*. Fourth, USEPA recommends that the Board adopt criteria for the UDIP to ensure that the water has a set of criteria consistent with 40 C.F.R. 131.11(a)(1) and 131.11(b)(1). *Id*. at 8. The Board could adopt criteria for the UDIP to be consistent with IEPA's May 24, 2013 proposal of updated standards for other ALU A waters, and by adopting DO criteria for the UDIP that are consistent with the protections for General Use waters. *Id*.

Fifth, IEPA's proposal to replace CWA-effective criteria at Part 302, Subpart D, which currently applies to all of CAWS and LDPR, with new and revised criteria for ALU A, ALU B, and UDIP ALU waters has the effect of removing all criteria applicable to Bubbly Creek. *Id*. No new aquatic life use or criteria has been proposed for this water, and no criteria are in place to protect Indigenous Aquatic Life. *Id*. Therefore, these changes do not appear to be consistent with 40 C.F.R. 131.5(a)(2), 131.5(c), and 131.11(a)(1). *Id*. USEPA recommends the Board remedy this by either retaining the existing criteria that apply to Bubbly Creek or temporarily place Bubbly Creek into one of the new aquatic life use designations until such time as site-specific uses and criteria are justified. *Id*. Sixth, USEPA recommends that the Board ensure that its rules include appropriate criteria to protect non-recreational uses for the Chicago River. *Id*. at 9. The Board decided in Subdocket C that the Chicago River should meet the General Use standards for aquatic life uses and thus did not list the Chicago River at 303.230 or 303.235, where aquatic life uses are described. *Id*. at 9. Nor is the Chicago River listed in 303.220. *Id*. Therefore, no standards exist to protect non-recreational use in the Chicago River. *Id*. As for remedies, USEPA recommends either a) removing the Chicago River from the definition of CAWS in Sec. 301.247 and the definition of the Chicago River System at Sec. 301.250, or b) add language that specifically states that all Subpart B standards apply to the Chicago River at Sec. 302.204. *Id*.

Seventh and finally, USEPA approves of IEPA's revision to include the protection of human health. *Id*. USEPA further recommends that the Board clarify Section 302.410 in order to ensure that the language provides for appropriate protection of human health. *Id*. Substances that are harmful to human health may not be toxic to aquatic life, but this provision could be interpreted to be limited only to substances which harm aquatic life. *Id*. To remedy this, USEPA notes that the Board could simply delete the words "toxic to aquatic life." *Id*. Removing this phrase removes the possibility of a limited reading. *Id*. In addition, USEPA urges the Board to consider updates to 304(a) guidance criteria for human health, to be released in May 2014. *Id*.

Citgo/PDV's Chloride. USEPA raises doubt that Citgo/PDV's site-specific criteria (SSC) for chloride in the CSSC is scientifically defensible, as required by 40 C.F.R. 131.11(a)(1) and 131.11(b)(1). *Id*. at 10-12. Citgo/PDV's proposed winter SSC removed the *Sphaerium* fingernail clam, *Ceriodaphnia* water flea, and *Lampsilis* mussel from the toxicity database used to derive chloride water quality in Iowa. *Id*. at 10. It also added one new toxicity result for *Musculium* fingernail clams to calculate the new winter acute chloride SSC of 990 mg/L, using this to derive the new winter chronic chloride SSC of 620 mg/L. *Id*. USEPA argues that these changes are not appropriate because these species should be considered to "occur at the site" as defined in USEPA's 2013 revised deletion process guidance or because the stand as necessary surrogates for other occurring species. *Id*. USEPA further questions whether all appropriate new toxicity data has been added to the toxicity database used to derive the criteria. *Id*.

Citgo/PDV's Mixing Zone Rules. USEPA argues that the CWA allows states to adopt mixing zone provisions in their water quality standards if, among other things, such provisions are protective of designated uses. *Id*. Such a provision allowing chronic criteria to be exceeded within a mixing zone may be protective of aquatic life use designation. *Id*. at 12. USEPA responds to Citgo/PDV's mixing zone proposal by doubting that this provision, which would

allow for chronic criteria to be exceeded outside the mixing zone, would be protective of applicable aquatic life use designations. *Id.*

Revisions to 35 Ill. Adm. Code 301 – 303 to Address USEPA's May 16, 2012 Disapproval. As further explained in PC 1338, Illinois should revise its water quality standards to address USEPA's May 16, 2012 disapproval. *Id.* at 13. USEPA recommends that Illinois delete 35 Ill. Adm. Code 303.227(b) and either a) designate the Lower CSSC and Brandon Pool for incidental contact use, or b) reinstate the previous Secondary Contact recreation use. *Id.* In addition, USEPA recommends that Illinois designate Upper North Shore Channel and Calumet River from Lake Michigan to O'Brien Lock and Dam for primary contact use. *Id.* Finally, USEPA encourages the Board to carefully consider how any regulatory changes arising out of Subdocket D relate to all aspects of provisions that USEPA disapproved in its May 16, 2012 letter. *Id.* As a reference during its review, USEPA offers to the Board USEPA Region 5's "Summary of effective standards." *Id.*

District

PC 1031

On June 17, 2011, the District submitted its Proposed Aquatic Uses and Dissolved Oxygen Water Quality Standards and Implementation Procedures "in order to provide the exact regulatory language that the District would suggest the Board adopt as to aquatic uses and dissolved oxygen water quality standards". PC 1031 at 6. The District explains that the proposed regulatory language "implements the recommendations made in its testimony before the Board". Accordingly, the District provides the proposed regulatory language that implements the recommendations made in its testimony before the Board. *Id.*

PC 1292

On March 13, 2012, the District filed a response to comments on the proposed aquatic life use designations. PC 1292 at 1. The District notes that it has been in discussions with the Environmental Groups and IEPA regarding the resolution of issues related to aquatic life use designations and the water quality standards for DO. A tentative agreement was reached, which was filed with the Board on January 27, 2012. The terms of this agreement are included as Exhibit A. *Id.*

One of the terms of this agreement is to grant the District a five year variance related to DO to allow it to work towards compliance with the proposed DO criteria while it completes TARP, installs green infrastructure, and takes other steps to reduce pollutant loadings to CAWS. A copy of the proposed variance is included as Exhibit B. *Id.* at 1 and 2.

The District explains that discussions with the Environmental Groups, IEPA and USEPA are ongoing, and it hopes this will lead to an agreement in the near future. This agreement would include "a recommended course of action, including issuance of variances related to the District's NPDES permits". *Id.* at 2.

Because a final agreement is not yet in place, the District explains that it continues to have the same issues and concerns it raised previously regarding the aquatic life use designations proposed by IEPA. PC 1292 at 1. The District suggests examining the testimony of Ms. Wasik (Exh. 187) and Ms. Nemura (Exh. 116) to gain an understanding of its concerns. *See supra* 50, 55. In addition, the District's recommended solutions for their concerns can be found in PC 1031. *Id.*

PC 1366

On January 9, 2013, the District filed a report notifying the Board that agreement has been reached between various Environmental Groups and the District regarding aquatic life use designated uses and aquatic life water quality standards for DO. PC 1366 at 1. The focus of this summary will be the agreement on water quality standards for DO because aquatic life use designations were finalized in Subdocket C.

The District reports that there is agreement that the DO criteria proposed by IEPA to protect ALU A and ALU B waters are appropriate. *Id.* at 3. In order to allow the District time to work toward compliance, there is agreement that the District be granted a 5-year variance. *Id.* at 2. During the term of this variance, the District agrees to move forward in completing TARP and in implementing green infrastructure, as well as taking other steps to reduce pollutant loadings to CAWS. *Id.* The District notes that an additional variance may be needed, with the variance terms and requirements addressed at that time. *Id.*

The District refers to the initial variance petition that it submitted to the Board in its March 19, 2012 filing. *Id.* at 2. The District would file a formal petition with the Board after final DO standards have been adopted. If the variance is granted by the Board and approved by USEPA, the District agrees to comply with all of its commitments outlined in the variance, including working with the NGOs on "agreed-upon habitat improvement projects" in CAWS. The District commits up to $500,000 towards implementation of these habitat improvement projects. *Id.*

According to the District, there is also agreement that existing "SEPA stations 3, 4, and 5 will be operated during the months of April through October" except when there is short-term equipment failure, weed control or mechanical problems or the replacement of equipment for maintenance purposes. *Id.* at 3. The District also notes that the "record supports the District's proposed standards for zinc". *Id.*

The District included a letter from Tinka G. Hyde, the Director of the USEPA Region 5 Water Division, dated June 26, 2012, in which the District requested USEPA's reaction to a possible variance from DO criteria being considered for the District's permits for the Northside, Stickney, and Calumet wastewater treatment plants. PC 1366 Att. A at 1. While USEPA asserts that its letter "does not constitute a formal decision", insight was provided on the District's assertions related to the proposed variance. First, USEPA notes that the District claims that the DO criteria being considered for adoption by the Board are not attainable primarily due to CSO controls specified in TARP, which cannot be completed within five years. As USEPA understands the District's assertions, "CSOs are human caused conditions or sources of pollution

that prevent the attainment of the DO criteria and cannot be remedied within the term of the variance, in accordance with 40 C.F.R. 131.10(g)(3) (factor 3)". *Id.* at 2. USEPA states that its initial review "suggests that an adequate variance demonstration may be able to be based on factor 3". *Id.* However, the District has also asserted that factors 4 and 5 "might also support the granting of the proposed variance", an assertion that USEPA does not support. *Id.*

The District also asked USEPA to consider its assertion that the DO variance "should apply to the three wastewater treatment plants' effluent", which USEPA does not support because the information provided by the District focuses on CSOs. Additional information would have to be provided by the District for this to be considered by USEPA. PC 1366 Att. A at 2.

Citgo/PDV

PC 1394 Citgo/PDV

To address mixing zone issues, Citgo/PDV proposed a new subsection to the Board's mixing zone rules at Section 302.102. Citgo/PDV states that the rationale for the proposed revision to the mixing zone rules lies in the fact that conditions of effluent-dominated ALU B waters are shaped mainly by the District's effluent and sediment re-suspension as well as upstream point and non-point sources that contribute snow-melt run-off. PC 1394 at 2.

Citgo/PDV proposed adding a new subsection (j) to 302.102 or 302.102(b)(13), as appropriate.

(j) Notwithstanding the provisions of 302.102(b)(9), a mixing zone shall be allowed if the following are demonstrated:

(1) The exceedance of the water quality standard is in a water body which is a "Use B" water body; and

(2) The discharger uses an intake from that water body for supply of at least 50% of its process water (including for cooling use) on an annual basis; and

(3) The chemical for which the water quality standard is exceeded in the water intake referred to in (2) above, or the water body is listed as impaired for that chemical; and

(4) Until a total maximum daily load ("TMDL") allocation is effective, the discharger employs Best Management Practices for the pollutant of concern during the times that the exceedance of the applicable water quality standard occurs; and

(5) Either of the following is demonstrated by the Best Management Practices Plan;

(i) the Best Management Practices plan has as its objective to reduce the amount of the discharge of the pollutant of concern by the amount by which the discharger would exceed the allowable discharge during the exceedances in the receiving stream; or

(ii) Compliance is determined by comparing the predicted concentration at the edge of the mixing zone as within the precision of the test method for the subject pollutant. PC 1394 at 2.

Citgo/PDV stated that at least one other stakeholder in the rulemaking will probably request that the above language also be applicable to the UDIP in addition to ALU B waters. PC 1394 at 2.

PC 1395

In response to requests from IEPA and the Board at the December 17, 2013 hearing, Roger Klocek provided additional information regarding data from the Illinois Natural History Service (INHS) on plankton, including *Ceriodaphnia* in particular, referenced in his testimony. PC 1395 at 1, 12-17-13Tr. at 163-164. Mr. Klocek explained that *Ceriodaphnia* is a type of Cladocera water flea. The data were collected by Dr. Steve Butler of the INHS during May through October of 2010 to 2012 from various points on CAWS and the Illinois River, including a station located in the CSSC at Western Avenue. From the data, Mr. Klocek observed the trend in the number of all Cladocera water flea types combined from Lake Calumet downstream into the Illinois River. Mr. Klocek noted that all Cladocera types appeared in greatest numbers at Lake Calumet, declined from Lake Calumet to the Illinois River, and increased downstream near Ottawa and Peoria, Illinois. PC 1395 at 1.

Mr. Klocek observed, "*Ceriodaphnia* appear to be transitory individuals that are originating in Lake Michigan and are carried along portions of CAWS…The *Ceriodaphnia* in the CSSC are not likely reproductive." PC 1395 at 1. On the other hand, Mr. Klocek continued that it is the *Bosmina longirostris* that is the dominant water flea in the CSSC and does reproduce in the CSSC. Mr. Klocek noted the *Bosmina* were found in all sample months, whereas during 2012, *Ceriodaphnia* was only found in July and at concentrations approximately 300 times smaller than *Bosmina*.

During the cooler months of the year when water temperatures reach 50 to 55 degrees, Mr. Klocek explained that algae, which is the food source for plankton such as water fleas, disappear as photosynthesis declines. In turn, the water fleas also disappear. Cladocerans, including *Ceriodaphnia*, then produce resting ("diapausing") eggs that are resistant to extreme conditions. The resting eggs rest in the sediment and can remain viable over the winter or even years, hatching when conditions are more favorable, typically when the water warms to approximately 55º F. Based on a 2004 study entitled, "Salinity tolerance of diapausing eggs of

freshwater zooplankton"[11], Mr. Klocek stated, "Elevated chloride in the CSSC at the levels we have historically seen during the winter months would likely have no effect on the hatchability of the resting eggs." PC 1395 at 2. Mr. Klocek concluded that the lack of or very low presence of *Ceriodaphnia* in the CSSC during the summer months when chloride levels are low is attributable to the lack of good habitat. As such, Mr. Klocek stated that Citgo/PDV's proposed elevated winter chloride standard would be protective of the aquatic life in the CSSC. PC 1395 at 2.

PC 1402

Citgo/PDV submitted their final comments in support of its proposed changes to IEPA's proposal. The Lemont Refinery, located just south of the City of Lemont on the CSSC, is operated by Citgo Petroleum Corporation and owned by PDV Midwest, LLC. The Refinery's intake and discharge pipes are immediately upstream of the Black Safety Zone (and the electric fish barrier) and within the Coast Guard RNA. PC 1402 at 1.

The comments addressed the original proposal filed by IEPA, and the changes proposed by IEPA's May 24, 2013 Motion to Amend. Citgo/PDV has "actively participated in these rulemaking proceedings since their inceptions, and has provided the Board with evidence, data and testimony to support its position and recommendations" regarding the adopted regulations for 1) a winter time seasonal standard for chloride to be adopted, 2) the use of BMP to allow dischargers to have a mixing zone in effluent dominated waters that exceed the water quality standards, and 3) the proposed standards for mercury and certain derived criteria to be refined to meet the adopted non-recreational water use for the Lower Ship Canal. PC 1402 at 2.

Citgo/PDV stated that IEPA's proposals and its testimony in the record do not fulfill the Board's obligation under Section 27 of the Act. It claimed that IEPA failed to present any information regarding technical feasibility and economic reasonableness with respect to its proposed changes. PC 1402 at 2-3. Citgo/PDV claimed that it, however, presented exhibits and testimony that support each of its proposed modifications to IEPA's proposal. Bearing in mind its suggested adjustments, Citgo/PDV recommended that the existing TDS standard for ALU B waters be eliminated and replaced with a proposed sulfate standard and a winter-time chloride standard. There was no objection to the 500 mg/L chloride standard with respect to non-winter months. PC 1402 at 3.

According to Citgo/PDV, the Board is not required to "pass-through" IEPA's proposed standards because they are not regulations that have been adopted as a matter of federal law. IEPA has introduced federal guidance, which is national and focused on the general goal of "fishable-swimmable streams", and not on water bodies that qualify for one or more of the six criteria for a use less than "fishable/swimmable". This guidance has not been adopted as a federal rule. Citgo/PDV agreed with the Board that the CSSC should be ALU B because it met three of the factors justifying a different use, but Citgo/PDV claimed that none of these federal

[11] Baily, Sarah A., Ian C. Duggan, Colin D.A. Van Overdijk. Thomas H. Johengen. David F. Reid. and Hugh J. Macisaac. "Salinity tolerance of diapausing eggs of freshwater zooplankton", Freshwater Biology (2004) 49, 286-295.

water quality criteria focused on an urbanized stream such as CAWS and the Lower Ship Canal, nor the differences from these water bodies as compared to the federal criteria for "fishable-swimmable" streams. *Id*.

Citgo/PDV claimed that IEPA was correct in realizing that some of the proposed water quality standards would not be attained by current conditions in the water bodies, but it also claimed that IEPA still failed to submit testimony or address the technical feasibility and economic reasonableness of the proposed standards. *Id*. Citgo/PDV cited IEPA's admission that the proposed standards for DO, pH, chloride, and possibly mercury, would not be met under current conditions. Citgo/PDV also emphasized the fact that the only relevant information on chloride and mercury came from the testimony of expert Jim Huff on behalf of Citgo/PDV. Citgo/PDV presented the Board with the necessary information to fulfill its obligations under Section 27 of the Act. PC 1402 at 4. Chloride, mercury, and the language of Subpart F were all cited as issues of concern with respect to the proposed water quality standards. Citgo/PDV submitted that it has provided sufficient information and evidence to the Board in order for it to accept its suggestions regarding the proposed water quality standards. It does not take a position on the other proposed water quality standards. *Id*.

First, Citgo/PDV claimed that the Board should adopt chloride water quality standards that accurately reflect the conditions of the CSSC. According to Citgo/PDV, "water quality standards that are ultimately adopted for a water body should reflect the reality and the designated uses of the water body". Citgo/PDV actively participated in the Board's previous hearings regarding the "Uses" of the Lower Ship Canal, and agreed with the "Non-recreational" use designation that the Board selected for the Lower Ship Canal, claiming that it reflects the reality of the water body. *Id*. Citgo/PDV asserted that "the Lower Ship Canal's industrial nature and aquatic habitat should not be disregarded in setting the appropriate water quality standards". PC 1402 at 5.

Because the Lower Ship Canal is also an effluent dominated stream, Citgo/PDV cited IEPA and pointed out that "in conditions without storm flows, up to 100% of the flow past Citgo/PDV's water intake is from the wastewater discharges of the District". Citgo/PDV withdraws approximately 6.4 million gallons of water daily from the Lower Ship Canal. The water is used for Citgo/PDV's processes and cooling and is then discharged as wastewater back into the Canal. This effluent is therefore "highly vulnerable" to what discharges are made by upstream contributors. *Id*.

According to Citgo/PDV, vulnerability to upstream discharges is typically only present during dry flow conditions. In the CSSC, the biggest problems documented to date have been due to higher flow conditions and stormwater run-off. Citgo/PDV has taken scores of TDS and chloride samples of its intake since 2006. These scores have indicated that during snow melt conditions, the Lower Ship Canal regularly exceeds the existing 1,500 mg/L TDS standard and the proposed 500 mg/L chloride standard. Again citing Huff, Citgo/PDV noted that "based on eight years of data, the summer time chloride are consistently well below 500 mg/L, whereas winter chloride levels as high as 1,099 mg/L have been recorded at Citgo/PDV's intake". PC 1402 at 6.

In fact, Citgo/PDV claimed that "chloride concentrations above IEPA's proposed 500 mg/L standard occur nearly every winter". Citgo/PDV cited the recent severe winter of 2014, with its "record cold and record number of snow-falls in the Cook County region", as having contributed to the "surge of elevated chloride levels". *Id*. Citgo/PDV claimed that the de-icing practices for such an "intense population center" and suburban county "coupled with an effluent dominated stream such as the Lower Ship Canal", make achieving a 500 mg/L chloride standard "not practical or realistic". PC 1402 at 6-7. Therefore, Citgo/PDV urges the Board to consider these "very real variables and statistics" when setting water quality standards for the Lower Ship Canal and CSSC. It urged the Board to adopt Citgo/PDV's revisions to IEPA's proposed 500 mg/L standard. PC 1402 at 7.

Next, Citgo/PDV urged the Board to adopt a "BMP offset approach for dischargers that withdraw substantial volumes of water from an effluent dominated stream and also discharge back into that same stream". Citgo/PDV discussed TMDL, which is a study prepared by the state when a water body exceeds an applicable WQS. According to Citgo/PDV, when the TMDL process is underway, IEPA imposes the WQS as permit effluent conditions. *Id*. Citgo/PDV therefore expected IEPA to begin imposing an effluent limit equal to the water quality standard, "even where, as in the case of Citgo/PDV, the discharger is a very minor source of pollutants and upstream dischargers are causing the exceedance of the water quality standard". PC 1402 at 7-8.

Citgo/PDV also pointed out that "if a water quality standard is violated, dischargers cannot receive a mixing zone for their discharge without receiving a variance from the Board". Citgo/PDV asserted that it demonstrated to the Board (with IEPA's recommendations), that an "arbitrary and unreasonable hardship exists to meet the TDS and chloride water quality standards when upstream sources in the Ship Canal carry snow melt with significant chloride levels". The Refinery cited Mr. Huff's summary of the difficulties encountered by Citgo/PDV regarding USEPA's review of the recent variance granted to Citgo/PDV by the Board. It claimed that its experience has demonstrated that "imposing a water quality standard at the point of discharge into the Ship Canal during snow melt conditions creates an unjustified expense, with no environmental benefit". PC 1402 at 8.

Citgo/PDV therefore proposed that dischargers be permitted to use, in the permitting process, a "BMP approach" to "offset their discharge to the extent that it would cause or contribute to water quality standard violation and, if they do so, to be eligible to have a mixing zone for that parameter". This approach was submitted in the context of an amendment to the mixing zone rule, but Citgo/PDV contended that it could also be applied in other "compliance demonstration contexts throughout the permitting process". Citgo/PDV cited one of its previous public comments, PC 1394, to emphasize this point. PC 1402 at 9.

According to the Citgo/PDV, when "the BMP approach is framed in the context of the mixing rule and as an exception to the mixing rule, the substantive elements could be used for a compliance plan", because its essential feature "alleviates the notion that the water quality standards must always be imposed in an 'end-of-pipe' context". This implies that the discharger, "subject to NPDES permit or other storm water permitting requirements", is free to "follow the BMP rather than be stuck in a seemingly never ending variance process while waiting for a

TMDL". PC 1402 at 10. Again citing Mr. Huff, Citgo/PDV stated that "the goal of the BMP would be to reduce chloride discharged from point sources by the equivalent of the chloride contribution over 500 mg/L, whenever the Ship Canal is over 500 mg/L". Such a program could remain in place until a TMDL study was completed and the adoption of numeric water quality standards [takes place]. The net result [of] such a commitment would essentially be offsetting a discharger's contribution to water quality exceedances, [making it] eligible for a mixing zone for chloride because it would no longer be causing or contributing to water quality exceedances". *Id*.

The Board had already asked how this proposal might be implemented and if it could be done through existing NPDES regulations in a previous comment from December of 2013. According to Citgo/PDV, regulations to implement a BMP approach already exist because of stormwater permitting requirements that were included in the 1987 Clean Water Act amendments. The Citgo/PDV claimed that the "Special Conditions Part III" of these "MS4" stormwater permits are "squarely applicable" because they state that "discharges, alone or in combination with other sources, shall not cause or contribute to a violation of any applicable water quality standard outlined in 35 Ill. Adm. Code 302", and if there is such a case, "different limitations and/or requirements may be imposed". This includes "Storm Water Management Programs" that are "designed to reduce the discharge of pollutants" from sewer systems to the "maximum extent practicable", and "to protect water quality and to satisfy the appropriate water quality requirements of the Illinois Pollution Control Board Rules and Regulations". Citgo/PDV claimed that this provides a clear framework for IEPA to implement the BMP approach in Citgo/PDV's proposed regulatory amendment. PC 1402 at 11.

Citgo/PDV also claimed that the BMP approach could be "interpreted as an interim step to a TMDL" and, since nearly all major stormwater run-off in CAWS is subject to permitting requirements, could be implemented "without new regulations beyond [the] docket". PC 1402 at 11-12. Citgo/PDV explained that this could be done if the Board were to "broaden the applicability of the BMP requirement proposed by eliminating the requirement that the discharger use an intake from the impaired water body". PC 1402 at 12. The most important aspect of the BMP approach is "that it would allow the discharger subject to a permit to have a mixing zone in return for a BMP-offset condition". This off-setting of excess discharge enables the direct discharger to avoid "causing or contributing" to water quality violations and therefore not be subject to the "no mixing zone rule of Section 302.102(b)(9)". Citgo/PDV also pointed out that "the BMP requirement could be implemented on other sources who perhaps have not previously been concerned with the mixing zone rule". *Id*.

Citgo/PDV then discussed the need for the Board to adopt an alternative chloride standard for winter months. Citgo/PDV pointed out again that the de-icing practices "in and around Chicago and suburban Cook County" make chloride concentrations rise above IEPA's proposed 500 mg/L standards nearly every winter. *Id*. Citgo/PDV cited IEPA's categorization and the Board's adoption of the CSSC and Brandon Pool as ALU B waters to illustrate its point that uses of a waterway should be considered before water quality standards are created to protect those uses. Citgo/PDV also pointed out that it participated in Subdocket C by providing "substantive suggestions" and testimony that focused on the Lower Ship Canal, including an assessment of the aquatic life in the vicinity of Citgo/PDV. PC 1402 at 13.

Citgo/PDV argued that it could provide values (calculated by its experts Huff and Huff using data from the CSSC) that satisfy protective measures for designated species during winter months in both chronic and acute conditions. These levels are as follows: 624 mg/L for chronic value and 991 mg/L for acute value; for regulated purposes: 620 mg/L for chronic value and 990 mg/L for acute value. *Id*. According to Citgo/PDV, "these levels reflect the available toxicity information, with appropriate adjustments for those species that are present and those that are absent". PC 1402 at 14. Citgo/PDV cited the Pre-filed Testimony of Roger Klocek, who described the species present in the CSSC during the winter months. Citgo/PDV claimed that such "evidence demonstrates that, during winter months, levels below 990 mg/L chloride would not be acutely toxic and levels below 624 mg/L chloride would not exhibit chronic toxicity to the species in the Lower Ship Canal, and particularly in the vicinity of the Regulated Navigation Barrier or the Black Safety Zone". As a result, Citgo/PDV urges the Board to adopt chloride limits of 990 mg/L acute and 624 mg/L chronic as a seasonal (from December 1 through March 31) chloride water quality standards for ALU B waters. *Id*.

Citgo/PDV then explained that the proposed 500 mg/L standard for ALU B waters was unsupported by the record, and that the proposed number "lacks any foundation in exhibits or testimony other than what is found in IEPA's original statement of reasons". *Id*. Citgo/PDV asserts that IEPA "failed to provide any substantive response to the contrary evidence" from the record or that which was previously discussed in Citgo/PDV's argument. PC 1402 at 14-15. Citgo/PDV also claims that IEPA's proposal failed to include any discussion focused on the "general presence of chloride in Illinois waters". Citgo/PDV claimed that this "lack of connection between the proposed standard and the situation in Illinois" is both problematic and confusing "given the abundance of information" provided by the Illinois State Water Survey ("ISWS"). PC 1402 at 15. Citgo/PDV provided the "highlights" of the ISWS's report entitled *The Sources, Distribution, and Trends of chloride in the Waters of Illinois* to illustrate that "highway de-icing salts are the largest single source of chloride being introduced in the environment in Illinois and particularly in CAWS". Again, Citgo/PDV asserted that it is the Chicago area upstream of Citgo/PDV that discharges "hundreds of thousands of tons of chloride per year" into the CSSC. PC 1402 at 15.

Citgo/PDV pointed out that IEPA had admitted to proposing the 500 mg/L standard because this standard had already been in place for general use waters. *Id*. The Refinery also drew attention to the fact that both IEPA and USEPA had considered a chloride standard recently adopted by Iowa, but that USEPA was "having second thoughts" because of "agency interplay", where the Iowa standard could not be approved if it were adopted by IEPA. PC 1402 at 15-16. Citgo/PDV claimed that this "should not and cannot serve as the basis for simply defaulting to the existing general use standard without any appropriate analysis", and that such "lack of rationale and justification for IEPA's proposed standard is simply unacceptable". PC 1402 at 16. Citgo/PDV asserted that USEPA can be "looked to for guidance", but "cannot be the basis for the proposed standard when the reality is that USEPA has not adopted any chloride water quality standard at all". This is because USEPA only offers a "criteria" to states. *Id*.

Citgo/PDV also claimed that this chloride criteria is itself in a state of "flux" and that it is "troublesome" that USEPA has not dealt with an "urban, channelized stream such as the CSSC,

particularly the Lower Ship Canal", where "three of its UAA factors for justifying an exception to the 'fishable-swimmable' goal of the Clean Water Act are squarely met". Citgo/PDV cited Mr. Twait, who testified that USEPA's "criteria" (quotations are Citgo/PDV's) did not account for habitat. PC 1402 at 16.

Citgo/PDV concluded its argument for its "winter-time chloride standard" (PC 1402 at 17) by stating that there is no evidence that IEPA "made any effort to remove non-representative species before assessing the appropriate toxicity value". IEPA was also accused of failing to produce any evidence of the calculations used to determine the "unrealistically low", "safe" value if too many species were removed, as it did not include a "single memorandum in which it made any such analysis". *Id*. Citgo/PDV cited Mr. Klocek again, who demonstrated through his analysis and proposal that "the notion of an unrealistically low 'safe' value is supported by his analysis for winter chloride standards in Use B waters". PC 1402 at 16-17. The study, its calculations, and the species relied upon were not challenged by IEPA. PC 1402 at 17.

Next, Citgo/PDV outlines the technical feasibility and economical reasonableness of its BMP approach and alternative chloride standard. It begins its argument by stating that IEPA "did not meet the burden" of proving that its proposed standard was economically reasonable or technically feasible, having "generally failed to address these issues". This is because IEPA "limited its testimony to USEPA criteria documents for protection of aquatic species", and because it "presented testimony without regard to the particular uses for a stream segment". It also failed to incorporate the impacts of "upstream sources of chloride [causing] a discharger to lose the ability to have a mixing zone" on how its proposal meets technically feasible and economically reasonable requirements. *Id*.

Citgo/PDV claims that it will be "adversely impacted by IEPA's proposed chloride and mercury water quality standards". It explains that it is a "minute contributor to the chloride loadings in the CSSC", as it contributes "less than 0.2% of the chloride loadings in the CSSC during snow melt events". Citgo/PDV claims that the costs to remove the chloride from the discharge during snow melt are "extremely large and wholly disproportionate to any benefits". Citgo/PDV emphasized that these costs are actually "tremendous", and clearly implied that they are unnecessary by stating that they account for "only a fraction of the economic impact that the proposed water quality standards will have". PC 1402 at 17-18.

Citgo/PDV explains that if the Board were to adopt the proposed chloride standard, it would create a "scenario" where IEPA would then need to issue an NPDES permit that imposed a 500 mg/L chloride water quality limit only when the CSSC is above 500 mg/L chloride. According to Citgo/PDV, this means it would have three options. The first would be to install "reverse osmosis on the high chloride wastewater streams with a multi-effect evaporator on the reverse osmosis reject stream". The second is to "hold the two streams that contribute chloride, which are the crude unit desalter and the zeolite regeneration stream". The Refinery claimed that the "capital cost" for pretreatment, followed by reverse osmosis and evaporation of the reject stream from the reverse osmosis units for these two streams, is an estimated $42 million. The Refinery ultimately found fault with the proposed standard because "despite such significant capital expenditure, neither of these options would resolve the issue 100% because chloride from

other incidental sources would still affect Citgo/PDV's effluent, making compliance with the 500 mg/L effluent limit unachievable". PC 1402 at 18.

The third option entailed literally storing the "entire effluent until there is a sufficient assimilative capacity in the CSSC to discharge". Citgo/PDV claims that this period would take three weeks, because "holding 5.79 million gallons per day for 21 days would require a holding capacity for 122 million gallons of water". According to Citgo/PDV, there is "simply no room for such a retention basin at Citgo/PDV. The closest conceivable area would be south of Citgo/PDV, and it would still necessitate the construction of a pump station and a force main as well as the permitting of a new outfall. This would essentially be a 20-foot deep pond occupying about 19 acres, along with a road and a fence. Citgo/PDV estimates the cost of such a basin to be $21 million, along with "substantial land acquisition costs" and operating costs. *Id*. Citgo/PDV claims that this project would take a minimum of five years to complete due to the need for "rock excavation, land purchase and the process associated with securing appropriate easements". PC 1402 at 18-19. Citgo/PDV notes however, that the most significant flaw in this plan is that the $21 million expenditure "would not remove any chloride from the CSSC"; it would only "retard any contribution from Citgo/PDV during periods when the chloride are above 500 mg/L". PC 1402 at 19.

In order to find a solution to this issue, Citgo/PDV urges the Board to adopt the aforementioned BMP approach and alternative chloride standard for winter months. Citgo/PDV clarified that this could "either be a final result or it could be structured as an interim measure, assuming the Board adopts a chloride standard which cannot be met . . . and would lead to a TMDL study". Citgo/PDV claims that there is "no reason to prolong the number of years" spent seeking variances from the Board. That is why it proposed an "appropriate and protective seasonal water quality standard as well as an interim set of measures to reduce further snow melt loading of chloride". *Id*.

Next, Citgo/PDV expresses its desire to have the mercury standard modified from the language proposed. It claims that IEPA failed to supply any justification or supporting evidence" with respect to technical feasibility or economic reasonableness for the mercury standards in its proposal. It also claims that there is no evidence in the record that shows "how the Human Health Standard of 12 nanograms per liter protects aquatic life, or even human health with respect to dischargers in CAWS, including the CSSC". *Id*.

Citgo/PDV claims that "atmospheric deposition of mercury is the source of nearly all the mercury loading to Illinois' waters". The Refinery cited Lial Tischler, an expert who testified in December on the behalf of ExxonMobil. Tischler claims that "impairment of surface waters by point source dischargers is almost non-existent". Citgo/PDV also claimed that "with few exceptions, states and USEPA have consistently documented that impairment of water quality by mercury is caused by atmospheric deposition and not by point sources". PC 1402 at 19-20. Citing a USEPA publication from 2001, Citgo/PDV explained that "only control of the atmospheric deposition of mercury would reduce fish tissue concentrations of mercury to acceptable levels in the vast majority of U.S. watersheds". PC 1402 at 20.

Citgo/PDV also cites Marcia Willhite, who in her testimony before the Board in R06-25 explained that, "the total of all wastewater dischargers to receiving streams and rivers in Illinois provide an average annual loading of 45 pounds of mercury per year". This, according to Willhite, made up "only 0.64% of the total annual emissions of mercury (7,022 pounds per year) from coal-fired power plants in Illinois" (2002). Citgo/PDV therefore claims that "even if point source dischargers all achieved the applicable mercury water quality criteria at the 'end of pipe' on a water body that is impaired by mercury, they would still have no measurable effect on the extent of the impairment". *Id*.

Citgo/PDV claims that the elevated levels of mercury in the CSSC are actually a product of re-suspension of sediments from higher ground. Citgo/PDV cited some sampling from 2008 and 2011, in which it was discovered that total dissolved mercury levels were low, but total mercury averaged 9.59 ng/L. It was noted that 20% of the time, the flow was above the harmonic mean, and the total mercury exceeded 12 ng/L. Four of the six samples during periods of flows above the harmonic mean exceeded the 12 ng/L proposed standard. Citgo/PDV therefore noted that basically, "67% of the time of high flows, there was an exceedance of the proposed standard". *Id*. This was attributed to "re-suspension of sediment during higher flow periods". PC 1402 at 20-21. Citgo/PDV claims that "these events would be a violation of the proposed mercury water quality standard". This is interpreted to mean that "even though a discharger, like Citgo/PDV, would have nothing to do with stream flows above the harmonic mean nor the re-suspension of contaminated sediments, because the water quality upstream. . . exceeds the proposed water quality standard, Citgo/PDV would not be allowed a mixing zone for mercury". Thus, Citgo/PDV came to the conclusion that "the imposition of the 12 ng/L standard during periods when the flow is above the harmonic mean makes no sense technically, because to achieve this standard during higher flow periods [dredging of the CSSC is required]". PC 1402 at 21.

Citgo/PDV then outlined the "substantial" costs of meeting point source control of mercury and how it ultimately "[produces] no meaningful benefit". Citgo/PDV again cites Mr. Huff again, who summed up the costs of backwash stream management and ultrafiltration to be approximately $18.5 million and between $39 and $147 million dollars, respectively. Most of these costs depended on "significant engineering issues" and accumulation. *Id*. Citgo/PDV therefore claims that it would need to treat the Design Average Flow (5.79 mgd) and bypass higher flows to meet a 12 ng/L mercury limit when the influent already averages 9.59 ng/L. PC 1402 at 22. It estimates this would cost from $13 to $47 million dollars. Citgo/PDV claimed that such an "expenditure would effectively reduce the net mercury contribution from Citgo/PDV from 0.075 pounds per year to no net contribution". This, according to Citgo/PDV, is an "infinitesimal share of the mercury in Illinois' waters". *Id*.

Citgo/PDV also claims that IEPA "[had] not presented any information about the amount of mercury coming from point sources. . .compared to airborne sources into CAWS". Citgo/PDV stated once again that a "key source of mercury in the CSSC is the re-suspension of sediments during high flow conditions", and that those deposits "occurred long ago and are not something that a current discharger. . .can control". Citgo/PDV cited the evidence presented in the 2008 and 2011 sampling to illustrate this point. It also claimed that it is "important to note that the proposed standard for mercury assumes fish consumption by humans and would already

be violated due to the existing sediment contamination". Citgo/PDV also claims that IEPA failed to acknowledge this or make a "causal connection between the standard and the reality of the environment in the Lower Ship Canal". Because IEPA has the TMDL process "by which the sources of mercury would be inventoried and a waste load allocation derived", Citgo/PDV claims that this could "provide the costs and funding sources to address pre-existing conditions such as mercury in sediments in CAWS". *Id*.

Citgo/PDV urges the Board to "take into account that fishing is not a known, or for the most part, even possible activity in the Lower Ship Canal", particularly in the "vicinity of the Regulated Navigation Area". *Id*. This was claimed to have been demonstrated by Citgo/PDV's video and testimony of Bruce Nelson, as shown in Subdocket C. PC 1402 at 22-23. According to Citgo/PDV, "fishing is simply not a realistic activity in this area, nor would it be a fruitful one. . .based on the present configuration and aquatic life". PC 1402 at 23. It therefore claims that "any concern centered around this fishing activity is based on pure speculation and [is] unsupported by any information in this record". It notes that the Board had "already decided that the Lower Ship Canal, and the Des Plaines River down to the Brandon Road Lock and Dam is a 'Non-recreation' water body", having been defined as "a water body where the physical conditions or hydraulic modifications preclude primary contact, incidental contact and non-contact recreation". Citgo/PDV urges the Board "not to include the Human Health Standard for mercury with respect to ALU B waters, "or at least those ALU B waters that have a use designation of Non-recreation". *Id*.

In the event that the Board does adopt the Human Health Standard for mercury, Citgo/PDV urges that the Board consider modifying the language proposed by IEPA. It provided the following example:

> The human health standard (HHS) for the chemical constituents listed in subsection (f) shall not be exceeded when the ~~stream flow is at or above the harmonic mean flow pursuant to section 302.658 nor shall an~~ annual average <u>of the stream flow</u>, based on at least eight samples, collected in a manner representative of the sampling period, exceed the HHS except as provided in subsection (d). *Id*.

Citgo/PDV claims that the "principal problem with the language as proposed by IEPA is that it unduly weights high flow conditions, which, in the case of the CSSC is likely affected by storm conditions and resuspension of sediments". Citgo/PDV claims that its proposed revision offered a solution to this issue. *Id*.

Citgo/PDV then states that there are "two clarifications [that] the Board should make with respect to IEPA's approach to Subpart F". PC 1402 at 24. The first clarification would be applied to the Lower Ship Canal and the Lower Des Plaines River from Lockport Lock and Dam to the Brandon Road Lock and Dam. It refers to the human health criteria in Sections 302.642 through 302.658. Citgo/PDV claimed that these are "confusing and contrary to the 'Use' designations just established by the Board in Docket A". The second clarification the list of toxic substances proposed by IEPA. If the Board were to add this list, Citgo/PDV would urge it to "make clear that the species to be assessed. . .be the resident species". Otherwise, according

to Citgo/PDV, "the meaning of ALU B will be lost in applying the 'derived from criteria' under Subpart F". *Id.*

Citgo/PDV cites Section 27 of the Act, which takes into account matters such as "existing water quality and the technical feasibility and economic reasonableness of reducing pollution", when promulgating a rule. According to Citgo/PDV, "IEPA has not presented any information on these factors with respect to the application of Subpart F." Citgo/PDV stated that "the CSSC and other ALU B waters. . .clearly have differentiating conditions, with extensive man-made influences and effluent dominated streams, which are not typical of any other waters in the State of Illinois". Citgo/PDV claims IEPA "simplistically [attempted to] delete the phrase 'General Use' in Subpart F and thus bring in all of Subpart F into application for ALU B waters". Citgo/PDV disagrees with this approach, and therefore "for all of the reasons set forth herein, as well as the record in Subdocket D", it urges the Board not to adopt IEPA's proposed language. *Id.*

Next, Citgo/PDV focuses its attention once more upon the human health issues discussed in portions of Subpart F. *Id.* According to Citgo/PDV, "the Human Health criterion under 302.642 is intended to protect humans 'from adverse effects resulting from incidental exposure to, or ingestion of, surface water. . .and from ingestion of aquatic organisms taken from surface water. . .". PC 1402 at 25. Citgo/PDV claims that this same language was used in Section 302.651, regarding the Human Nonthreshold Criterion, and apparently there are "other sections in this sequence from Subpart F" that focus on the effects on human health due to "exposure or ingestion of the surface water. . .". Citgo/PDV takes issue with this because the Lower Ship Canal and the Lower Des Plaines River to the Brandon Lock and Dam are "designated as 'Non-recreation' waters". According to Citgo/PDV, Non-recreation waters are defined as "a water body where the physical conditions or hydraulic modifications preclude primary contact, incidental contact and non-contact recreation". Therefore, the Lower Ship Canal is "by definition not the kind of water body for which human health criteria and regulatory terms would apply" and therefore, "Subpart F should not apply to such 'Non-recreational' water bodies". *Id.*

According to Citgo/PDV, "the 'non-recreational' status of the Regulated Navigation Area should be obvious". Due to the Black Safety Zone, boating and incidental contact activities have been "strictly regulated" to ensure that people not get swept into the Black Safety Zone and suffer injury or death. Citgo/PDV notes that IEPA admitted to having no knowledge of any fishing that occurred in the RNA upstream of the barrier. However, Citgo/PDV claimed that no fishing would occur in the Black Safety Zone, and that it is "clear that along the Regulated Navigation Zone, there is no means for public access into the Lower Ship Canal". *Id.* Citgo/PDV therefore claims that "even if IEPA or the Board decided to change the Recreational Use designation of the Lower Ship Canal, the result [would be] the same with respect [to] the Regulated Navigation Zone". PC 1402 at 25-26.

Citgo/PDV sums up its discussion of Subpart F by citing Mr. Twait's testimony regarding IEPA's consideration of resident fish species. According to Mr. Twait, "if a resident or indigenous species wasn't available, then [IEPA] would look for a species that is similar, same genus, same family and same tolerance". Citgo/PDV claims that for ALU B waters, this would "by definition, be tolerant species". It claims that "at minimum, if IEPA's language in Subpart F

is adopted as to aquatic life, a reference to IEPA's testimony with respect to the intent of proposed amendment to sections 302.410 [derived standards] and 302.601 should be included". Citgo/PDV concludes its argument by stating that "if the Board [were to conclude] that. . .Section 27 requirements have been satisfied with respect to Subpart F", Citgo/PDV would "urge the Board to either not strike through the reference to 'General Use' in 302.601", or to replace it with the phrase "except for Non-Recreational Waters". PC 1402 at 26.

PC 1410

The May 14, 2014 response provided by Citgo/PDV proposed specific regulations in the alternative to those proposed by IEPA. "With respect to issues relating to the proposed water quality standards in this proceeding", Citgo/PDV believes that IEPA failed to provide the requisite information required by Section 27 of the Act. Citgo/PDV claims to have participated in all of the hearings which bear on these issues, and to have presented extensive testimony in support of these alternative regulations. PC 1410 at 1.

Citgo/PDV's response discusses "specific matters raised by IEPA and USEPA", and focuses particularly on the proposed seasonal (winter-time) water quality standard for chloride and the BMP-offset based rule for mixing zones. PC 1410 at 1. According to Citgo/PDV, "the [IEPA] has proposed the same change to the proposed human health mercury standard" that Citgo/PDV suggested as an alternative. Citgo/PDV asserted that "even if the Board were to choose to use the 'secondary contact' denomination for the non-recreational waters, (which was considered acceptable by USEPA), its "argument in the memorandum. . .submitted on April 30, 2014 with respect to 'Non-recreational' waters applies equally well". *Id*.

First, Citgo/PDV reiterates its prior comments urging the Board to adopt the seasonal winter-time standard for chloride that Citgo/PDV proposed as an alternative. Citgo/PDV also adds that IEPA and USEPA could "generally" revisit the seasonal standard once they are prepared to propose a change to the 500 mg/L chloride standard. PC 1410 at 2. Citgo/PDV includes Huff & Huff's comments concerning the proposed winter-time standard in Attachment I. In this attachment, Citgo/PDV emphasizes the results of a stream survey meant to ascertain the presence of *Ceriodaphnia*. According to Huff & Huff's data, *Ceriodaphnia* was not present in the Lower Ship Canal. Citgo/PDV claims this indicates that USEPA's reference point in its comments, which was a mile downstream of the Lockport Lock and Dam, is a poor comparison to the Lower Ship Canal. *Ceriodaphnia* prefers warmer waters, and the Lower Ship Canal was found to have a mean winter temperature of 39.9 degrees Fahrenheit. This explains why "not a single *Ceriodaphnia* [was] found in the three sampling events near Citgo/PDV". *Id*.

Citgo/PDV claims that IEPA did not want to exclude *Ceriodaphnia* because "exclusion of this species may not be protective of other resident species". PC 1410 at 2. However, according to Citgo/PDV, "IEPA does not even provide an example, let alone assert that there are other resident species present". PC 1410 at 2-3. Citgo/PDV points out that Huff & Huff used a methodology that depended on which species of Daphnia were present in the CSSC, rather those species which are "rarely found, even in summer months, and [have] not been detected in the winter months". PC 1410 at 3.

Citgo/PDV then discusses the relative absence of Sphaerium Fingernail Clams, which it claims is "another species [that] is simply not representative of resident species in Use B waters". PC 1410 at 3. Citgo/PDV cites the thirteen biological surveys done by the District from 1975 to 2010 that showed that the fingernail clams *Muscilium* and *Eupera* exist in "moderate numbers in the CSSC", but that *"Sphaerium* fingernail clams are at best, a rare visitor to the CSSC". Citgo/PDV also cites Roger Klocek, who concluded that "the regular presence of *Musculium* fingernail clams and the relative absence of *Sphaerium* clams in the CSSC lend scientific credibility" to Citgo/PDV's suggestion to "use the former, and not the latter, in the recalculation study submitted to the Board in the December 17 hearing". Citgo/PDV also claims that USEPA failed to examine the record with respect to its comments pertaining to *Lampsilis Mussel*. The *Lampsilis Mussel* was not included in the updated site specific calculations because "they do not occur in the CSSC", which Citgo/PDV attributes to the "infestation of the zebra mussels". *Id*.

Citgo/PDV concludes its discussion on the adoption of its proposed winter-time chloride standard by stating that "Huff & Huff addressed each of USEPA comments in detail", and that it "followed USEPA guidance meticulously". PC 1410 at 4. Citgo/PDV finds fault with what it claims is USEPA's insistence on "saying that more sensitive species *could* be present, as opposed to Huff & Huff using what *is* present" (emphasis in original). *Id*. It is "surprising" to Citgo/PDV that IEPA would propose that there exist no chloride standard during the winter months, when "IEPA knows or ought to know, that such is NOT approvable by USEPA" (emphasis in original). *Id*. Citgo/PDV cites the lack of a winter-time TDS standard as the reason for why USEPA "disapproved of the Citgo/PDV variance" . *Id*. It also notes that "IEPA testified that USEPA would not approve the 500 mg/L standard even for non-winter months". It is therefore "curious" to Citgo/PDV that "IEPA would criticize Citgo/PDV on not knowing what USEPA might approve". *Id*.

Next, Citgo/PDV claims that IEPA and USEPA "misunderstood the BMP-offset approach [they] suggested". PC 1410 at 4. Citgo/PDV claimed its BMP approach is "consistent with federal law and provides a necessary relief for dischargers to effluent dominated waters". Citgo/PDV claims that neither IEPA nor USEPA "can deny that the Lower Ship Canal is an effluent dominated stream", and that "snow melt runoff is the principal source of chloride in the Ship Canal". *Id*. Citgo/PDV is therefore "disappointed" that IEPA has "not been willing to meet to investigate [Citgo/PDV's] proposal, even though Scott Twait testified [that] the [IEPA] would be open to considering a mixing zone proposal". PC 1410 at 4-5.

Citgo/PDV claims that its "off-set proposal using BMP is a reasonable tool", and that the "Ship Canal would not exist [if not] for man-made changes". PC 1410 at 5. Citgo/PDV admits that it knows that TMDL studies take a long time, and that "effluent-dominated water bodies need another approach than the existing mixing zone rule". Citgo/PDV cites the three Citgo/PDV variances decided by the Board as to why "the concept of using BMP for chloride has been chosen as a realistic tool for compliance". Citgo/PDV claims that "[the BMP approach] is practical and brings in non-point source and stormwater sources into the process of reducing chloride dischargers". *Id*.

Citgo/PDV claims that "chloride levels in snow melt is the cause of the elevated chloride levels", and therefore "reducing those discharges through the use of BMP is practical and can be

done quickly using existing permit procedures". PC 1410 at 5. Citgo/PDV explains that their mixing zone proposal is "one part of the BMP approach and would allow the re-issuance of existing NPDES permits without the long and expensive efforts involved in variances (which USEPA would likely reject) or a TMDL study". *Id*.

Citgo/PDV asserts that "USEPA's comments with respect to the Citgo/PDV BMP/mixing zone proposal suggests that it is consistent with federal law". PC 1410 at 5. Citgo/PDV emphasizes that its mixing zone is "quite small", and that it meets USEPA criteria of being "turbulent or other conditions within the mixing zone [that] ensure that aquatic life [resides] within the mixing zone for a period of time shorter than the exposure period necessary to observe a chronic effect". Regarding "chronic levels", Citgo/PDV provides the testimony of Huff & Huff, who show in Attachment I that "chloride levels below 624 mg/L are protective on a chronic basis and below 991 mg/L are protective on an acute basis, during the winter months". *Id*.

Citgo/PDV clarifies that it is "not proposing that chronic criteria be exceeded outside the mixing zone", because the "BMP measures which are the heart of the proposal are designed to be an 'off-set' or reduction of chloride use". PC 1410 at 6. According to Citgo/PDV, its BMP approach would offset the amount of chloride discharged above 500 mg/L when the CSSC exceeds 500 mg/L, which would mean that "the discharger would not be causing or contributing to water quality violations". These "offsets" would occur during storm events and after snow melts, because it is during these times that the CSSC has elevated chloride levels. *Id*.

Citgo/PDV also claims that "the relative share of chloride from [its] discharge to the Ship Canal is 0.2% of the quantity in the Ship Canal". PC 1410 at 6. This is because the "sampling precision at the average chloride concentration when above 500 mg/L is 15 mg/L, compared to less than 10 mg/L contributed at the edge of the mixing zone by Citgo/PDV". According to Citgo/PDV, this "contribution cannot be measured, it can only be calculated, and these amounts are before the reductions achieved by the BMP". Citgo/PDV claims that "using an offset approach quantifies the benefit and chloride reduction from the BMP during the same events that the Ship Canal is elevated", and "therefore, the discharger cannot be said to be 'causing or contributing' to a water quality violation". Citgo/PDV clarifies, however, that "by the time the Lower Ship Canal mixes with the Des Plaines River, [one] would expect a substantial decline in chloride levels in the combined waters, since the area drained by the Des Plaines River is less urbanized than the area drained by the CSSC". *Id*.

Citgo/PDV claims that it has "tried to engage IEPA on this proposal", but that IEPA wants to meet with USEPA first. PC 1410 at 6. However, Citgo/PDV offers that it is "not wedded to the mixing zone as the regulatory solution". PC 1410 at 7. Rather, the BMP approach it proposed is "a method that would avoid the gridlock of the mixing zone rule in the Ship Canal and other effluent dominated streams". This is because "the chloride sources are upstream and the road salt is the source". Citgo/PDV claims that its proposal provides a "tool that could be easily implemented through permitting". *Id*.

Citgo/PDV does approve, however, of IEPA's proposed change to the HHS for mercury, "which is identical to the alternative approach [Citgo/PDV] proposed in [its] April 30

comments". PC 1410 at 7. Citgo/PDV supports IEPA's proposal to amend the Harmonic Mean mercury standard as stated in IEPA's April 30 comments. According to Citgo/PDV, "this leaves the sole question [of] whether mercury [that] discharges into a receiving stream that meets the 12 ng/L mercury standard on an annual basis is eligible for a mixing zone". Citgo/PDV claims that "a simple reading of the Board's regulation would conclude 'yes' to this question, but IEPA's interpretation has not been consistent with the language in the regulations". Citgo/PDV therefore asserts that "the Board has an opportunity to clarify this question", and "[eliminate] this issue from future appeals before the Board". *Id.*

Finally, Citgo/PDV raises a concern regarding the Lower Ship Canal and the RNA's designation as "non-recreational" or "Secondary Contact" waters. According to Citgo/PDV, "while IEPA has not made any proposal to change the Board's decisions with respect to recreational use designations, USEPA seems to suggest it wants a change made". PC 1410 at 7. Citgo/PDV states that "absent some formal process which is allowed by the Environmental Protection Act, that the existing decisions on recreational uses are the law and the designated uses". PC 1410 at 8. However, Citgo/PDV claims that "with respect to the Lower Ship Canal and Restricted Navigation Area, it really does not matter whether the designation is 'non-recreational' or 'Secondary Contact', [because] the proposed human health exposure criteria should not be adopted for these Non-Recreational waters". "It [also] does not matter if the name reverts to Secondary Contact" because "IEPA has submitted no evidence to justify those requirements as water quality standards". Citgo/PDV states that therefore, the proposed rules "should not be adopted because they are unjustified". Citgo/PDV claims that these rules are "contrary to decisions the Board has already made in Docket A", and "have not been supported by any evidence or other section 27 factors in this proceeding". *Id.*

Citgo/PDV concludes its comments by stating that it "respectfully requests the Board adopt the alternative suggestions" discussed, which includes the "Winter Chloride Criteria for the Ship Canal; [the] BMP-offset rule as an alternative for dischargers into effluent dominated waters; and the alternative language for the mercury HHS; and to decline to adopt certain water quality standards for nonrecreational/secondary contact waters". PC 1410 at 8.

ExxonMobil

PC 1398

On behalf of ExxonMobil, Lial Tischler provides responses to requests for information made by the Board at the December 17, 2013 hearing. Mr. Tischler was asked to provide greater clarification regarding the fish species used in the Yoder Report and the "exact objection to the fish he uses" and to provide "a list of fish that you think should have been considered". PC 1398 at 2.

Mr. Tischler explains that the authors of the Yoder Report, Yoder and Rankin, prepared lists of fish species that were based on the "authors' assessment of fish species that would be representative of three types of habitat". *Id.* at 2. These include a warmwater habitat group consistent with Illinois' General Use standards; a group that reflects the habitat in the impounded

portions of the LDPR (modified use); and a group that represents the more limited conditions of the Illinois Secondary Contact and Indigenous Aquatic Life use waters. *Id.*

Mr. Tischler states that the maximum UDIP temperature standard proposed by IEPA is based on the "Modified Use "resident" population of 27 species postulated by Mr. Yoder and Rankin. *Id.* at 3. He opines that this list of "representative" species was not compared to the species that actually exist in the UDIP, based on studies conducted by contractors for Midwest Generation. Mr. Tischler provides a list of fish species that he believes "would be appropriate for calculating maximum temperature standards for the UDIP aquatic life use". This list consists of 14 species "found by electrofishing and seining collections in the years 2000-2004 that were present in the UDIP in numbers exceeding 50 animals for at least two of the five years". *Id.*

Mr. Tischler states that this list of 14 fish species "could have been evaluated to represent actual representative species in the UDIP". *Id.* at 4. Mr. Tischler explains that this list of 14 species "is simplified, by intent, because it only represents species found in significant populations in the UDIP that are adapted to the unique physical and hydrological characteristics of this water body". *Id.*

Mr. Tischler also responds to the request for regulatory language from mercury rules used in Indiana, Ohio, and New York. *Id.* at 4. He notes that ExxonMobil is evaluating three examples and researching variances from other states and provides the text for each of three examples being examined. This includes the mercury variance rule codified by Indiana and Ohio, and New York's multiple discharger variance rule. *Id.*

PC 1406

ExxonMobil explains that water quality standards for Subdocket D were "driven in part by ALUs, which were adopted by the Board in Subdocket C." PC 1406 at 1, citing Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(C), (Feb. 6, 2014). Subdocket C recognized the uniqueness of the UDIP, and justified the need for "unique" water quality standards. ExxonMobil claims that this uniqueness grants the Board "flexibility when adopting water quality standards and rules implementing water quality standards for the UDIP." *Id.*

ExxonMobil states that there are conditions in the UDIP that ought to be considered before adopting water quality standards and "regulatory relief mechanisms", as those conditions highlight the "need to scrutinize" certain standards proposed by IEPA and the adoption of alternative proposed standards. PC 1406 at 2. ExxonMobil expresses a need for regulatory relief mechanisms because it has concerns about impacts on dischargers. *Id*.

ExxonMobil provides a detailed outline of its comment, beginning with its renewed support of a separate subdocket for chloride, its recommendations and opinions regarding IEPA's proposed chloride standard for the UDIP, the feasibility and implementation of IEPA's proposed standard for mercury for the UDIP, IEPA's proposed thermal standards, and finally the Board's "flexibility" when adopting regulations in Subdocket D. PC 1406 at 2-3.

New Subdocket for Chloride. ExxonMobil supported IEPA's request for a separate subdocket for the development of a chloride standard and addressed the Board's decision to decline from creating a new subdocket. PC 1406 at 4, citing Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9D, (Mar. 6, 2014). ExxonMobil disagrees with the Board's decision and assessment of information in the record regarding chloride, arguing that the majority of the record addresses "issues other than chloride." *Id*. at 5.

ExxonMobil argues that there are a number of factors that support a decision to open a subdocket for chloride, including the fact that UAA viewed chloride as a "parameter that met the General Use water quality standard." PC 1406 at 5. ExxonMobil notes that Mr. Twait acknowledged that "there will be periods of non-compliance in the system due to deicing," and that USEPA was unwilling to approve any of the standards that had been considered by IEPA up to that point. *Id*., citing 9/23/13Tr. at 77-78. ExxonMobil urges the Board to address this issue in a new Subdocket, which "takes on added significance since any chloride standard adopted by the Board will be the first chloride standard to apply to the UDIP". *Id*. Because of "recent refocus" on water quality standards and testimony that revealed "severe concerns with the feasibility and approvability of the proposed chloride standard," ExxonMobil requests that the Board reconsider its decision not to open a subdocket for chloride. PC 1406 at 6.

Board's Findings in Subdocket C. ExxonMobil opines that the Board's decision to adopt a UDIP ALU designation noted the fact that "the UDIP does not presently fully attain the CWA aquatic use goal." According to ExxonMobil, this "allows the Board to consider conditions that are unique to the UDIP when adopting water quality standards in Subdocket D." *Id*. ExxonMobil claims that to do so would be "consistent with previous findings in Subdocket C," in which it was determined that "particularly in the area of temperature, water quality standards may need to be adapted for the UDIP." PC 1406 at 6-7. In summary, ExxonMobil "encourages the Board to embrace the flexibility of its finding in Subdocket C" because "the numeric and narrative water quality standards for the UDIP ALU that are being considered in Subdocket D can. . .properly represent the unique, site-specific physical, chemical and ecological conditions that are thoroughly documented in the extensive record for Subdocket C." PC 1406 at 7.

Chloride Standard. ExxonMobil explains that non-point and non-industrial sources, particularly deicing, contribute to elevated chloride levels and exceedances of the chloride standard in winter months. PC 1406 at 7. Because there is no "immediate replacement for salt," ExxonMobil claims that the "reduction of chloride in the system will not occur in the immediate future and will need to be achieved through massive initiatives beyond the scope of the standard NPDES permitting process." PC 1406 at 7-8. ExxonMobil therefore urges the Board to consider adopting a standard that "recognizes this use of the UDIP and is still protective of the ALU or, in the alternative, adopt an appropriate relief mechanism for point source dischargers that will allow time for [IEPA] to address non-point source impacts, which are the actual cause of elevated chloride levels." PC 1406 at 8. ExxonMobil claims that the Board has "flexibility on the type of

standard it may adopt," and provided "workable criteria" and proposed approach by Citgo Petroleum Corporation to illustrate this claim. *Id*.

ExxonMobil opines that "reducing or replacing salt would be long-term proposition," but IEPA cannot "simply reduce limits in NPDES permits since the source of salt is non-point sources." PC 1406 at 9. According to ExxonMobil, "load allocations would have to be distributed through a total maximum daily load ("TMDL") process," but IEPA's "resources for such an undertaking are limited, so meaningful reductions of chloride will likely occur in the distant future." *Id*.

ExxonMobil argues that USEPA described a similar situation in which a "human-caused source of pollution" prevented the attainment of DO criteria for part of the CAWS. PC 1406 at 9. According to ExxonMobil, "human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place." PC 1406 at 10. ExxonMobil explains that this much the same with chloride, and therefore urged the Board to adopt an aquatic life water quality criterion that is "consistent with. . .current conditions," and temporarily relies on "human-caused conditions UAA factor." ExxonMobil admits that "this may be considered a temporary bridge to a permanent solution in the future." *Id*.

ExxonMobil also argues that waterways exist in which elevated chloride concentrations can be "consistent with. . .CWA Section 101(a) requirements" and remain "protective of aquatic life use." PC 1406 at 10. ExxonMobil explains that USEPA has approved and other states have consequently adopted chloride standards that "apply to water segments that have a high aquatic life use but also elevated chloride concentrations." *Id*. ExxonMobil claims that this approach "makes sense for UDIP ALU waters since there is no low 'natural' baseline of chloride levels for the effluent dominated waters and the existing aquatic life clearly is protected under the current regime." PC 1406 at 10-11. ExxonMobil adds that the Board can "revisit such a standard periodically," and could "incrementally lower the chloride standard periodically provided the waterway isn't also limited by other conditions." PC 1406 at 11.

ExxonMobil offers that alternatively, the Board could address chloride with a seasonal or annual standard. PC 1406 at 11. According to ExxonMobil, these standards are "scientifically justified and take into account the elevated concentrations of chloride seen from November through April." ExxonMobil opines that these standards could "work in concert with salt reduction activities on area roads and incremental standard changes by the Board." ExxonMobil points out that "all dischargers have the potential to be impacted by elevated chloride in the waterbody," and therefore it "does not make sense to set an unachievable standard and have individual dischargers request variances." *Id*.

ExxonMobil agrees with Citgo's approach, as long as it is "coupled with a reasonable chloride water quality standards ." PC 1406 at 12. ExxonMobil also requests that the provision be applied to the UDIP ALU waters. ExxonMobil explains that conditions in ALU B waters, much like those in the Greater Chicago Metropolitan Area, experience exceedances of the proposed chloride standard of 500 mg/L. ExxonMobil therefore opines that UDIP ALU waters should also "have access to such relief." *Id*.

Mercury Standard. ExxonMobil criticizes IEPA's claim that UDIP ALU waters are "impaired for mercury," because it was based on analysis of fish tissue samples. PC 1406 at 12. ExxonMobil argues that such data is "outdated and not reflective of water column conditions", and it "creates compliance concerns for dischargers to such impaired water bodies because of mixing zone implications." *Id*. ExxonMobil admits that it was "not aware of commercially available mercury treatment methods that have been demonstrated in full scale application to effluents from either municipal or industrial wastewaters that can meet [IEPA]'s proposed human health standard for mercury of 12 ng/L at the end-of-pipe." *Id*. ExxonMobil is primarily concerned with "achieving compliance with the standard end-of-pipe in the event the Board adopts [IEPA]'s proposed mercury human health standard and no mixing zone is authorized." PC 1406 at 12-13. ExxonMobil therefore proposes regulatory relief from the proposed mercury standard in the form of a "specific level of justification for receiving an adjusted standard." ExxonMobil explains that such an approach is consistent with those from other states. PC 1406 at 13.

ExxonMobil points out that Mr. Twait explained the process to determine impairment for fish consumption under CWA Section 303(d). PC 1406 at 13. ExxonMobil notes that Mr. Twait acknowledged that such a process "did not account for mercury actually present in the water column," and the IDNR and IEPA "have not collected side-by-side samples of fish tissue and water column data that can be used to translate between the two." According to both ExxonMobil and Mr. Twait, IEPA would like to use water column data for mercury, but it "doesn't have such data available." IEPA does however, according to Mr. Twait, have the "ability to go out and collect data", but the numeric water quality standards for mercury would be used for permitting purposes. *Id*.

Mr. Twait went on to explain that when a water body is listed as impaired for a given parameter, IEPA "typically would not allow a mixing zone for the parameter in that water body." PC 1406 at 13. ExxonMobil claims that "where fish tissue data is used to determine compliance, there is no direct connection between the amount of mercury present in the water column and the ability of dischargers to obtain a mixing zone from a water column-based standard." PC 1406 at 13-14. Mr. Twait listed the dates from which fish tissue data was collected, which ExxonMobil cited as the "basis of impairment," as well as Mr. Twait's acknowledgment that the data from 1989 was particularly unrepresentative. ExxonMobil explains that ultimately, "such an impairment determination is based on data that is both irrelevant and outdated for purposes of determining whether a mixing zone is available." *Id*.

ExxonMobil also explains that "the presence of mercury is surface waters is primarily due to sources other than point source discharges." PC 1406 at 14. ExxonMobil claimed that states and USEPA have consistently found that impairment of water quality by mercury is caused by atmospheric deposition rather than point sources. ExxonMobil cited the pre-filed testimony of Mr. Tischler, who presented a 2011 USEPA publication entitled *Mercury Maps* (Exh. 448 at 23). This publication supported his argument that "only control of the atmospheric deposition of mercury would reduce fish tissue concentrations of mercury to acceptable levels in the vast majority of U.S. watersheds." *Id*.

ExxonMobil notes that IEPA acknowledged the "severe impact" of mercury from sources other than point source discharges. PC 1406 at 14. ExxonMobil cites the testimony of Ms. Marcia Willhite, Chief of the IEPA Bureau of Water, from Proposed New 35 Ill. Adm. Code 225 Control of Emissions From Large Combustion Sources (Mercury), R06-25 (Dec. 21, 2006), who stated that:

> It was determined that the total of all wastewater dischargers to receiving streams and rivers in Illinois provide an average annual loading of 45 pounds of mercury per year. This, in comparison, was only 0.64% of the total annual emissions (2002) of mercury (7022 pounds per year), from coal-fired power plants in Illinois. PC 1406 at 15.

Ms. Willhite also acknowledged that "other states have realized large reductions in mercury levels in fish as a result of addressing mercury emissions." ExxonMobil also points out that IEPA has conceded that "resuspension may be occurring due to combined sewer overflows and stormwater runoff." *Id*.

ExxonMobil comments that IEPA may therefore find that "UDIP ALU waters are impaired for mercury due to fish tissue levels, even where water column levels do not exceed the human health standard and fish tissue levels are primarily attributable to sources other than industrial point source discharges." PC 1406 at 15. ExxonMobil points out that "allocations pursuant to the TMDL process" could offer future relief, but the process is long and IEPA does not have the resources to "engage in such undertakings." *Id*. ExxonMobil therefore recommends that IEPA set effluent limits that are equal to the applicable water quality criterion when an NPDES permit is renewed following the Section 303(d) listing "despite having no immediate plan to address the waterway TMDL process [and there being] no actual water column data demonstrating that the mercury standard is in violation." PC 1406 at 15-16.

ExxonMobil claims that since the "promulgation of 35 Ill. Adm. Code Part 225 regarding mercury air pollution controls," IEPA has not determined "whether or not fish tissue levels have attenuated in Illinois." PC 1406 at 16. ExxonMobil also claims that "relying" on the NPDES program of point sources in order to remedy mercury impairments will have "virtually no effect" on the impairment because the source is "a non-point source – atmospheric deposition." ExxonMobil acknowledges that it is not aware of any "commercially available treatment process to treat mercury levels below 12 ng/L." PC 1406 at 16. ExxonMobil cites the hearing, in which it was discussed that of the two industrial dischargers given permits to exceed 12 ng/L, one of them was complaining about unreasonable economic impact. *Id*.

ExxonMobil noted that Mr. Tischler testified to the necessity of relief from the "circumstances surrounding" mercury impairment designations, the proposed mercury water quality standards, and potential mixing zone implications. PC 1406 at 16. Mr. Tischler added that the situation with mercury is "analogous to relief needed from nutrient standards, as indicated by USEPA in the Preamble to the Proposed Clarifications Rule." ExxonMobil claims that "since non-point sources can't be directly regulated by the NPDES program, it may take years to implement non-point source controls for nutrients when you have a body of water that is impaired due to nutrients." *Id*.

Bearing this in mind, ExxonMobil asserts that "some type of regulatory relief is needed." PC 1406 at 17. ExxonMobil explains that other states have adopted "either statewide or water body variances for mercury and in one case a statewide TMDL" to avoid assigning mercury water quality based effluent limits to NPDES permittees that are "technically infeasible and economically unreasonable." According to ExxonMobil, these approaches were approved by USEPA, and they require "point sources to adopt BMPs for mercury control but do not impose infeasible numeric limits in NPDES permits." ExxonMobil explains that these approaches were based on the "lack of viable end-of-pipe treatment and the fact that mercury is ubiquitous in surface water." *Id.*

Mr. Tischler went on to explain that there is an "individual showing requirement for Illinois variances," but in some states, such as Ohio, "if you can't comply with the mercury standard, you are given an interim goal limit that you must meet and [also] certain requirements in terms of mercury minimization plans." PC 1406 at 17. If one meets these requirements, they are subject to a variance without having to provide an individual demonstration showing it is a "potential specific hardship" to try to comply with the standard. ExxonMobil claims that:

> Mercury minimization plans can identify sources of mercury such as mechanical equipment seals and instruments and plans that are in place to reduce the use of mercury containing devices, handling of fluorescent light bulbs and identifying all the potential sources of mercury and having a plan to figure out how to make sure that they don't contribute mercury to the discharge. *Id.*

Based on the approach used by other states, ExxonMobil proposes a "streamlined regulatory relief mechanism for addressing mercury." PC 1406 at 17-18. ExxonMobil worked "within restrictions imposed by the Illinois Environmental Protection Act regarding variances and adjusted standards," and was therefore able to identify the "adjusted standard mechanism as a feasible approach for addressing mercury discharges." PC 1406 at 18. This is because ExxonMobil's adjusted standard approach "provides a regulation-specific level of justification pursuant to 415 ILCS 5/28.1(b)," which was attached in its testimony as Exhibit 1. *Id.*

Temperature Standards. Mr. Tischler explained that ExxonMobil has a "relatively small impact on the temperature of the UDIP." PC 1406 at 18. ExxonMobil states that as long as the waters receiving their discharge meet the proposed thermal water quality standards and "provide for a modest mixing zone", it expects to be able to comply with the proposed thermal standards applicable to UDIP ALU waters. ExxonMobil claims that upstream dischargers jeopardize its ability to rely on a mixing zone because current regulatory relief "cannot be extended to waters that are the subject of this rulemaking." *Id.* ExxonMobil argues that IEPA does not have a "reliable mechanism for accommodating dischargers" such as ExxonMobil, who are downstream of large thermal dischargers. Rather, there is "no clear mechanism for timely bringing large upstream dischargers into compliance before water quality standards apply to downstream dischargers." ExxonMobil also claimed that proposed standards from IEPA are "not necessary to protect species in UDIP ALU waters." *Id.* ExxonMobil therefore urges the Board to adopt "alternative thermal water quality standards and a regulatory mechanism for

permitting large thermal dischargers before requiring compliance from downstream dischargers." *Id*.

ExxonMobil then provides a description of upstream impact and the consequences for ExxonMobil. PC 1406 at 19-20. According to ExxonMobil, thermal discharges from two Joliet generating systems, Joliet 9 and Joliet 29, lead to a 43% increase of effluents in the UDIP approximately one-half mile upstream of the Brandon Road Lock and Dam and approximately seven miles upstream of the I-55 Bridge. ExxonMobil argues that "under low flow conditions, the two power stations are actually recirculating a portion of their effluent to the UDIP back into their intakes," which actually increases the temperature of water that has already been treated by their systems. *Id*.

Mr. Tischler testified that the river temperature in the lower seven miles of the UDIP and the "entire five mile stretch of the Lower Dresden Island Pool ("LDIP") are a function of the thermal discharges from the two power stations." PC 1406 at 19. ExxonMobil claims that "even with the existing temperature standards for the UDIP. . .which are essentially tailored to the existing thermal discharges from the two power stations," Midwest Generation still needed relief due to low flows in the river, extreme hot weather, and high customer demand for electricity. PC 1406 at 19-20.

Mr. Tischler described ExxonMobil's thermal discharge as well, explaining that it enters the UDIP approximately 1,600 feet upstream of the I-55 Bridge. The "once-through cooling water used in the refinery is pumped from the UDIP at a location approximately 1,200 feet upstream of the discharging point," and therefore the Refinery intake water temperature is "governed by the thermal discharges of the two upstream power stations." ExxonMobil explains that the refinery's once-through cooling system and process effluent actually increase the thermal loading of intake water by 104 million British Thermal Units per hour ("MBTU/hr"). Altogether, Midwest Generation adds a heat load of 7,000 MBTU/hr to the river when the supplemental cooling towers at Joliet 29 are not being used, according to ExxonMobil. *Id*.

ExxonMobil notes that preliminary modeling results indicate a maximum temperature rise above the intake water temperature of 0.4° F in the winter and 0.2° F in the summer. PC 1406 at 20. ExxonMobil therefore claims that "in the absence of elevated intake temperatures, the Refinery is able to use the Illinois mixing provisions of 35 Ill. Admin. Code 302.102 to demonstrate compliance with existing UDIP and LDIP water quality standards ." PC 1406 at 20-21. ExxonMobil notes however, that the Provisional Variance granted to Midwest Generation still indicates that the water temperature rises 12.4° F at the Joliet 29 station and 10.7° F at Joliet 9 station. PC 1406 at 21.

ExxonMobil also points out that the Board had indicated in Subdocket C that the UDIP ALU temperature standards would "likely have to be adjusted to acknowledge the existing conditions." PC 1406 at 21. ExxonMobil explains that in 2007, IEPA proposed revised temperature standards for the UDIP at 35 Ill. Adm. Code 302.408 to establish a maximum temperature of 88.7° F and variable average temperatures for 17 separate periods throughout the year. *Id*. ExxonMobil explains that IEPA's proposed thermal standards for the UDIP would be "substantially more restrictive than the General Use standards that apply downstream of I-55."

PC 1406 at 22. ExxonMobil also notes that despite there being two large power stations, the current proposal for the UDIP is "substantially more stringent. . .than the proposal for the upstream ALU B Waters." *Id*.

ExxonMobil outlines several options for the Board to adopt and implement thermal water quality standards in the UDIP. PC 1406 at 22. ExxonMobil claims that under some of the Board's approaches, "smaller downstream dischargers are put in an untenable situation without a reasonable regulatory relief mechanism." *Id*. ExxonMobil notes that Mr. Twait acknowledged that "thermal sources downstream of major upstream thermal sources should not be expected to comply immediately with revised temperature standards for the UDIP." ExxonMobil notes IEPA's "cascading" implementation of the standards, "wherein the major upstream thermal sources would be addressed to assure compliance with the water quality standards so that downstream thermal sources would not have to comply with temperature standards when the water upstream from them does not comply with those standards." *Id*. ExxonMobil also notes that no regulatory mechanism is in place to implement this approach, so it therefore recommended "imposing a thermal demonstration requirement on major dischargers and delaying compliance for other impacted dischargers until such a demonstration is made and its results are implemented." PC 1406 at 22-23.

ExxonMobil provided three approaches:

1. The Board could adopt the existing UDIP temperature standard (currently 35 Ill. Adm. Code 302.408), which is less restrictive than the General Use standard.

2. The Board could adopt the General Use temperature standard, which would be compatible with the current LDIP standard. This action would require some form of relief such as the cascading implementation of the standard and inclusion of regulatory relief to prevent undue hardship to existing thermal sources that are downstream of thermal sources that dominate the river temperature regime.

3. The Board could adopt another set of UDIP ALU-specific temperature standards. This could include the standards proposed by Illinois EPA in Subdocket C Second Notice Comments or a scientifically supported alternative. This action would also require some form of relief such as the cascading implementation and inclusion of regulatory relief to prevent undue hardship to existing thermal sources that are downstream of thermal sources that dominate the river temperature regime. PC 1406 at 23.

ExxonMobil relies on Mr. Tischler, who stated that the Board could justify adopting the existing temperature standards "on the basis of protecting the existing indigenous aquatic life biota." This option, according to ExxonMobil, "recognizes that the Board will have a continuing opportunity to revise the temperature standards in the future". *Id*.

ExxonMobil explains that if the Board alternatively adopted the General Use temperature standards for the UDIP ALU, then the evidence in the record would clearly show that "the standards will not be met on the date of adoption." PC 1406 at 23. However, according to ExxonMobil, this option would also allow IEPA to "require the power stations on the UDIP to perform the demonstration required by the General Use standards at 35 Ill. Adm. Code 302.211(f), in which:

> The owner or operator of a source of heated effluent which discharges 150 megawatts (0.5 billion British thermal units per hour) or more shall demonstrate in a hearing before this Pollution Control Board (Board) not less than 5 nor more than 6 years after the effective date of these regulations or, in the case of new sources, after the commencement of operation, that discharges from that source have not caused and cannot be reasonably expected to cause significant ecological damage to the receiving waters. If such proof is not made to the satisfaction of the Board appropriate corrective measures shall be ordered to be taken within a reasonable time as determined by the Board. PC 1406 at 24.

ExxonMobil explains that this demonstration is necessary because it would apply "for the first time" to the UDIP, and because it would determine whether revised temperature standards and therefore "corrective measures" would be necessary by the power stations. It could also prove whether the existing UDIP temperature standards are already appropriate. ExxonMobil states that if standards are found to be sufficiently protective, they can be adopted in a future triennial review. *Id*.

ExxonMobil explains however, that this plan will "place all thermal dischargers on the UDIP in jeopardy of receiving temperature limitations in NPDES permits in the next permit cycle that cannot be met immediately," and it would therefore constitute an "undue burden." PC 1406 at 24. ExxonMobil explain that:

> In the case of thermal dischargers downstream of the Joliet power stations, such as the Refinery, if temperature limits incorporating General Use temperature standards (or stricter) were placed in their renewed permits, assuming that they could not be granted mixing zones because the river would be impaired for temperature, they would be faced with installing sufficient cooling to achieve the water quality standards end-of-pipe at great expense.

ExxonMobil points out that IEPA acknowledged that "a small downstream discharger may lose a mixing zone if upstream waters are not meeting water quality standards due to a larger upstream discharger." *Id*.

ExxonMobil notes that Mr. Twait indicated that it would be "unfair or unwise to implement revised thermal standards in permits for downstream facilities with a thermal discharge before addressing larger upstream dischargers." PC 1406 at 25. ExxonMobil again cites IEPA's cascading implementation of temperature standards in order to address the "major upstream thermal sources first." Mr. Twait also acknowledged, however, that his approach may raise some concerns. These include different dischargers having different renewal application

deadlines, and how it is "unclear how an NPDES permit modification of a downstream discharger would further disrupt this procedure." *Id.*

ExxonMobil points out that "current regulatory relief extended to Midwest Generation will not relieve its generating stations from newly adopted standards in the UDIP." PC 1406 at 25. According to ExxonMobil, once IEPA was to modify Midwest Generation's NPDES permit, water quality standards would "have to be met at the edge of the mixing zone unless they were granted further relief." Joliet 9 and Joliet 29 stations would therefore have to meet UDIP thermal standards at the edge of their respective mixing zones. ExxonMobil is therefore concerned that the existing regulatory authority to cascade implementation of temperature standards is "unclear and imperfect." *Id*. ExxonMobil explains that "although compliance schedules are available for such WQBELs, these would be inadequate if the major upstream sources could not comply within the typical 3 to 5 year schedule allowed, which is probable in the case of the two Joliet power stations." PC 1406 at 25-26.

ExxonMobil explains that such an inadequacy justifies regulatory relief being built in for downstream dischargers if the Board were to adopt UDIP ALU temperature standards that are "either equal to the General Use standards, or otherwise more restrictive than the existing standards." PC 1406 at 26. ExxonMobil claims that this could take the form of a "demonstration such as that required by Section 302.211(f) and a clarification that until such a demonstration is made and implemented, other thermal dischargers that are impacted by such a discharger need only comply with previously-permitted limits." ExxonMobil provides an example of such a provision:

> The owner or operator of a source of heated effluent which discharges 150 megawatts (0.5 billion British thermal units per hour) or more shall demonstrate in a hearing before this Pollution Control Board (Board) not less than 5 nor more than 6 years after the effective date of these regulations or, in the case of new sources, after the commencement of operation, that discharges from that source have not caused and cannot be reasonably expected to cause significant ecological damage to the receiving waters. If such proof is not made to the satisfaction of the Board appropriate corrective measures shall be ordered to be taken within a reasonable time as determined by the Board. Until this demonstration is complete and necessary corrective measures are in place, dischargers impacted by thermal discharges from such existing sources must comply with water quality standards in place prior to the adoption of these regulations. *Id.*

ExxonMobil admits that single discharger variances are another alternative, but that they would be "cumbersome for all stakeholders (and [IEPA] and the Board)" because individual hardship showing would be required. PC 1406 at 26. ExxonMobil also notes that because of the "interrelationship between thermal dischargers and multiple dischargers that can potentially be impacted, a waterbody-wide regulatory mechanism in the water quality standards itself is most appropriate." PC 1406 at 26-27.

ExxonMobil then addresses the basis for the temperature criteria. PC 1406 at 27. ExxonMobil explains that IEPA's proposed summer UDIP temperature standards from 2007

were based on a report by Yoder and Rankin that used a temperature "model" based on thermal effects data for freshwater fish to calculate average and maximum standards. According to ExxonMobil, the Thermal Report provided temperature standard recommendations for three classes of resident aquatic species ("RAS"), or fish that "may inhabit 'modified use' water" thought to represent LDPR segments. The classes are 1) modified use RAS 1, 2) modified use RAS 2, and 3) secondary contact/indigenous aquatic life. The Thermal Report provides temperature criteria for four proportions of the species in each class. These were 100, 90, 75, and 50 percent. It was Table 3 in the Thermal Report on which IEPA based their summer temperature standards. The temperature standard recommendations used by IEPA, according to ExxonMobil, were described by Yoder and Rankin as the "'survival (long term)' and 'survival short term' maximum temperatures." PC 1406 at 27. IEPA proposed to use the "period average" and "daily maximum" temperatures for modified use RAS 2 at the 100 percent proportion of species from Table 3. *Id.*

ExxonMobil explains that IEPA's proposal uses a "constant daily maximum temperature for the entire year and 17 period average temperature standards to represent seasonal variation." PC 1406 at 28. Period average temperatures for 13 "non-summer" periods were calculated using the least restrictive of the 75th percentile from data collected from the District effluent and the 90th percentile from the data collected from the Route 83 station on the Cal-Sag Channel. According to ExxonMobil, the Cal-Sag Channel Route 83 station was chosen because it "was not directly influenced by thermal sources." ExxonMobil cites Mr. Tischler's description of IEPA's assumptions underlying the proposed criteria in the Statement of Reasons:

1. The modified RAS 2 species assemblage that consists of 27 species was used as the basis for the summer daily and period maximum temperatures. Note that the modified RAS 1 assemblage, which has one fewer fish species, gives the same temperatures.

2. The 100 percent proportion of RAS temperature standard was specified.

3. The District effluent and the Cal-Sag Channel Route 83 station is representative of the non-summer temperatures in the UDIP in the absence of the existing thermal loadings. *Id.*

ExxonMobil explains that the first assumption, in which RAS 2 fish species assemblage is consistent with modified ALU in the UDIP, makes a "substantial difference" in the summer period average and daily maximum temperatures. PC 1406 at 28. According to ExxonMobil, if IEPA had used the secondary contact/indigenous species category instead, the daily maximum "would be 1.6° F greater than the proposed value (90.3° F vs. 88.7° F) and the summer period average would be 1.6° F greater." *Id.* ExxonMobil then points out that neither the report by Yoder and Rankin nor IEPA's SOR compared the RAS 2 species list with the fish species actually present in the UDIP. PC 1406 at 28-29. Therefore the assumption that RAS 2 is "more representative" than the secondary contact/indigenous species class is "unproven and may not be representative of the attainable UDIP ALU." PC 1406 at 29.

ExxonMobil notes that whether to use the 100% or 90% proportion of RAS as the basis for the selected summer temperature criteria was another assumption. ExxonMobil explains that this assumption is based on a decision very much like the secondary contact/indigenous basis for summer temperature criteria, in that the 90% proportion RAS 2 daily maximum temperature criterion is 90.1° F compared to the 88.7° F at the 100 percent proportion. ExxonMobil claims that there is a similar difference for the summer period average temperature. *Id*.

ExxonMobil points to Mr. Tischler, who noted that USEPA's guidance for developing water quality criteria for toxic chemicals uses a 95 percent protection level on the basis that "aquatic ecosystems can tolerate some stress and occasional adverse effects," and that "protection of all species at all times is not deemed necessary." PC 1406 at 29. ExxonMobil claims however, that the decision to select a RAS consisting of 27 species was arbitrary because, as it was stated in the SOR, the ". . .Des Plaines River between the Brandon Road Lock and Dam and the I-55 Bridge has an incrementally more diverse aquatic life and higher quality habitat than the rest of the CAWS and Lower Des Plaines River." *Id*. ExxonMobil claims that the secondary contact/indigenous species class or the 90% protection level of RAS 2 could justifiably have been used as a basis. PC 1406 at 29-30.

ExxonMobil argues that "in respect to non-summer periods, the Board should require additional justification for use of temperature data from MWRD and the Cal-Sag Channel Route 83 station." PC 1406 at 30. ExxonMobil explains that the physical and hydrologic conditions of any upstream station that are unimpacted by local thermal sources should be "comparable to corresponding conditions in the UDIP." ExxonMobil points out that the UDIP is an "impounded pool," and "temperature regimes in impounded surface waters are strongly influenced by the physical and hydrologic characteristics of the impoundment," and "natural heating and cooling are substantially different from freely flowing rivers." Therefore, "establishing temperature criteria for an impounded surface water using data from a river site with higher stream velocities is not likely to result in representative temperature criteria for the impoundment." *Id*.

ExxonMobil claims that the use of the 75th and 90th percentiles as the basis for a maximum period average temperature is too "conservative" as a limit. PC 1406 at 30. ExxonMobil explains that this is because the 95th percentile determines that only 1 month out of 20 can have a 50 percent probability of exceeding a limit "strictly by chance." The 75th percentile on the other hand, based temperature maximum monthly period average limits on an ambient temperature distribution so that one month out of every four has a 50% probability of exceeding the limit. *Id*.

ExxonMobil then addresses the cold shock provision. PC 1406 at 31. Citing Mr. Twait, ExxonMobil explained that IEPA does not have any "knowledge of cold shock occurring." According to ExxonMobil, when USEPA requested a cold shock provision, IEPA did not think it was necessary since there is "no evidence" of cold shock occurring. Mr. Twait expressed his doubts regarding how such a provision would even be incorporated into a permit. ExxonMobil claims, therefore, that a cold shock provision is not necessary for the UDIP. ExxonMobil did state, however, that if the Board were to adopt a cold shock provision, then ExxonMobil would request that the applicability to facilities with large thermal impacts on the basis of a BTU threshold be limited. *Id*.

ExxonMobil therefore recommends four factors for the Board to consider in adopting temperature criteria for the UDIP ALU in Subdocket D:

1. The temperature standards should be based on protecting aquatic life that is representative of the existing uses of the UDIP. Selection of a list of fish species on an arbitrary assumption is not a scientific basis for setting a standard.

2. The temperature standards do not have to protect 100 percent of the species 100 percent of the time, as USEPA has recognized in guidelines for development of numeric water quality criteria.

3. It is not appropriate to base a maximum period temperature average (approximately equivalent to a maximum monthly average) on the 75th percentile (or 90th percentile) of ambient temperature data. This assumption results in period temperature averages that will be exceeded once in every four periods (or 10 periods for the 90th percentile) due to natural variation. The 95th percentile, which USEPA recommends for water quality criteria implementation, is more appropriate.

4. The Cold Shock provisions, as proposed by Illinois EPA in the Subdocket D Motion to Amend and discussed at length at the July 29, 2013 public hearing should be removed from the proposed rule. The Illinois EPA was unable to substantiate that the Cold Shock phenomenon has ever occurred in Illinois. If not completely removed, the rule should include a Cold Shock threshold below which the provisions do not apply. ExxonMobil suggests a threshold of 0.5 billion British thermal units per hour (150 megawatts), which is the existing threshold in the General Use water quality standards for conducting thermal demonstrations *(see* 35 Ill. Admin. Code § 302.211(f)). PC 1406 at 31-32.

Regulatory Relief. ExxonMobil then discusses the need for UDIP dischargers to have clear access to regulatory relief and regulatory flexibility. PC 1406 at 32. ExxonMobil reiterates the fact that the UDIP is "subject to significant non-point source impacts, atmospheric impacts, and upstream point source impacts," which may "not governed by NPDES permits and must be addressed by programs outside the typical NPDES permitting scheme." ExxonMobil explains that some contaminants may not be addressed "in the next five to ten years, if they are addressed at all." ExxonMobil cites the "massive scope" of efforts described by upstream dischargers to comply with proposed thermal standards as reason to believe that compliance will not be achieved in the near future. ExxonMobil also points out that IEPA has gathered "limited ambient data in the UDIP, notably in cases of mercury and thermal data." Finally, ExxonMobil claims that in the case of mercury in particular, this has forced IEPA to rely on "outdated fish tissue data as a proxy for water column data." *Id*.

ExxonMobil claims that the reasons above serve as justification for the UDIP dischargers to obtain clear access to regulatory relief and regulatory flexibility mechanisms. PC 1406 at 32. ExxonMobil asserts that "when water column data do not indicate a water quality standard is violated, a mixing zone for dischargers should be available." Other measurements such as fish tissue should also not prevent the availability of mixing zones. *Id*. ExxonMobil asserts that if a given point source discharger is not the "primary" cause of a water quality violation and only contributes a "relatively modest amount" of contamination to a waterway, that discharger should still be provided a path to a mixing zone, "regardless of compliance status of upstream dischargers." PC 1406 at 32-33.

ExxonMobil notes that regulatory mechanisms should allow for extended periods for attaining compliance. PC 1406 at 33. Furthermore, ExxonMobil claims that "when non-point or atmospheric sources are the primary sources of water quality standard violations, impacts from point source dischargers should be addressed when non-point source impacts are addressed." According to ExxonMobil, to do so sooner would be an "unnecessary use of resources that would provide little improvement and may not fit into a comprehensive plan for a waterway." ExxonMobil also notes that "relief in the form of a compliance schedule or variance would be necessary to delay applicability of water quality standards," which may extend beyond five years. ExxonMobil explains that these extended relief periods may be necessary when upstream dischargers are unable to comply in a timely manner, and that they are consistent with USEPA's views in the Proposed Clarifications Rule. ExxonMobil therefore urges the Board to "strongly consider amending and clarifying regulatory relief and regulatory flexibility provisions to accommodate dischargers." *Id*.

PC 1413

ExxonMobil's comments address conditions in the UDIP that "warrant consideration when adopting water quality standards and regulatory relief mechanisms in Subdocket D." PC 1413 at 1. ExxonMobil is concerned about "the impacts of road de-icing on chloride levels in the UDIP in winter months" and the "need to adopt a standard or an appropriate relief mechanism that recognizes this activity." Feasibility and implementation of IEPA's proposed standard for mercury in the UDIP and the sources of this mercury were also addressed. ExxonMobil explained that in addressing these issues, it presented a "streamlined relief mechanism for implementing a new mercury standard". *Id*. Concerning the proposed thermal water quality standards, ExxonMobil stressed the "need for a regulatory relief mechanism to address large upstream thermal dischargers before requiring downstream dischargers to comply". PC 1413 at 2. ExxonMobil ended its testimony by explaining the need for "clear access to regulatory relief and regulatory flexibility for UDIP dischargers." *Id*.

First, ExxonMobil expresses its approval of IEPA's approach to setting a chloride standard. PC 1413 at 2. ExxonMobil notes IEPA's admission that "violations" of its chloride standard can be expected during winter months. ExxonMobil agrees with IEPA's decision to work with USEPA on an "approvable chloride water quality standard and an approvable variance that would be water body specific and would meet the requirements of USEPA's proposed Calculations Rule." According to ExxonMobil, IEPA was in the same process for a provision that would incorporate best management practices in the winter. ExxonMobil explains that IEPA

"encourage[d] the Board to delay decision on a chloride standard or open another subdocket." IEPA also proposed a 500 mg/L chloride water standard for non-winter months, defined as the months of May through November. *Id*.

ExxonMobil supports IEPA's approach to setting a water quality standard for chloride, because IEPA's concerns are "similar to those raised by ExxonMobil in its pre-first notice comments." PC 1413 at 3. According to ExxonMobil, road de-icing is the "overwhelming" cause of elevated chloride levels in the UDIP during winter months. De-icing is considered a non-point source chloride contributor and is the cause of elevated levels of chloride in waterways for all dischargers during the winter months. ExxonMobil expresses its continued support of a new subdocket to develop a new approvable chloride standard. ExxonMobil explains that a new subdocket would "allow stake-holders to continue to effectively provide feedback on quickly developing issues". However, ExxonMobil also recognizes the Board's concern about "the standard that would apply before a new approvable subdocket is complete." ExxonMobil therefore supports IEPA's initial seasonal standard for the months of May through November. ExxonMobil cites the testimony of Lial Tischler, who asserted that a seasonal standard is "scientifically justifiable and could work in concert with other salt reduction activities in the winter." *Id*.

ExxonMobil disagrees, however, with IEPA's "insistence on including a cold shock provision in its proposed water quality standards." PC 1413 at 3. ExxonMobil explained that in the Pre-First Notice Comments, USEPA had recommended IEPA protect aquatic life from cold shock "despite [IEPA] not being aware of trouble with cold shock situations in the system." PC 1413 at 3-4. According to ExxonMobil, IEPA has provided neither justification nor explanation of how permit writers would incorporate this provision into a permit. PC 1413 at 4.

According to ExxonMobil "any new cold shock provision adopted by the Board and incorporated into a permit would need to be addressed by a discharger's compliance program." PC 1413 at 4. ExxonMobil claims that if the cold shock provision were adopted, "numerous dischargers. . .would need to prepare compliance programs and implement procedures and practices for a regulatory provision," even those with "minimal thermal impact." ExxonMobil also points out that permittees would have "additional permit applications and recordkeeping requirements," and therefore IEPA would have to perform "additional regulatory analysis for each NPDES permit." ExxonMobil asserts that such "additional obligations" are "unnecessary and regulatory and administrative burdens" both to the discharger and to IEPA. ExxonMobil therefore recommends that the Board either reject IEPA's "narrative cold shock provision," or "limit its applicability to large thermal sources." *Id*.

Next, ExxonMobil supports Midwest Generation's suggestion that the effective date for any revised thermal standards for the CSSC and UDIP be delayed. PC 1413 at 4. This suggestion was made due to the "uncertainty regarding the demonstration necessary to obtain water quality standard variance." PC 1413 at 4-5. As explained by Midwest Generation, "a delay in effectiveness would allow time to clarify variance criteria and determine the necessary demonstration to qualify for a water quality standard variance." PC 1413 at 5. ExxonMobil explains that "this would give dischargers the opportunity to pursue necessary variance relief without 'being in potential jeopardy'." *Id*.

ExxonMobil cites the testimonies of Mr. Twait and Mr. Tischler to explain the "potential impacts on downstream dischargers if new, stricter thermal standards were adopted by the Board and applied immediately upon adoption." PC 1413 at 5. According to ExxonMobil, "small downstream dischargers may lose mixing zones if upstream waters are not meeting water quality standards due to large upstream dischargers." This particular phenomena is what prompted Mr. Twait to suggest a "cascading approach to permitting." However, ExxonMobil claims that such an approach is "unclear and imperfect given [IEPA]'s permitting process." ExxonMobil explains that in delaying the effectiveness of a new standard, large dischargers have time to "attain compliance or seek appropriate regulatory relief." ExxonMobil noted that this delay could be paired with "a demonstration by larger dischargers similar to that in the General Use Thermal Standards at 35 Ill. Admin. Code 302.211(f)." ExxonMobil adds that "until such a demonstration is completed, smaller thermal dischargers could continue to comply with previously permitted limits." *Id.* ExxonMobil explains that combining both a delayed effective date and a demonstration by larger dischargers would be "protecting smaller dischargers that are not contributing to elevated temperatures in the UDIP and providing a path for larger discharges to attain compliance and relief." PC 1413 at 5-6.

ExxonMobil next addresses the mercury human health criterion. PC 1413 at 6. ExxonMobil provides a brief description of USEPA's recommendations to IEPA, which focused on consistency with the fish tissue-based methyl mercury criterion set in the January 2001 guidance document. ExxonMobil explains that IEPA was planning to adopt a 12 mg/L water quality standard to be reviewed by USEPA for "protectiveness and scientific defensibility" pursuant to 40 C. F. R. 131.11(b)(1) and the April 2010 guidance for implementing the January 2001 methyl-mercury water quality criterion. ExxonMobil cites USEPA's "preferred methods for translating fish tissue concentration to a water column concentration", which entails using "site-specific bioaccumulation factors (BAF)" and "conversion factors derived from field studies" or a "scientifically defensible bioaccumulation model". However, ExxonMobil claims that IEPA had indicated that there were "no entities that collect low-level mercury samples in ambient water from the area, so a site-specific BAF does not appear possible" at the time. According to ExxonMobil, USEPA had provided another method for deriving water column criterion from the 2001 methyl-mercury criterion in its April 2010 guidance. This method involves using USEPA's "draft national BAFs and draft national conversion factors." USEPA noted however, that such information "may result in criteria that are either under protective or overprotective of human health uses." *Id.*

ExxonMobil cites USEPA's review of IEPA's fish tissue data from CAWS and LDPR. PC 1413 at 7. IEPA found that fish tissue levels were 0.21 mg/kg or less, as based upon 141 collected samples. According to ExxonMobil, this value was "lower than USEPA's 304(e) criterion guidance value for methyl-mercury fish tissue concentrations of 0.3 mg/kg." ExxonMobil also claims that the average fish tissue concentration for the fish sampled was 0.07 mg/kg. According to ExxonMobil, USEPA's analysis of the date provided by IEPA suggests that "fish tissue data for these waterways do not indicate [that] uses of the waterway are impaired by mercury in fish tissue." ExxonMobil therefore suggests that IEPA "remove the UDIP form the 303(d) list with respect to fish tissue mercury levels." *Id.*

Midwest Generation

PC 1403

As an initial matter, Midwest Gen's post-hearing comment notes that NRG Energy, Inc. (NRG) acquired Midwest Generation from Edison Mission Energy on April 1, 2014. PC 1403 at 1. Midwest Gen's comment focuses on the proposed thermal standards, because Midwest Generation contends that those standards "threaten the viability of existing and future operations of its three electric generating stations, the Will County, Joliet 9 and 29 stations." *Id*. Will County Station discharges to the CSSC, which is designated as ALU B, and the Joliet Stations (9 and 29) discharge to UDIP, which is designated as UDIP ALU. Midwest Generation contends that the IEPA's proposed thermal standards raise significant legal and technical concerns. Midwest Generation argues that the proposed thermal standards are not scientifically justified since they are not based on existing biological data. Further, Midwest Generation contends that IEPA's proposed thermal standard defies logic because they are more restrictive than the existing General Use thermal standards at 35 Ill. Adm. Code 302.211 that are intended to protect higher quality waters. *Id.* at 2.

Midwest Generation urges the Board to reject IEPA's thermal standards, and instead adopt "the proposed thermal standards developed by EA Engineering & Science (EA or EA Engineering) that Midwest Generation provided to the IEPA in 2007 [Exh. 368], or alternatively, the 2003 proposed thermal standards which were also submitted by Midwest Generation for the IEPA's consideration." *Id.* at 3. Alternatively, Midwest Generation states that the Board may consider other thermal standards such as the AS 96-10 or General Use thermal standards as alternatives for UDIP as they are less objectionable to IEPA's thermal standards. Additionally, Midwest Generation notes that regardless of the thermal standards adopted by the Board, it may need to seek regulatory relief "from the Use B and UDIP Use thermal standards because the technical feasibility and economic reasonableness of compliance is at best uncertain and more likely unsustainable." *Id.* In the following sections, the Board will briefly summarize Midwest Generation concerns with IEPA's proposed thermal standards along with alternative standards recommended by Midwest Gen.

Problems with IEPA's Proposed Thermal Standards. Midwest Generation strongly urges the Board to reject IEPA's proposed thermal standards because: the standards are arbitrary; the period averages are unnecessary, they are inapplicable to highly modified waters; are overly stringent; the narrative cold shock standard is unnecessary and vague; the derivation of daily maximum standards is contrary to the CWA's mandate of state primacy; and the standards are economically unreasonable. PC 1403 at 6-34.

IEPA's Thermal Standards are arbitrary. Midwest Generation contends that IEPA's thermal standards, which are more stringent than the existing General Use standards, "makes no scientific or logical sense considering that the ALU A, the ALU B and the UDIP Use are all lower aquatic life use designations than is the General Use designation." *Id.* at 6. Midwest Generation argues that it would be arbitrary and irrational to adopt stricter thermal water quality standards for waters designated for lower aquatic life uses than the General Use waters. Midwest Generation questions IEPA's reliance on work performed by Mr. Yoder of MBI) to develop

thermal standards. Mr. Yoder's approach to selecting thermal WQS is not scientifically sound or defensible because it "fails to properly adjust literature-based data to incorporate known, real world conditions in these waters as documented in available biological data." *Id.* at 6-7.

Midwest Generation notes that although Mr. Yoder claims to have used a "Fish Temperature Model" to derive thermal standards, the "model" is just a database containing a collection of literature temperature data or data extrapolated by MBI on various fish species. The thermal endpoints (*e.g.,* acute upper lethal temperatures) for each species are ranked from least sensitive to most sensitive. *Id.* at 7-8. The proposed daily maximum thermal standards for the UDIP Use, and CAWS ALU A/ALU B waters are based solely on the "most sensitive" representative aquatic species determined from this ranking of thermal endpoint literature and extrapolated data. Midwest Generation argues that if an endpoint value assigned to the most sensitive species in Mr. Yoder's RAS list is erroneous, then the resultant thermal criterion he recommends is also erroneous.

Midwest Generation claims that Mr. Yoder's approach has several shortcomings. First, the thermal data literature Mr. Yoder relied upon for deriving or extrapolating the daily maximum values are questionable because he did not conduct a quality assurance review of the literature data. *Id.* at 9. Midwest Generation argues that "the issue of data review and acceptability is especially important when the proposed thermal standard is based on a single test result for a single most sensitive species, because an invalid or outlier data point will result in an erroneous, arbitrary limit if the value in question is associated with the species ranked most sensitive." *Id.* In this regard, Midwest Generation notes a review of Mr. Yoder's thermal data and literature references in Exhibit 16 by EA indicated 65% of the 79 species had at least one or more erroneous or inappropriate endpoint values were assigned to them by Mr. Yoder. Further, one or more of the endpoints reported in Table Z3 of Exhibit 16 are wrong for at least 51 species. *Id.* at 11.

Midwest Generation asserts that "[f]or the determinative "most sensitive species" for the UDIP, the white sucker with an endpoint value of 31.5º C (90.5º F), Mr. Yoder was not sure what data he used from the studies he listed in Exhibit 16 or whether or not he "averaged the data in some way" to derive this endpoint value." *Id.* at 13 citing 1/31/08Tr. at 75-80. Additional information submitted by IEPA also failed to support the end point value of 31.5° C (90.5º F) for white sucker. *Id.* at 13. Therefore, Midwest Generation contends that the ALU A and UDIP ALU daily maximum values are not supported by scientific data. *Id.* at 13-14. Therefore, Midwest Generation contends that the adoption of the proposed daily maximum values would be an arbitrary and capricious decision. *Id.* at 14.

Next, Midwest Generation contends that Mr. Yoder's approach is contrary to the standard USEPA guidance regarding derivation of water quality standards. While USEPA guidance calls for water quality standards designed to protect aquatic life communities, Mr. Yoder's approach relies on protection of individual species. PC 1403 at 14-15. Midwest Generation notes that USEPA's 1985 National Guidelines provide that water quality criteria should be based on the 95th percentile of genus mean acute values, since aquatic ecosystems can tolerate some stress and occasional adverse effects. However, Mr. Yoder's approach uses 100% short-term survival of all RAS. *Id.* at 15. Thus, "the proposed daily maximum values based on this data for both the

UDIP Use and Use B are far too conservative and go well beyond what the Clean Water Act requires." *Id.* at 15. Additionally, relying on USEPA's guidance for Section 316(a) demonstration ("Interagency 316(a) Technical Guidance Manual And Guide For Thermal Effects Sections Of Nuclear Facilities Environmental Impact Statements"), Midwest Generation argues that several species on Mr. Yoder's RAS list for UDIP, including northern pike, white sucker, fathead minnow, rock bass and walleye are not "representative" or "important". *Id.* at 15-16. Midwest Generation contends that relying solely on literature data and not giving consideration to available fish survey data results in arbitrary standards. *Id.* at 17-18.

Finally, Midwest Generation states that Mr. Yoder's approach does not reflect real world conditions. The literature-based approach to deriving the proposed daily maximum thermal standards do not reflect the ability of fish (juvenile and adult) to avoid excessively warm or cool temperatures. PC 1403 at 18. Although long-term avoidance of a particular habitat is detrimental, Midwest Generation asserts that short-term avoidance (days or hours) is a beneficial, adaptive response. EA's long-term studies of the UDIP area demonstrate that while there is short-term avoidance of the power plant discharge canals during the hotter periods of the summer, the fish move back into these areas once more preferable temperatures resume. Therefore, Midwest Generation contends that the proposed daily maximum standards are overly protective of the aquatic community and provide optimum environment rarely present in real world conditions regardless of the economic and other environmental costs. *Id.* at 18-19.

Midwest Generation also expresses serious concerns regarding the lack of consideration of over twenty years of fish data available for LDPR in the derivation of the proposed thermal standards. PC 1403 at 19. While Mr. Yoder agreed that biological field data are important in assessing thermal conditions, he did not use such data available from EA studies. Again relying on USEPA's Section 316(a) demonstration guidance, Midwest Generation argues that Mr. Yoder's approach is inconsistent with USEPA's guidance. Midwest Generation contends that because of IEPA's reliance on a flawed approach used to derive thermal standards, the proposed standards are not based on sound science. *Id.* at 20. In summary, Midwest Generation argues that IEPA's proposed thermal standards based on Mr. Yoder's method must be rejected because they are erroneous, arbitrary and overly conservative.

Proposed period average thermal standards are unnecessary and inapplicable to highly modified waters. Midwest Generation states that IEPA's proposed period average thermal standards are the same for all ALU A, ALU B and UDIP ALU waters, with the sole exception a slightly higher value for ALU B waters in the summer months. As such, IEPA's proposal does not reflect the three different use designations, which are "intended to protect aquatic life populations of differing quality and hence, differing thermal tolerances." PC 1403 at 21. The lack of distinction between thermal standards between differing aquatic life uses, Midwest Generation contends, is an indication that the standards are not scientifically justified and overly conservative.

Further, Midwest Generation notes that IEPA's period average thermal standards represent background temperatures based on the least restrictive of the 75th percentile of the District's effluent temperatures and 90th percentile of the Cal-Sag ChannelRoute 83 station. *Id.* Therefore, the proposed period average standards are not based on sound science because IEPA

did not give any consideration to either laboratory or field derived thermal effects end points for aquatic species. IEPA did not make any comparison of the proposed period average standards to studies or other biological data to determine whether the proposed period average standards are more stringent than necessary to protect the species expected to be present in the designated waters. *Id.* at 22.

Midwest Generation also questions IEPA's position that CWA provisions allow for maintaining the existing thermal regime created by effluent dominated waters, so that one of the District's treatment plants need not cool its discharge. PC 1403 at 22. However, other dischargers are not allowed the same tolerance or deference. *Id.* Midwest Generation contends that the seasonal thermal changes in effluent dominated waters of CAWS and UDIP are not like "natural waters" because the seasonal temperature regimes of these waters are determined by the seasonal temperatures of the effluent discharge. *Id.* at 23. As such, the proposed period average standards for winter and spring months are elevated as a result of the District's Stickney plant discharge.

Additionally, Midwest Generation maintains that IEPA has not provided any scientific support for the need of "cold periods" to provide for reproduction of the species expected to be present in these waters. PC 1403 at 24. The IEPA has not provided any "biological data to support its position that thermal values higher than its non-summer months period averages would inhibit aquatic life, but rather, is solely relying on Mr. Yoder's unproven "method" to conclude that background temperatures uninfluenced by man-made conditions should be maintained." *Id.*

Finally, Midwest Generation argues that IEPA's approach to calculating the period averages by using 75th percentile or the 90th percentile of the background temperature data are inconsistent with USEPA guidance which provides for the use of either a 95th or 99th percentile. IEPA has not provided any justification for using 75th percentile for the District's effluent temperature data. Midwest Generation maintains that "it is simply irrational to apply a more stringent and overly conservative approach to deriving thermal WQS than what the Clean Water Act requires for protection of the designated use." At a minimum, Midwest Generation asserts that period averages must be based on 95th or 99th percentile of both effluent temperature data and the Cal-Sag Channel Route 83 station data. *Id.* at 25.

IEPA's proposed cold shock amendment. Midwest Generation voices concern regarding the narrative "cold shock" provision proposed by IEPA as a part of its May 2013 amendments. Midwest Generation notes that the cold shock provision was proposed by IEPA at the behest of USEPA even though IEPA is not aware of any cold shock incident in Illinois waters, including CAWS and LDPR. PC 1403 at 26. Midwest Generation contends that the proposed cold shock rule is vague and does not provide any implementation guidance. Additionally, USEPA has also not developed any implementation guidance for the proposed cold shock standard. Therefore, as suggested by USEPA, Midwest Generation urges the Board to consider an alternative numeric approach by demonstrating that the proposed numeric thermal standards will prevent cold shock. *Id.* at 27.

The process followed to derive the proposed daily maximum thermal standards is contrary to the CWA's mandate of state primacy. Midwest Generation claims that the process followed by IEPA in developing the proposed daily maximum thermal standards did not follow the structure established by Section 303 of the CWA, 33 U.S.C § 1313(c). Under Section 303(c), the states have the responsibility of developing water quality standards, while USEPA's role is to review the standards adopted by the states to determine if they meet the CWA requirements. This process, Midwest Generation contends, was not followed in the development of the proposed Subdocket D thermal standards. PC 1403 at 27-28. Midwest Generation asserts that, "[i]nstead of Illinois EPA maintaining a primary role in the development of the proposed thermal standards, the USEPA became directly and actively involved in the development of the standards." *Id.* at 28. USEPA provided funding to its contractor, MBI, to assist IEPA with the development of the thermal standards.

Additionally, Midwest Generation notes that USEPA had significant involvement during the standards development process, including the preparation of the RAS list. Specifically, Midwest Generation contends that USEPA's directive to include white sucker to the RAS list resulted in the thermal standards becoming more stringent. *Id.* at 29. Also, the inclusion of the vague and indeterminate cold shock standard in IEPA's proposal was based on USEPA's directive. In light of USEPA's significant involvement in the development of the proposed thermal standards, Midwest Generation asserts that IEPA was reluctant to consider alternative approaches or relevant data. *Id.* at 30. Therefore, Midwest Generation maintains that the proposed thermal standards derivation process was biased and contrary to the provisions of the CWA.

Proposed Thermal Standards are economically unreasonable. Midwest Generation notes that under Section 27 of the Act, the Board must consider, among several factors, the economic reasonableness of reducing pollution. Further, IEPA's Statement of Reasons notes that the Board must examine the economic impacts of any technology required by the rulemaking. PC 1403 at 31. Midwest Generation states that retrofitting Midwest Generation stations with closed cycle cooling through the use of cooling towers is the only option capable of achieving and maintaining compliance with the proposed thermal standards. *Id.* at 31-32. A study by Sargent and Lundy, Midwest Gen's consultant, submitted in Subdocket C estimates the cost of installing closed-cycle cooling through the use of cooling towers at the Midwest Generation stations would be over $600 million, with an estimated annual operation and maintenance cost of approximately $17 million based on 2011 dollars. *Id.* at 32-33 citing Exh. 440. Midwest Generation contends that the costs of compliance with the proposed thermal standards are not economically reasonable given that there is no evidence showing any improvement to the aquatic communities in the UDIP and CSSC segments. Therefore, Midwest Generation urges the Board to reject the proposed thermal standards for UDIP and ALU B waters. If the Board adopts the proposed standards, Midwest Generation asserts that the rules should provide for appropriate variance relief to dischargers like Midwest Gen.

Alternative Thermal Standards for UDIP and CAWS ALU B Waters. Midwest Generation points out that the record includes several alternative thermal standard options other than IEPA's thermal standards that the Board can consider in adopting thermal standards for UDIP and CAWS ALU B waters. These include thermal standards prepared by EA in 2003 and

2007, the 1996 Adjusted Thermal Standards adopted by the Board in AS 96-10, and the numeric General Use thermal standards in 35 Ill. Adm. Code 302.211. PC 1403 at 34-35. Midwest Generation notes, "[b]oth 2003 and 2007 EA Thermal Standards, as well as the AS 96-10 Adjusted Thermal Standards, are based on information collected from the Upper Illinois Waterways Studies that were developed and implemented under the direction of an ad hoc task force consisting of representatives from IEPA, USEPA Region 5, Illinois Department of Natural Resources and the District, as well as other interested public, private and academic groups." *Id.* at 35. In addition to literature review on effects of temperature on fish and interactions of temperature and chemicals of fresh water biota, the Upper Illinois Waterways Study involved the collection of biological monitoring data on fish, phytoplankton, macrophytes, benthic invertebrates and icthyplankton. *Id.*

Midwest Generation notes that EA's thermal standards are based on the biological data collected from the Upper Illinois Waterways studies beginning in 1994 along with the subsequent annual surveys in the Lockport, Brandon and Dresden Pools, and in the south branch of the Chicago River. *Id.* at 36. In contrast to 22 sample collections made by MBI in 2006, EA has made 3,159 collections from Dresden, Brandon and Lockport Pools to assess fish populations. Further, the biologic data collected by EA meets the "highest quality data" standard specified in the USEPA guidance for derivation of water quality. *Id.* Further Midwest Generation states that the field biological data take into account avoidance behavior "because if a species avoids a thermally-enhanced area during the May through September annual time period during which the field collection work was performed, its absence is noted and the biological measurements that were used (*e.g.,* species richness and the modified Index of Well Being) were "reduced accordingly to reflect their absence." *Id.* citing PC 1403, Attach. C at 4-5.

2007 EA Thermal Standards. EA performed two different and independent statistical analyses of the Upper Illinois Waterways biological data and measurements described above to identify and confirm the appropriate thermal values for the protection of a balanced, indigenous aquatic population. Based on the more conservative of the analyses, EA recommended a monthly average temperatures limit of 90º F and a daily average temperatures limit of 93º F. Based on EA's recommendation, Midwest Generation proposed a summer maximum monthly average temperature of 90º F, with a maximum daily average temperature not to exceed 93º F. For non-summer months, the 2007 EA Thermal Standards included a provision prohibiting a change in the ambient temperatures of more than 27º F to addresses USEPA's concerns regarding cold shock. *Id.*

Midwest Generation notes that the 2007 EA thermal standards report was reviewed by Dr. Charles C. Coutant, a nationally recognized thermal standards expert. Dr. Coutant found EA's thermal analyses and findings to be sound and consistent with recognized scientific literature and administrative guidance. He concluded that the numerical thermal values for the UDIP derived by EA were supported by their technical analyses, which was both "appropriate and well done." PC 1403 at 38-39 citing PC 1403 Attach E.

The EA 2007 thermal standards are based on a "community-based approach" that uses site-specific field data instead of laboratory-derived values. PC 1403 Attach C at 2-3. This approach, EA states, is consistent with USEPA guidance on development of water quality

criteria, as well as CWA Section 316(a) guidance on thermal assessments. *Id.* at 3. Further, EA maintains that the community based approach accounts for thermal habitat partitioning or avoidance because the biological data are reduced to reflect absence of species that avoid thermally-enhanced areas. The biological data also reflect upward thermal acclimation of species, this allows fish to occupy warm water without harm. *Id.* This approach is based on setting a thermal limit that does not significantly reduce appropriate measures of community balance. EA used two widely recognized benchmarks, species richness and the modified Index of well-being (IWBmod), to measure community balance. *Id.* at 5.

EA used two statistical approaches, pair-wise ANOVA comparisons, and Loess regression, to determine the temperature at which species richness and IWBmod declined significantly. The regression curve obtained by grouping Dresden Pool data into 5-degree increments resulted in best fit as indicated by high coefficient of correlation for both species richness (0.95) and IWBmod (0.89). *Id.* at 6. A pair-wise ANOVA comparison indicated temperature had no significant effect on species richness and IWBmod within a temperature range of 65.0 to 89.9º F. However, both measures declined in the 5-degree increment of 90.0 to 94.9º F. By analyzing the data in one-degree interval between 90.0 to 94.9º F, EA determined that 91º F as a valid standard because of a decline of IWBmod at higher temperature. *Id.* EA also analyzed Dresden Pool data using Loess regression, which involves a sequence of regressions in a window that slides across the data. *Id.* at 7. EA notes that the Loess procedure also yielded similar curves as pair-wise ANOVA with a broad temperature plateau for both species richness (65 to 87º F) and IWBmod (68 to 87º F). Significant decline in both species richness and IWBmod was observed at 90º F. *Id.*

In summary, EA notes that both statistical analyses indicate that temperatures need to exceed 90 or 91º F to result in a significant decline in native species richness or IWBmod values. *Id.* at 8. EA states that the endpoints (i.e., species richness and IWBmod) used in the statistical analysis are indicators of the long-term responses by the fish community to a range of temperatures and, therefore, must not be viewed as an acute limit but instead should be applied as a monthly average temperature for the LDPR for the summer months. *Id.* at 7. Thus, EA states that a balanced indigenous community should persist so long as monthly average temperatures do not exceed 90º F (more conservative of the two estimates) and daily average temperatures do not exceed 93º F. Additionally, the 2007 EA thermal standards include a cold shock provision that would require plume temperatures not to exceed ambient temperature by greater than 27º F. PC 1403, Attach. E at 9.

2003 EA Thermal Standards. Midwest Generation notes that EA's 2003 thermal standards for UDIP used a different approach than the one considered in the 2007 EA thermal standards. The 2003 EA standards for summer months were based on the biological data from the Upper Illinois Waterways studies, but did not include extensive statistical analysis of the data. Also, the standards for non-summer months were based on the existing temperature regime in the waterways. PC 1403 at 41. The 2003 EA thermal standards for UDIP are as follows:

January:	72º F
February:	77º F
March:	82º F

April:	90º F
May 1-15:	92º F
May 16-31:	93º F
June:	93º F
July:	93º F
August:	93º F
September:	93º F
October:	92º F
November:	90º F
December:	82º F

In addition, the maximum temperature in the main body of the river shall not exceed the maximum limits listed above by more than 5º F for more than 5% of the hours in the 12 month period ending December 31 of each calendar year. Also, Midwest Generation notes that compliance with the thermal standards would be measured at the edge of the allowed mixing zone. *Id.* at 42. Under this proposal, EA notes that "the water temperature limits would be gradually lowered over the Fall and Winter periods, and increased in the Spring period, in correspondence with the current modified thermal regime of the waterway." PC 1403 Attach. D at 65. The step-wise seasonal progression of monthly or semi-monthly temperature limitations would reflect the ambient conditions of the waterway and would also complement the existing adjusted thermal standards at the I-55 Bridge. *Id.*

AS 96-10 Thermal Standards. While Midwest Generation maintains that the Board must adopt either 2003 or 2007 EA Thermal Standards, Midwest Generation proposes AS 96-10 standards as an alternative if the Board decides not to adopt the EA standards. Midwest Generation notes that the Board granted an adjusted thermal standard to Commonwealth Edison ("ComEd"), applicable to the Midwest Generation power plant discharges at the I-55 Bridge, which is the geographical dividing line between the UDIP Use and the downstream General Use waters. PC 1403 at 43. The AS 96-10 thermal standards were supported by the 1991-1995 comprehensive Upper Illinois Waterways Study performed by EA Engineering and overseen by the Upper Illinois Waterways Task Force. The AS 96-10 thermal standards are as follows:

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

December: 65º F

In addition, the above numeric thermal Standards may be exceeded by no more than 3º F during two percent of the hours in the 12-month period ending December 31, except that at no time shall the water temperature at the I-55 Bridge exceed 93º F.

If the Board adopts the AS 96-10 standards for UDIP, Midwest Generation states that the numeric standards should be applied on an average basis, not on an instantaneous daily maximum basis to reflect the lesser aquatic life use designation of UDIP. *Id.* at 44. Midwest Generation contends that the AS 96-10 thermal standards are preferable to the unscientific, erroneous and overly stringent IEPA thermal limits, since the AS 96-10 standards "are proven thermal standards which are consistent with the requirements of the CWA for protecting the General Use waters below the I-55 Bridge. *Id.*

The General Use Thermal Standards. Midwest Generation states the General Use thermal standards apply to Illinois waters that are fully capable of meeting a full aquatic life use goal. However, the UDIP ALU designation adopted by the Board recognizes that the UDIP has a lower aquatic life use potential than do General Use waters. PC 1403 at 45. Therefore, Midwest Generation asserts that "the adoption of the General Use thermal standards for the UDIP is not justified by the requirements of the Clean Water Act and these standards were not intended to apply to a lower aquatic life use water like the UDIP." *Id.* However, Midwest Generation states that the application of the numeric General Use thermal standards to the UDIP is less objectionable to the Board adopting IEPA's proposed thermal standards.

Authorized Use of Compliance Schedules. Midwest Generation asserts that the Board should include a provision in Subdocket D regulations that clearly authorizes the use of compliance schedules. Midwest Generation argues that compliance schedules may be addressed in the proposed regulations as a part of Illinois' implementation of the CWA. Midwest Generation notes that 40 C.F.R. §123.25 provides for the inclusion of compliance schedules in the state NPDES program. PC 1403 at 45. Midwest Generation notes that the authorization of compliance schedules is codified in 35 Ill. Adm. Code 309.148 that addresses water pollution regulation permits. Because Illinois water quality standards are in different parts of the regulations, Parts 302 and 303, Midwest Generation is concerned that USEPA "may later question whether Illinois intended that compliance schedules may be included in NPDES permits issued by the IEPA, which incorporate water quality based effluent limits based on these new water quality standards." *Id.* 46. To avoid any confusion regarding the authorized us of compliance schedules, Midwest Generation proposes the following amendment to 35 Ill. Adm. Code 302.101:

Section 302.101 Scope and Applicability

a) This Part contains schedules of water quality standards which are applicable throughout the State as designated in 35 Ill. Adm. Code 303. Site specific water quality standards are found with the water use designations in 35 Ill. Adm. Code 303. The issuance of compliance schedules for the water quality standards contained in

> this Part is authorized in accordance with the requirements set forth in 35 Ill. Adm. Code §309.138. *Id.* at 48.

Midwest Generation notes that because the record establishes that compliance with the proposed thermal standards would require massive efforts spanning several years on part of the dischargers, the Board should address the issue of compliance schedule authorization in the Subdocket D regulations. *Id.* at 48.

Variance Issue and Permit Shield. Midwest Generation states that it faces a significant risk of receiving NPDES thermal limits that it cannot meet, with or without a compliance schedule, regardless of the alternative thermal standards adopted by the Board. *Id.* at 48. Therefore, Midwest Generation urges the Board to consider options for providing relief to existing dischargers that is consistent with the applicable law. However, Midwest Generation notes that the "current regulatory landscape of the demonstration necessary to obtain variance relief is at best very unclear." *Id.* at 49. Specifically, Midwest Generation refers to USEPA's disapproval of Citgo's TDS variance granted by the Board where USEPA concluded "that Illinois' allowance of a variance in Section 35 of the Illinois Environmental Protection Act based on "compliance with any rule or regulation, requirement or order of the Board would impose an arbitrary or unreasonable hardship" is not authorized under the Part 131 Clean Water Act implementing regulations." *Id.* at 49-50 citing PC 1367. In light of this, Midwest Generation urges that the Board consider other options, including: delaying the effective date for any revised thermal standards; providing clarification of applicability of UAA Factors to a UDIP variance; provide multi-discharger or water body variances; and recognition of a "permit shield" for existing NPDES permits. *Id.* at 50-55.

Summary. Midwest Generation urges the Board to reject IEPA's proposed thermal standards since they "are not scientifically justified, are severely flawed, and are inconsistent with the extensive biological data available for these waters." *Id.* at 55. Instead, Midwest Generation asks the Board to adopt the 2007 EA Thermal Standards, which present the Board with a scientifically sound alternative thermal standard for the UDIP waters. Alternatively, Midwest Generation states that the 2003 EA Thermal Standards are also acceptable if the Board determines that year-round daily average maximum thermal standards are needed in addition to the cold shock prevention provision in the 2007 EA Thermal Standards for the non-summer month periods. Finally, if the Board does not adopt either of the EA prepared thermal standards, Midwest Generation states that AS 96-10 or the General Use thermal standards would be preferable alternatives, since they are less objectionable than IEPA's proposed thermal standards. *Id.*

PC 1408b

Midwest Generation reiterates its contention that the Board must reject IEPA's proposed thermal standards for ALU B and UDIP ALU waters because they are neither scientifically sound nor consistent with USEPA guidance. PC 1408b at 1. Further, Midwest Generation argues that the Environmental Groups' proposed thermal standards must not be adopted for similar reasons. Midwest Generation also address issues raised by USEPA regarding excursion hours along with ExxonMobil's request that the Board impose a thermal demonstration

requirement upon Midwest Gen. Finally, Midwest Generation requests that the Board adopt either a multi-discharger or water body variance for thermal standards. *Id.* at 2.

Environmental Groups' Proposed Thermal Standards. Midwest Generation states that the Environmental Groups' proposal for stricter thermal standards is "based exclusively upon the flawed thermal values provided to the Illinois EPA by the Midwest Biodiversity Institute ("MBI"), primarily through the efforts of Mr. Yoder. PC 1408b at 2, citing PC 1403 at 7-14. Midwest Generation notes that Environmental Groups reliance on Mr. Yoder's approach, which used the white sucker UILT of 88.7º F as the fish species with lowest short-term survival endpoint, is flawed because the only support for that value is a single article based on laboratory conditions not representative of CAWS or LDPR waters. *Id.* at 4. Midwest Generation also argues that USEPA exerted its influence over the contents of the Yoder Report resulting in lower recommended thermal values. *Id.* at 5. Midwest Generation also expresses serious concern regarding the lack of consideration of site-specific field biological data and real world conditions in the Environmental Groups' proposal. *Id.* at 6-7.

Next, Midwest Generation contends that the Environmental Groups did not "provide any support for the application or relevance of the Ohio River thermal standards to the UDIP or ALU B waters, other than the fact they are in some respects stricter than the IEPA's proposed standards." PC 1408b at 8. Midwest Generation notes that EA's review of a small portion of MBI's Ohio River database indicated the same type of deficiencies identified in Mr. Yoder's study in this rulemaking. Further, Midwest Generation asserts that Environmental Groups' proposal must be rejected because it is not consistent with the CWA Section 304(a) water quality standards criteria guidance. *Id.* Midwest Generation urges the Board not to adopt standards based on the MBI/Yoder approach "because it uses incorrect or aberrant data to set thermal standards and improperly ignores high-quality in-stream data." *Id.* at 10. In this regard, Midwest Generation notes that the extensive "in-stream biological data show that many of the fish species which the MBI/Yoder Report finds should be limited or excluded by higher temperatures are indeed present and thriving in the Lower Des Plaines River." *Id.* at 11.

Midwest Generation also questions the Environmental Groups' contention that thermal endpoints from in-stream biological data must be lowered by 2° C (35.6º F) to provide a margin of safety. In this regard, Midwest Generation notes that the 1986 USEPA "Gold Book" guidance on the derivation of water quality criteria acknowledges that the origin of the 2º C (35.6º F) margin of safety is based on laboratory experiments, not real world conditions. *Id.* at 11 citing PC 1403, Attach E at 13.

Again, Midwest Generation urges the Board to reject Environmental Groups' proposal, and instead, give consideration to alternative thermal standards prepared by EA in 2007. *Id.* 13.

Allowance of Excursion Hours. In response to USEPA's concerns that the proposed excursion hours would allow for temperatures above the UILT, Midwest Generation asserts that such allowance does not make the thermal limits unprotective or inconsistent with the USEPA's guidance. PC 1408b at 13-14. Midwest Generation argues that fish in the affected waters have been exposed to temperatures higher than those that would be allowed under the excursion hours provision with no evidence of any resulting mortality. Midwest Generation notes that AS 96-10

Thermal Standards allow excursion hours at the same level as the proposed thermal limitations under Section 302.408(a). However, EA's annual fish surveys downstream of I-55 Bridge have shown no adverse effect on aquatic life.

Midwest Generation asserts that the elimination of the excursion hours provision would make the proposed daily maximum temperatures even more unreasonable than they already are. PC 1408b at 17. Midwest Generation maintains that it would be inappropriate to establish an instantaneous daily maximum temperature because ambient stream temperatures fluctuate not just seasonally, but daily within any waterway. Therefore, Midwest Generation urges the Board to include the excursion hours provision in the Subdocket D thermal water quality standards.

Multi-Discharger or Water Body Variance. Midwest Generation renews its request that the Board apply a multi-discharger or water body variance to the thermal standards for CAWS and UDIP. This issue was addressed by USEPA's comments by noting that "for a variance to be consistent with federal requirements, the record should demonstrate that the variance applies only to the times, places, and/or dischargers where attainment of the criteria cannot be achieved for one of the reasons set forth at 40 C.F.R. 131.10(g)." PC 1408b at 18, citing (PC 1404, Encl. I at 5-6). Midwest Generation contends that the Board may adopt a multi-discharger or water body variance consistent with USEPA's directive based on the Board's findings regarding the application of UAA Factors to CSSC and UDIP support. *Id.* at 19.

ExxonMobil's Suggestion to Impose a Thermal Demonstration upon Midwest Gen. Midwest Generation states that ExxonMobil's recommendation for a thermal demonstration "unduly and unjustifiably expands the applicable scope of the thermal demonstration requirement applicable only to General Use waters under Section 302.211(f)". PC 1408b at 21. Such demonstration should not be required because UDIP is not General Use water. Midwest Generation notes that "General Use Waters" are defined as all waters of the State, "except as otherwise specifically provided." 35 Ill. Adm. Code §303.201. Midwest Generation contends that UDIP is "otherwise specifically provided for," within the meaning of Section 303.201, as a separate UDIP ALU designation, described and defined in the newly codified 35 Ill. Adm. Code § 303.230. Further, Section 303.230 states that the UDIP ALU standards must comply with Subpart D, not Subpart B, of Part 302. *Id.*

Midwest Generation argues that even if the Board applies General Use thermal standards to UDIP, the UDIP will not become a "General Use" water for purposes of Section 302.211(f). Even if UDIP is considered as General Use, Midwest Generation contends that ExxonMobil has not provided any justification for requiring Midwest Generation to conduct a 316(a) demonstration. Relying on the Upper Illinois Waterways studies and the Board's decision in AS 96-10, Midwest Generation maintains that it has already demonstrated that its discharges "have not caused or cannot be reasonably expected to cause significant ecological damage to the receiving waters" within the meaning of Section 302.211(f). *Id.* at 22.

Stepan

PC 1405

Stepan submits comments regarding IEPA's proposal on temperature criteria. A summary of their comments follows. *Id.*

Stepan last renewed its NPDES permit in April 2008. *Id.* The permit addresses the discharge of wastewater from process operations, cooling tower blowdown, sanitary waste and storm water. *Id.* The plant discharges approximately 0.88 million gallons per day and is regulated for 68 parameters most of which are based on the best available treatment technology for the organic chemicals industry. *Id.* Currently, their permit does not address limits on temperature or dissolved oxygen levels, nor do they have technology specifically designed to address these measures. *Id.*

Consideration of Economic Reasonableness and Technical Feasibility. Stepan mentions that Section 27 of the Act lists certain factors the Board may consider before establishing standards, including economic reasonableness and technical feasibility. *Id.* at 4. Therefore, Stepan believes the Board should consider these factors before implementing the standards set forth in IEPA's proposal. *Id.*

Rejection of Proposal and Adoption of Alternative. First, Stepan discusses the Board's designation of the aquatic life use for the UDIP. Stepan claims the Board supported the designation of the UDIP, but noted that the UDIP does not currently attain the CWA aquatic life goal but may attain it in the future if temperature criteria were established. *Id.* at 6. Stepan states that IEPA's proposed temperature criteria for the UDIP would be inconsistent with the ALU designation adopted by the Board. *Id.*

The current criteria established for the UDIP is for Secondary Contact and Indigenous Use Waters. PC 1405 at 6. Specifically, the standards require that a temperature of 93º F not be exceeded more than five percent of the time with an absolute maximum temperature of 100º F. *Id.* at 6-7. The General Use standards apply to the downstream boundary of the UDIP. *Id.* at 7. These standards require hourly criteria of 60º F from December through March and hourly criteria of 90º F from April through November. *Id.* These temperatures must not be exceeded more than one percent of the hours in a 12 month period. *Id.* There is also an absolute maximum temperature of 63º F from December through March and 93º F from April through November. *Id.*

Stepan notes that the Board granted Midwest Generation an adjusted standard (AS 96-10) at the I-55 Bridge. PC 1405 at 7. For 12 out of the 17 time periods established, AS 96-10 has standards less than or equal to the General Use criteria. In two periods the standard is less by more than 10º F. *Id.* For the remaining periods, the criteria are greater than the General Use standards but for three summer periods the increase is only by 1º F. *Id.* Stepan notes that the Board found in AS 96-10 that the standards did not have any more adverse effects on the environment or health than the General Use criteria. *Id.*

Stepan argues that IEPA's proposed criteria will dramatically lower the temperature criteria. *Id.* IEPA proposes a single daily maximum temperature of 88.7º F, an absolute maximum of 92.3º F, and 17 different period averages. *Id.* Stepan contends that all 17 of the period averages are lower than those required in the Secondary Contact criteria and even lower

than those in the General Use criteria. *Id*. at 8. Some period averages are more than 10º F lower than the General Use standards. *Id*. Stepan indicates that the proposed daily maximum and absolute maximum are respectively 4.3º F and 7.7º F less than those in the Secondary Contact criteria. *Id*. Stepan also notes that these proposed criteria are 1.3º F and 0.7º F less than those in the General Use criteria. *Id*.

Stepan believes that, for most of the year, it will be difficult or impossible for dischargers to achieve the proposed period averages if they are near the daily maximum on more than one or two days. *Id*. For example, if the temperature is 85º F (below the daily maximum) for three days during the early May period while retaining a temperature of 65º F for the other twelve days, Stepan's discharge will still violate the required period average of 68.1º F. *Id*. Likewise, Stepan observes, that the dischargers will receive daily penalties for an entire period even when the non-compliance issue is only limited to a few days. *Id*. at 13.

Stepan claims that the IEPA provided little scientific support to justify the proposed non-summer period averages. *Id*. at 8. IEPA stated that these averages reflected the need to maintain seasonal fluctuations in temperature. *Id*. However, Stepan asserts that Mr. Yoder admitted that the maintenance of normal seasonal cycles did not require achieving background temperatures as if there were no human influences. *Id*. at 9. Also, Stepan maintains that the IEPA did not refer to any scientific studies of thermal effects on aquatic species when IEPA set the period averages. *Id*.

Stepan discusses IEPA's past positions on temperature criteria as they applied to the UDIP. *Id*. at 9. Stepan states that IEPA's 2008 proposal included lower daily and absolute maximums and lower period averages than those required under the General Use criteria. *Id*. Next, the IEPA applied General Use criteria when the Board suggested designating the UDIP as a General Use water. *Id*. Later, when the Board reverted to the original proposal and designated the UDIP as a separate use, IEPA returned to the original proposal with certain modifications to reflect a change in the background station chosen to determine a number for the period averages. *Id*. Stepan disagrees with this change in background stations. *Id*. at 13. Originally, the background station used to determine the period averages was Rt. 83- CSSC. *Id*. Stepan believes this station was more suitable because the temperature data are not influenced by cooling water or Lake Michigan, and the flow from CSSC comprises 75% of LDPR flow. *Id*. The new background station, the Cal-Sag Channel-Rt. 83 station, only comprises 18% of LDPR flow. *Id*. at 13-14. Stepan claims the shift in background stations affected eight period averages, decreasing six of them. *Id*. at 14.

Stepan declares that IEPA's proposal for temperature criteria is inconsistent with the IEPA's approach to setting numeric criteria. *Id*. at 9. Stepan asserts that IEPA proposed the same DO levels for the UDIP that apply to General Use waters because IEPA believed the UDIP minimally attained the CWA aquatic life goal. *Id*. at 9-10. IEPA followed the same approach when they proposed the same numeric criteria for chloride for the UDIP as the General Use criteria. *Id*. at 10. Stepan argues that this method should also apply to temperature. *Id*. 10-11.

Cost of Compliance Economically Unreasonable. Stepan claims that the temperature and DO criteria under the Secondary Contact and Indigenous Aquatic Life Use standards are generally met in the UDIP. Therefore there are currently no permit limits. *Id*. at 14.

In the new proposal, IEPA has established different DO levels for the periods March through July and August through February. *Id*. at 15. Also, the proposed period average temperature criteria change every month and in some cases every fifteen days. *Id*. Furthermore, Stepan recognizes that the proposed criteria require significantly higher DO levels and lower temperatures. *Id*. Stepan does not believe that these criteria will be met in the UDIP. *Id*. Testimony from Mr. Twait indicated that temperatures in the UDIP do not currently meet General Use standards, which are less stringent than the proposed standards. *Id*. Also, the proposal will require DO levels to be greater than or equal to 5 mg/L for March through July. *Id*. Stepan declares that studies in 2004-2006, which measured DO levels in the LDPR, showed that the levels at the I-55 Bridge were lower than 5 mg/L on several occasions. *Id*. Finally, Stepan professes that its discharge will have difficulty meeting both the summer and non-summer proposed temperature standards if Stepan is not allowed a mixing zone. *Id*. at 16.

Stepan asserts that the warm water temperatures in their wastewater are beneficial to maintain a healthy biomass for reduction of biological oxygen demand (BOD) in the effluent. *Id*. Stepan claims that, in order to maintain a healthy biomass for reduction of BOD, temperatures must be between 65º F and 95º F, preferably at the higher end, and must be sustained year round. *Id*. Stepan explains that the use of cooling towers after activated sludge treatment for BOD reduction is not ideal for organic chemical, plastics, and synthetic fiber facilities, and that IEPA witnesses are not aware of any organic chemical, plastics, and synthetic fiber facilities in Illinois using cooling towers for this purpose. *Id*. at 17.

Finally, Stepan claims that the costs of complying with the lower temperature criteria will be significant. *Id*. After examining alternative compliance methods, closed-circuit cooling towers coupled with a heat exchanger/chiller were identified as the best technology for Stepan to consistently achieve the proposed temperature standards. *Id*. Hydrogen peroxide addition was found to be the best option for achieving consistent compliance with the proposed DO levels. *Id*. Stepan alleges that these efforts will result in $1,655,000 in capital costs and $1,950,000 in annual operating costs. *Id*.

Compliance will Cause more Damage. Stepan believes that the proposed thermal criteria for the UDIP will cause more environmental damage than the General Use or AS 96-10 standards. *Id*. at 18. Stepan claims that the technologies that it and other dischargers will have to implement in order to achieve these standards will have indirect environmental effects. *Id*.

Because Stepan receives most of its electricity from Joliet Station 9, the use of mechanical processes to reduce discharge temperatures will require more electricity, which will come from the burning of coal. *Id*. Stepan claims that these additional treatment processes will generate additional emissions of carbon dioxide, sulfur oxides, nitrogen oxides, and mercury. *Id*. at 19.

Allow Time for Adjustment. Because Stepan believes it will be difficult for it and other dischargers to comply with the new standards, Stepan suggests the Board adopt multi-discharger variances or adjusted standards and delayed effective dates. *Id*. at 20. Stepan also suggests requiring larger, upstream dischargers or non-point sources to achieve compliance first. *Id*. Stepan recognizes that in order for a variance from a water quality standard to be approvable at least one of the six UAA Factors must apply to the stream. *Id*. Stepan also asserts that many dischargers will be relieved by a delayed effective date, but there will be no incentive for large dischargers to take early action. *Id*. Stepan also mentions that a sequenced approach is sensible, however. the legal mechanism for implementing it remains unclear since water quality standards apply to everyone. *Id*. Stepan encourages the Board to consider these possible means of regulatory relief. *Id*.

Conclusion. First, Stepan does not believe temperature criteria that are more stringent than General Use standards should be applied to the UDIP, which is currently not attaining the CWA aquatic life goal. *Id*. at 20-21. Second, Stepan declares that the proposed temperature criteria are not economically reasonable. *Id*. at 21. Lastly, Stepan encourages the Board to consider options for regulatory relief. *Id*.

PC 1411

Stepan responds primarily to comments made by other participants regarding the UDIP, because these are the receiving waters for Stepan's Millsdale plant. PC 1411 at 1.

Temperature Alternatives Proposed by Midwest Generation are Reasonable. Stepan originally claimed IEPA's proposed standards were more stringent than the standards for General Use waters. *Id*. at 1-2. They suggested using the General Use standards or AS 96-10 instead of the proposed standards. *Id*. at 2.

In response to IEPA's proposal, Midwest Generation submitted its own proposal created by EA. *Id*. The report makes a number of points rejecting IEPA's proposed temperature criteria. *Id*. First, the report mentions that USEPA emphasizes the importance of using high quality field studies. *Id*. However, the Yoder Report, which IEPA's temperature criteria are based on, ignores field data. *Id*. EA also mentions that there are inaccuracies within the Yoder Report and many of Mr. Yoder's data are unsupported by the literature he cites. *Id*. Second, EA claims that they found many fish species in the field at temperatures in excess of the upper avoidance and lethal temperatures recommended by Mr. Yoder. *Id*. For example, the white sucker was found in the field at temperatures of 32º C (89.6º F) although the Yoder Report claimed the UILT was at 31.5º C (88.7º F). *Id*. Lastly, EA claims that analyses of the IWBmod and IBI show that the fish community in the UDIP is not significantly impacted until temperatures exceed 90º F. *Id*.

The EA proposes thermal criteria for the UDIP with a monthly average of 90º F and a maximum daily average of 93º F. *Id*. They claim these criteria are consistent with the CWA, and thus, the USEPA has no basis for disapproval. *Id*. at 3.

The EA also analyzed fish sample data from the UDIP and from General Use waters below the I-55 bridge. *Id*. EA claims that the catch rates of important fish are not materially

different from the Dresden Pool (General Use) and the Secondary Contact waters of the UDIP. *Id*. EA also notes that the Ohio EPA IBI scores for fish in the General Use waters below the I-55 bridge are only marginally better than the UDIP and are attributable to the off-channel areas present there. *Id*.

Stepan then commences to rank the proposals in the order of most preferred to least preferred. *Id*. The preferred proposal is the EA's 2007 proposal with a 90º F monthly average and a 93º F maximum daily average. *Id*. As a second choice, Stepan prefers EAs 2003 proposal with temperatures of….. *Id*. As a third choice, Stepan recommends the AS 96-10 with temperatures of…. *Id*. Fourth, Stepan suggests using the General Use standards, omitting the standards for natural and seasonal temperatures. *Id*.

Temperature Criteria Proposed by IEPA, USEPA, and Environmental Groups are Unreasonable.

The IEPA and USEPA Proposal Lacks Scientific Justification. Stepan claims that IEPA and USEPA suggest that the temperature criteria for the UDIP should be the same as for ALU A waters. *Id*. at 4. Stepan notes that these criteria are more stringent than General Use standards and disregard the logic of using less stringent criteria for lower quality waters. *Id*.

Next, Stepan states that the Yoder Report, on which the IEPA bases most of its criteria, is flawed. *Id*. Stepan explains that Mr. Yoder's model is simply a database of literature-derived values of temperature-related impacts to various fish. *Id*. Stepan also mentions that the report is not quality assured and contains numerous errors, according to EA. *Id*. at 4-5. Stepan contends that the UILT for the white sucker was not found in the article Mr. Yoder cited. *Id*. at 5. Also, the article cited indicated the fish in the study were acclimated at temperatures of 15-21º C (59-69.8º f), which is lower than what Mr. Yoder testified would be appropriate for the UDIP. *Id*. Stepan also claims that the IEPA blindly relied on the Yoder Report and never reviewed his sources. *Id*.

Stepan also believes Mr. Yoder should have used the USEPA's guidance to determine the temperature criteria. *Id*. The guidance suggests criteria should protect the aquatic community as a whole instead of all species at all times. *Id*. Furthermore, it indicates that criteria should be set to protect 95% of the representative community. *Id*. Stepan claims that Mr. Yoder derived his criteria based on a single, most sensitive species, the white sucker. *Id*. at 5-6.

Mr. Yoder based his criteria on the white sucker because he claims it is representative of fish species found in the UDIP. *Id*. at 6. Stepan notes that the white sucker comprises only 0.05% of the fish in the UDIP and is the 40th most common species found there. *Id*. Stepan also claims that other fish species used in the report, such as the northern pike and walleye, are rarely found in the UDIP. *Id*. Stepan does not believe these species of fish represent the UDIP since they are so rarely found there. *Id*.

Stepan observes the effect on the Yoder Report if the white sucker, northern pike, and walleye are eliminated from it. *Id*. Stepan notes the three most sensitive species would become the emerald shiner, bluntnose minnow, and freshwater drum. *Id*. Protecting the 95th percentile

would base the acute criteria on the 23rd most sensitive species, which would be the bluntnose minnow at 32.4º C (90.3º F). *Id*. Using Mr. Yoder's method, the daily maximum would be 90.3º F and the summer period average would be 86.7º F. *Id*. at 6-7.

Stepan claims that USEPA and IEPA influenced the outcome of the Yoder Report. *Id*. at 7. Stepan alleges that USEPA identified preferable temperatures and wanted to protect certain cool water species. *Id*.

Regarding the non-summer period averages, Stepan believes that the background station used for the UDIP was unjustified. *Id*. at 8. They claim that using the proposed background station would establish more stringent standards than for General Use waters. *Id*. Stepan proposes the non-summer averages should be the background temperature plus 5º F. *Id*. Regarding the two percent annual allowed excursion hours, the Environmental Groups argue that allowing temperatures above the daily maximum could harm fish. *Id*. However, Stepan notes that the Environmental Groups rely on the Yoder Report and ignore data that show that fish survive at temperatures that exceed the UILT and upper avoidance values derived from lab results. *Id*. The Environmental Groups also note that if the two percent excursion was used consecutively, this could result in temperatures above the daily maximum for as long as 7.3 days. *Id*. at 8-9. Stepan responds by suggesting that the provision be revised so the excursion is allowed for two percent of the hours in any month so that the consecutive hours of exceedance are at most limited to 29.8 hours. *Id*. at 9.

Environmental Groups' Proposal is too Extreme and Lacking in Scientific Justification. First, Stepan believes that the Environmental Groups' comparison between the proposed criteria for CAWS and LDPR and the existing criteria for the Ohio River is unjustified. *Id*. According to the State of Ohio, the Ohio River is designated as a public water supply, an agricultural water supply, and for bathing water, and will meet the most stringent criteria. *Id*. Stepan does not believe that this river should be compared to waters, such as the UDIP, which do not meet the CWA goals. *Id*.

The Environmental Groups, in their proposal, suggest a daily maximum of 85.1º F for the UDIP. *Id*. at 10. Again, Stepan observes that this criterion is based on the Yoder Report. *Id*. Stepan claims that Mr. Yoder did not check his sources or produce sources to support some of the key data in his report. *Id*. Also, Stepan asserts Mr. Yoder used data collected under acclimation temperatures that are not appropriate for the UDIP. *Id*. Stepan also contends that Mr. Yoder failed to use field studies, and that he could not explain a replicable procedure by which his method could be applied. *Id*.

The Environmental Groups apply a 2º C (35.6º F) downward adjustment to the daily maximum. *Id*. The Environmental Groups support this by referencing Colorado's adoption of the 2º C (35.6º F) factor. *Id*. However, Stepan claims that this factor does not apply to this situation since Colorado's criteria were derived using acclimation temperatures typical of the summertime in Colorado and calculated using the 95th percentile of species-specific acute values. *Id*. Stepan differentiates the Yoder Report since it did not include data that used UILTs derived using acclimation temperatures typical of Illinois summers nor did it use the 95th

percentile approach. *Id*. Stepan contends that Mr. Yoder used acclimation temperatures less than the 25 to 30º C (77-86º F) appropriate for the UDIP. *Id*.

The Environmental Groups suggest adjusting the daily maximum temperature by another 2º C (35.6º F) to calculate the summertime average temperature. *Id*. at 11. Stepan alleges that there is nothing in the record to support that a UILT acute survival value should be subject to a compounded 4º C (39.2º F) downward adjustment to protect for chronic survival. *Id*. Stepan also states that the 1986 Gold Book does not advocate this approach. *Id*. The Environmental Groups contend that this adjustment was proposed to protect the non-survival endpoints protected by Mr. Yoder; however, Stepan believes these values are suspect and point to inconsistencies by Mr. Yoder as reported by Midwest Generation. *Id*.; citing PC 1403 at 12-13.

The Environmental Groups propose daily maximums and period averages for the non-summer months. *Id*. The Environmental Groups base these criteria on Route 83-Cal Sag Channel data. *Id*. Stepan notes that flow from this channel only represents 18% of the flow into the LDPR. *Id*. The Environmental Groups also allege that the criteria are unlikely to cause any compliance issues for sewage treatment plants. *Id*. at 12. Stepan observed effluent temperatures from the Stickney Plant from 2001-2006. *Id*. Many of the proposed averages are lower than Stickney's 50th percentile temperature. *Id*. Stepan also observes that, during some non-summer periods, Stickney's effluent exceeds the Environmental Groups' proposed period averages more than 50% of the time. *Id*. Stepan notes that from December to February, Stickney's 50th percentile temperatures exceed the Environmental Groups' proposed periodic daily maximums. *Id*. Stepan also asserts that the Environmental Groups did not cite to any discharge temperatures of sewage treatment plants to justify this claim. *Id*. at 13.

The Environmental Groups claim that their proposal is consistent with prevailing temperatures. *Id*. Stepan counters that data for ambient temperatures at Route 83-Cal Sag Channel shows a substantial exceedance of Environmental Groups' proposed standards, and that the data from Route 83-CSSC shows even more exceedances. *Id*.

Cadmium. Stepan alleges that USEPA encourages the adoption of the IEPA's proposal regarding cadmium even though USEPA has issues with the criterion. *Id*. at 14. *Id*.

Stepan raises a series of issues with adopting the proposed criteria for cadmium. *Id*. at 14-15. First, it is questionable as to whether the Illinois General Assembly wants state agencies to adopt more stringent water quality standards than what is required by federal guidance. *Id*. at 15. Second, once the cadmium values are adopted as water quality criteria, they will be used as NPDES permit limits. *Id*. Finally, Stepan notes that water quality criteria are frequently used by other programs as cleanup and remediation goals. *Id*.

Stepan urges the Board to adjust the formula for cadmium criteria to reflect the preliminary reassessment reported by USEPA. *Id*.

USEPA's Comments of Section 302.407(b) and (c), 302.410 and 302.405(c)(3) Should not be Adopted.

Section 304.407(b) & (c). USEPA recommended modifying the first sentence of (b) that establishes the sampling requirements for attainment of chronic water quality standards. *Id*. at 16. USEPA suggested substituting "all samples" with "at least four consecutive samples" and "over any period of four days" with "over any period of at least four days." *Id*. USEPA also wanted to modify part (c) that establishes the sampling requirements for human health standards by deleting "based on at least eight samples." *Id*. USEPA reasons that including sampling requirements in water quality standards suggests that the criteria's applicability is dependent on whether the sampling requirements are met. *Id*.

Stepan does not agree with these modifications and cites to USEPA's Water Quality Standards Handbook indicating that the average time for chronic standards should be four days. *Id*. Stepan also mentions that, for health standards that use lifetime exposures, the concentration should be representative of the lifetime exposure instead of the concentration at a single point in time. *Id*. Stepan claims that USEPA's modifications would allow a single sample to constitute a chronic or human health water quality standard exceedance if no other samples were collected. *Id*. Stepan mentions that minimum sampling requirements account for the possibility of variability in the condition of the water and for sampling error. *Id*. at 17.

Stepan observes that Illinois water quality standards for other waters, such as General Use and the Lake Michigan Basin, include similar language regarding the sampling requirements. *Id*. Stepan contends that if there is a problem with the language, all the proposed rules that use this language should be reviewed at the same time. *Id*. at 18.

USEPA suggests omitting or rephrasing the language "at least four days" because USEPA claims it makes the chronic standard of "unlimited scope." *Id*. Stepan is unsure what this actually means, but Stepan asserts that the phrase only clarifies that a 3-day average is not enough to show a violation of a chronic standard. *Id*.

USEPA insists that the sampling requirements should be in a separate section of the Illinois Administrative Code. *Id*. Stepan claims that by doing this sampling requirements would not have to be part of what is submitted to the USEPA for approval as a water quality standard. *Id*.

Regarding Section 302.407(c), USEPA wants to add the phrase "for substances that are not bioaccumulative" to the end of the clause that makes an exception for mixing zones. *Id*. at 19. Stepan disagrees with this addition for multiple reasons. *Id*. First, Stepan claims that adding this sentence will make this section inconsistent with its counterparts for the General Use and Lake Michigan Basin waters. *Id*. Stepan asserts that if this section is to be changed, all the provisions should be changed at the same time. *Id*. Stepan also claims that the addition would disallow all mixing zones where bioaccumulative pollutants are involved without considering likely pathways of exposure. *Id*. Stepan cites the Water Quality Standards Handbook, noting that if mixing zones are allowed, an agency may deny one in a site-specific case. *Id*. at 19-20. Stepan maintains that prohibiting all mixing zones that contain bioaccumulative substances is not the same as giving site-specific consideration. *Id*. at 20. Lastly, Stepan argues that the additional sentence is redundant since nothing in Section 302.102 prevents the IEPA from considering bioaccumulative substances when determining whether or not to grant a mixing zone. *Id*.

Section 302.410. USEPA suggests deleting the phrase "toxic to aquatic life" from the introductory sentence of Section 302.410. *Id*. at 21. Stepan does not object to the change, however, it believes the introductory sentence itself needs further clarification since not all waters in CAWS and LDPR under subpart D have the same recreational/human uses. *Id*. Stepan suggests adding phrasing to make clear that the application of Subpart F must account for the differing designated uses. *Id*. Stepan recommends the section be modified as follows:

> Any substance or combination of substances not listed in Section 302.407 shall not be present in a discharge in amounts toxic or harmful to human health, aquatic life or wildlife, taking into account the designated use of the receiving water. *Id*.

Section 302.405(c)(3). USEPA suggests modifying Section 302.405(c)(3), which established the requirements for assessing the attainment of DO standards, but USEPA never makes a specific suggestion on how it should be modified. *Id*. at 22. USEPA has also suggested removing the section entirely and making it a separate section in the administrative code. *Id*. Stepan believes this is unwise because the General Use DO standard contains assessment requirements and CAWS and LDPR should also. *Id*.

The Board Should Insert a New Section into the Water Quality Standards Formally Incorporating its NPDES Permit Schedule of Compliance Regulation as a Water Quality Standard. In September 2013, Stepan notes, the USEPA proposed a rule requiring state authorizations for schedules of compliance for implementing water quality-based effluent limits in NPDES permits be adopted as part of the state's water quality standards and submitted to the USEPA for review. *Id*. Stepan argues that this proposal is based on an Administrator decision from 25 years ago in In the Matter of Star-Kist Caribe, Inc., 3 E.A.D. 172, 1990 WL 324290 (Apr. 16, 1990). *Id*. at 22-23.

Stepan claims that the principle message from this case is that USEPA is bound by state law when issuing permits for discharges in a state and could have no greater or different authority than the state. *Id*. at 22. Stepan believes the decision indicated that a state's compliance schedule regulation could either be part of the water quality standards or in a separate implementing regulation. *Id*.

Stepan mentions that Illinois has already adopted compliance schedule regulations as part of the NPDES permit regulations, and that the USEPA already has the opportunity to review those regulations. *Id*. Stepan recognizes that some dischargers may need schedules of compliance if their NPDES permits are revised to include limits based on newly revised water criteria. *Id*. at 24. Thus, Stepan urges the Board to revise Part 302 to include some reference to the IEPA's authority to include schedules of compliance in NPDES permits. *Id*.

The Board Should Follow the Requirements of the CWA and the Illinois Environmental Protection Act. Stepan notes that Congress gave the states, not the USEPA or IEPA, the lead role in establishing water quality standards. *Id*. at 25. Stepan admits that the standards must be submitted to the USEPA for approval but that its role in formulating the standards is limited. *Id*. Stepan contends that USEPA may only consider the requirements of the

federal statute and ensure that the state's standards meet the federal statutory requirements. *Id*. at 26.

Stepan asserts that USEPA's comments are not supported by a CWA provision or USEPA guidance. *Id*. Stepan believes that mere suggestions and policy or drafting preferences are not a basis for USEPA's disapproval as long as the state's standards are consistent with the CWA. *Id*. at 26-27.

The Board Should Work with IEPA to Ensure that USEPA Receives the Entire Administrative Record. Stepan insists that USEPA's letters following a Board First Notice Opinion have indicated that the only thing USEPA reviewed before submitting comments is the First Notice Opinion rather than the entire record. *Id*. at 27. Stepan is concerned that USEPA is not receiving the entire record and urges the Board and IEPA to provide USEPA with the entire administrative record. *Id*. at 28.

Environmental Groups

PC 1407

The Environmental Groups submit general comments concerning criteria that should be adopted to protect fish species in CAWS followed by four attachments. Each will be summarized below.

The Environmental Groups recognize that IEPA and other involved parties agree over the criteria for the protection of the waters of CAWS. PC 1407 at 1. However, the Environmental Groups note that there is no agreement over the criteria for Aquatic Life Use B and UDIP waters, especially concerning temperature. *Id*. The Environmental Groups believe that the Board must adopt more stringent temperature criteria for these use designations. *Id*.

The Environmental Groups believe IEPA's proposal is flawed in that:

1. The Maximum Daily temperatures proposed by IEPA are not protective of aquatic life uses designated for these waters,

2. The excursion allowance of 3.6º F for two percent of the year is unjustified and does not protect aquatic life,

3. The period averages do not protect aquatic life because a) they fail to protect the growth of aquatic life and b) they allow temperatures to occur that will lead to key species avoiding the waters. *Id*. at 1-2.

Yoder Report. The Environmental Groups do not agree with how IEPA used the data from this report to set the temperature criteria for the Lower Des Plaines River. *Id*. at 3. The Yoder Report uses the UILT and the critical thermal maximum (CTM) to determine the temperature standards. *Id*. at 4. Both are determined by putting fish into a tank and heating it until 50% of the individuals die. *Id*. The difference between the UILT and CTM is that the

UILT heats the tank gradually while the CTM heats it more quickly. *Id*. The maximum is found by subtracting 2º C (35.6º F) from the temperature that kills 50% of the individuals in the tank. *Id*. Mr. Yoder found that the lowest short-term survival endpoint was 85.1º F for Modified Use designated waters and 86.7º F for ALU B designated waters. *Id*. Mr. Yoder also proposed separate daily maximum temperatures for the non-summer months to maintain natural changes in temperature between seasons since this is vital for fish reproduction. *Id*. at 5.

IEPA Temperature Proposal. IEPA noted that it used data from the Yoder Report to develop the temperature standards for the CAWS and LDPR. *Id*. The Environmental Groups believe IEPA did not rely enough on the data found in the Yoder Report when formulating the proposal and that their proposed standards are not protective of aquatic life. *Id*. The Environmental Groups begin by comparing the UDIP and Brandon Pool standards with Ohio standards for the Ohio River. *Id*. at 6. The Environmental Groups note that the maximum daily temperature set by Ohio is 3º F less than what is proposed for the UDIP and 1.3º F less than Brandon Pool. *Id*. The Environmental Groups also mention that the period averages for the Ohio River are lower than both UDIP and Brandon Pool. *Id*. at 6-7. Finally, the Environmental Groups state that they do not believe the proposal is protective of aquatic life because: 1) the daily maximum temperature is based on the UILT, 2) there is a two percent 3.6º F excursion allowance, 3) there is a uniform daily maximum temperature for all months, and 4) the proposal ignores the impact on fish growth and avoidance. *Id*. at 7. Each of these reasons will be summarized below.

The UILT. The Environmental Groups do not believe that the daily maximum temperature should be based on the UILT since this is the temperature where 50% of the individuals in a species die. *Id*. Similar to the Yoder Report, the Environmental Groups suggest subtracting 2º C (35.6º F) from the UILT to gauge the daily maximum temperature. *Id*. This would bring the UDIP daily maximum temperature down to 85.1º F and the Brandon Pool daily maximum down to 88.3º F. *Id*.

The 3.6º F excursion allowance. IEPA stated that they chose the excursion allowance of 3.6º F by looking at the allowance under the General Use Standard and the Secondary Contact and Indigenous Aquatic Life Standards and selecting a temperature between the two. *Id*. at 8-9. The Environmental Groups argue that the General Use standard is not applicable to the current designations since the General Use Standard has additional restrictions to make up for the exclusion's harmful effects. *Id*. at 9. There are no additional restrictions contained in IEPA's proposed UDIP and ALU B criteria. *Id*. The Environmental Groups also suggest that the Secondary Contact and Indigenous Aquatic Life standards may not be protective because they have not been reevaluated for a number of decades. *Id*. Next, the Environmental Groups observe that the biggest flaw with this provision is that it double-counts the ability of the fish to survive short-term temperature stress. *Id*. Environmental Groups note that the daily maximum temperatures are already 3.6º F above the temperature the USEPA would set using the UILT as an endpoint. *Id*. The proposal also allows an excursion of an additional 3.6º F above the UILT. *Id*. The Environmental Groups cite the Yoder Report as indicating that the only time a UILT is an acceptable criterion is when this temperature occurs only for a short period. *Id*.

The Daily Maximum Temperature Allowed for Non-Summer Months. The proposal allows a daily maximum temperature of 88.7º F in January without violation as long as the monthly average is met. *Id*. at 10. The Environmental Groups believe this is inappropriate and could have a harmful effect on fish reproduction since fish are acclimated to lower temperatures in the non-summer months when reproduction mostly occurs. *Id*. The Environmental Groups note that even the USEPA questioned IEPA's usage of the same acute value all year and suggested a seasonally adjusted daily maximum. *Id*.

Growth and Avoidance Temperatures Should Have Been Used. Growth endpoints allow fish to continue normal reproductive cycles. *Id*. Avoidance endpoints maintain the health of the fishery since the avoidance temperature is where large decreases in population are observed. *Id*. The Environmental Groups question IEPA's usage of survival endpoints to configure the period averages since the survival temperatures lead to avoidance and reduced growth. *Id*.

Conclusion. The Environmental Groups propose a series of changes to the proposal. First, Environmental Groups would recommend deleting the 3.6º F excursion allowance. *Id*. at 11. Second, Environmental Groups would suggest including a cold shock provision for all three designations. *Id*. Also for all three designations, the Environmental Groups advocate setting the summer daily maximum temperature based on the UILT endpoint from the Yoder Report and setting summer period averages should also stem from the Yoder Report by subtracting 2º C (35.6º F) from the daily maximum temperature. *Id*. For all three designations, the Environmental Groups recommend period averages and daily maximum temperatures for each month, which are included in a table. *Id*. at 12-14. For the UDIP, the Environmental Groups propose basing the non-summer daily maximum temperatures and period averages from the Yoder Report. *Id*. at 11. For the ALU A and ALU B designations, Environmental Groups propose setting the non-summer daily maximum temperatures 5.0º F above the period average criteria. *Id*. at 12-13.

PC 1412

Summary. The Environmental Groups believe that the dischargers' main arguments in their post-hearing comments are broad, unsupported, and at times false. PC 1412 at 1. First, the Environmental Groups believe that IEPA's proposal for Aquatic Life A and B waters and for the UDIP are not more stringent than the general use standards. *Id*. Second, the Environmental Groups think that the thermal criteria in this proposal do not protect 100% of the species as the dischargers contend. *Id*. Third, Environmental Groups suggest that the criteria do not create optimal conditions for aquatic life and fall short of protecting tolerable conditions for many species. *Id*. Fourth, the Environmental Groups opine that the dischargers' economic concerns are highly speculative. *Id*. Last, the Environmental Groups believe it is not possible to address all of the dischargers' concerns in this proceeding. *Id*. at 1-2.

IEPA's Proposed Criteria is Less Stringent then General Use Standards. The dischargers argue that the IEPA proposal for temperature criteria regarding the UDIP is more stringent than the general use standards. PC 1412 at 2. The dischargers believe that the general use standards are protective of all aquatic life in all waters of the state and that the criteria

applied to CAWS and UDIP should be less stringent since they have high volumes of barge traffic and pollution. *Id*.

The Environmental Groups respond by stating that the general use standards may not be protective of the designated general use waters. PC 1412 at 2. The Board has previously recognized that these standards are not protective of all Illinois waters. *Id*. Also, the Environmental Groups think the general use criteria should be reevaluated for Illinois waters particularly since recent scientific studies have shown that high temperatures are a main cause of the growth of algal blooms. *Id*.

The Environmental Groups contend that the dischargers ignore most of the general use criteria. PC 1412 at 2. The general use standards provide maximum temperature criteria slightly higher than the proposal at times. *Id*. The criteria prohibit abnormal temperature changes, require normal seasonal fluctuations, and prohibit the temperature to rise 5º F above the normal temperature. *Id*. The Environmental Groups use this to contradict statements from Midwest Generation claiming that the IEPA proposal irrationally attempted to maintain natural seasonal variations. *Id*. The Environmental Groups also note that Midwest Generation exaggerates differences between the UDIP and General Use waters. *Id*. at 3. The Environmental Groups state that the main difference between the two is that the UDIP suffers from numerous old power plants that operate open-cycle cooling systems. *Id*.

IEPA is Correct in not Proposing Criteria to Maintain a Status Quo of Species. The dischargers claim IEPA and Mr. Yoder chose temperature criteria to protect 100% of the species in the community. PC 1412 at 3. The dischargers believe the standards should be chosen so that 95% of species that currently live in the waters are protected. *Id*. Environmental Groups support this claim by alleging the USEPA also recommends this 95% standard. *Id*. The dischargers contend that IEPA and Mr. Yoder both acted irrationally and violated USEPA guidance. *Id*.

The Environmental Groups counter by stating that the USEPA supported IEPA's developmental approach and the Yoder Report. *Id*. Environmental Groups claim that the USEPA even questioned whether Mr. Yoder included enough sensitive species in his study because he excluded many species due to the absence of thermal data. *Id*. The most thermally-sensitive species Mr. Yoder included in his report was the white sucker, which is a common species present in the Des Plaines River, according to the Environmental Groups. *Id*.

The Environmental Groups also include testimony from Dr. David Thomas, former chief of Illinois Natural History Survey, where he stated a number of fish species, like walleye and smallmouth bass, could appear in the UDIP if the temperatures were lowered. *Id*. at 4. Midwest Generation stated in their post-hearing comments that Midwest Generation could not find a study to support the UILT used for the white sucker in the Yoder Report. *Id*. The Environmental Groups contend that the UILT is found as easily as searching on Google and that many studies that they found cited a lower UILT than the one in the Yoder Report. *Id*.

The dischargers claim that USEPA supports standards that protect 95% of the species in a community and discourages higher percentages. *Id*. The dischargers support this claim with a citation from the 1985 USEPA Guidelines for Deriving Numerical Water Quality Criteria for the

Protection of Aquatic Organisms and their Uses, Office of Research and Development, PB85-227049. *Id*. However, the Environmental Groups are unsure whether the policies in this publication for developing nationwide criteria for toxins also apply to setting temperature criteria. *Id*.

Regarding the dischargers claim that the standards should be based on the species currently living in the waters, the Environmental Groups counter that the goal of these standards is to protect aquatic life that *could* live in the waters. *Id*. This indicates that species that could be present absent thermal impacts must also be accounted for. *Id*.

Midwest Generation believes that the standards for the I-55 Bridge or the AS 96-10 standards should apply. *Id*. at 5. The Environmental Groups note that the current standard for the I-55 Bridge is irrelevant since it was based on evidence that was collected two decades before wastewater treatment was prevalent. *Id*. Environmental Groups also claim the AS 96-10 standard does not apply because it concerns water quality studies dating to the 1970's and 1980's. *Id*. Midwest Generation also submitted their own proposal for temperature criteria; however, the Environmental Groups assert it allows temperatures of 98º F, which is higher than the UILT for every fish species except carp. *Id*.

IEPA Proposal does not Create Optimal Conditions for all Fish. The Environmental Groups state that the daily maximum and period averages in the Yoder Report are already above the optimum temperature for almost every fish. *Id*. at 5-6. Environmental Groups note that the IEPA proposal allows for maximum temperatures higher than those suggested in the Yoder Report. *Id*. at 6.

The dischargers disagree with the non-summer monthly averages in the proposal. *Id*. The Environmental Groups observe that these period averages are based on the higher end of the 90th percentile of the temperature at Rt. 83 and Cal Sag Channel and based on the 75th percentile of discharge temperatures from the District wastewater treatment plant. *Id*. The Environmental Groups believe the criteria should be lower for the UDIP because the plant is located 18 miles upstream from this location, allowing ample time for the discharge to cool. *Id*. The dischargers also claim that non-summer temperatures have no effect on the health of aquatic ecosystems. *Id*. The Environmental Groups state that temperature is very important to fish spawning and hatching. *Id*.

The Environmental Groups mention that they do not agree with the cold shock provision in IEPA proposal since it leaves too much for the permit writers to figure out while writing readily-enforceable numeric permit limits. *Id*. at 6-7. The Environmental Groups note, however, that Illinois has many standards that require permit writers to make calculations concerning water quality based effluent limits. *Id*. at 7.

The dischargers note that IEPA is not aware of any fish kills from cold shock occurring in the UDIP. *Id*. The Environmental Groups state that just because they are not aware of any fish kills from cold shock does not mean it never happened. *Id*. Environmental Groups claim that no IEPA official was looking for winter fish kills and that many fish kills may have gone unnoticed. *Id*.

The Environmental Groups mention Midwest Generation's proposal, claiming that it contains dangerously lenient summer temperature criteria, and that it allows winter temperatures of discharge plumes to rise 27º F above the ambient temperature. *Id*. The basis for these criteria originates from a chart in the USEPA's 1977 Temperature Criteria for Freshwater Fish: Protocol and Procedures, which claims that water temperatures in the UDIP generally do not drop below 50º F. *Id*. The Environmental Groups respond by noting that data collected from the Joliet 9 station's water intake temperatures for January and February 2009 and 2010 showed temperatures as low as 33º F with only one day out of the four-month study resulting in temperatures as high as 50º F. *Id*.

The Dischargers' Economic Arguments are Unreasonable. The Environmental Groups believe the dischargers' economic arguments should be rejected. *Id*. at 8. The Environmental Groups mention that the CWA requires criteria to be adopted unless it would cause a "substantial and widespread economic and social impact." *Id*. The Environmental Groups note the Board can consider economic reasonableness; however, this should not undermine other requirements. *Id*. The Environmental Groups claim that none of the dischargers have proven that the standards will have a widespread economic and social impact by meeting USEPA's requirements. *Id*.

The Environmental Groups believe that ExxonMobil's and Stepan's economic concerns are merely speculative since they are unsupported by evidence. *Id*. Stepan claims that it will have difficulty meeting the summer and non-summer temperature standards, while Exxon claims that meeting these standards will cost it large amounts of money. *Id*. Environmental Groups both believe that IEPA will be more lenient towards Midwest Generation. *Id*. at 9. The Environmental Groups claim that even if Midwest Generation is allowed to violate the standards for a period of time, there are other mechanisms to address this problem. *Id*.

The Environmental Groups also believe that Midwest Generation's estimate of compliance costs is unjustified and does not amount to a socially unacceptable outcome. *Id*. Midwest Generation claims that installing cooling towers will cost them $600 million. *Id*. However, the Environmental Groups claim that they determined lower estimates using USEPA's suggested method. *Id*. The Environmental Groups state that even if Midwest Generation's estimates were true, the record has no context for determining whether those costs would result in an economically unacceptable outcome. *Id*. Moreover, the Environmental Groups estimate that the investment would add $1.70 per megawatt hour (mwh) of energy to the current marginal cost. *Id*. at 10. Furthermore, Midwest Generation fails to evaluate other compliance options other than closed-cycle cooling, depriving the Board of the needed information to fully assess the economic impacts of compliance. *Id*. The Environmental Groups suggest that retrofitting Joliet 29 or Will Co. to combined-cycle cooling will reduce water use by half. *Id*. Since Joliet 29 already uses natural gas as a secondary fuel, the Environmental Groups believe the conversion could also allow the plant to achieve compliance with NAAQs and the "Combined Pollutant Standard." *Id*.

The Environmental Groups also raise the issue that Midwest Generation failed to consider non-technology-based compliance such as de-rating its units when waters became very

warm. *Id*. Midwest Generation claims that they would need to de-rate their units 100 days a year; however, Midwest Generation did not reveal what data they based this assertion on. *Id*. The Environmental Groups admit that de-rating units would result in lost revenue, but Midwest Generation deprived the Board of information regarding the cost of alternative compliance options. *Id*.

Midwest Generation also asserts that the switch to closed-cycle cooling will result in minimal environmental benefits. *Id*. However, the Environmental Groups point out that this switch is technically feasible, will reduce water use by 95-98%, will reduce thermal pollution because there is little or no water use, and will eliminate impingement and entrainment issues. *Id*.

The Environmental Groups allege that Midwest Generation relies on old arguments that do not pertain to them anymore since NRG Energy, Inc. (NRG) bought them. *Id*. at 11. NRG now controls Joliet 29, Joliet 9, and Will County. *Id*. The Environmental Groups argue that NRG has the proper funds that Midwest Generation lacked to retrofit the plants. *Id*. Thus, if Midwest Generation wants to assert financial hardship, they must do more than just determine the total costs for compliance. *Id*. Midwest Generation must also evaluate the cost in the context of an energy business and in the context of new ownership under NRG. *Id*. Furthermore, the Environmental Groups comment that NRG has prior experience complying with cooling water issues. *Id*. For example, NRG replaced a number of plants in California with new, modern plants that use dry-air cooling. *Id*. NRG also plans to retrofit a plant in Pittsburgh to use closed-cycle cooling. *Id*. The Environmental Groups mention that NRG will soon announce the business plan for its Illinois assets that may include adjustments to change the thermal load. *Id*. at 12.

Lastly, the Environmental Groups note that the state of Illinois has declared cooling towers as the preferred tech to address these issues in similar situations. *Id*. The Environmental Groups cite to an *amicus curiae* brief in Clean Wisconsin v. Public Service Commission of Wisconsin where the state identified cooling towers and dry-cooling as proper alternatives to once-through cooling. *Id*. The state also recognized the harm to aquatic life stemming from open-cycle cooling. *Id*.

Future Proceedings. The Environmental Groups think it unwise for the Board to adopt new criteria for pollutants due to a limited record and limited discussion. *Id*.

Regarding ammonia, selenium, and copper, IEPA has stated that CAWS, Brandon Pool, and the UDIP are all fully protected by the ammonia water quality standards. *Id*. at 13. The Environmental Groups do not think this is true and urge the USEPA to adopt more stringent criteria to protect more sensitive species. *Id*. The Environmental Groups urge the Board to adopt an ammonia criteria for CAWS and LDPR and they hope IEPA will propose an updated statewide standard in the future. The Environmental Groups believe that Illinois should address copper and selenium criteria; however, the Environmental Groups do not believe this issue should be discussed in this proceeding. *Id*.

Regarding chloride and mercury, the Environmental Groups are concerned with IEPA proposal limiting applicability of the 500 mg/L chloride standard to May 1-November 30. *Id*. The Environmental Groups also think that this rulemaking is not the proper forum to obtain variances from standards that the dischargers seek. *Id*. The Environmental Groups take no position regarding Citgo/PDV's chloride and mercury criteria for the limited regulated navigation zone surrounding the invasive species barrier. *Id*. at 14. However, the Environmental Groups do not believe these criteria should extend to ALU B waters. *Id*. Regarding Citgo/PDV's winter standards for chloride, the Environmental Groups state that their evidence does not take into account areas outside of the regulated safety zone where sensitive species are present. *Id*. Lastly, the Environmental Groups approve of Citgo/PDV's suggestion for implementing best management practices in controlling chloride pollution. *Id*.

DISCUSSION

IEPA proposed water quality standards for a number of chemical constituents and parameters that IEPA believes are necessary to protect the aquatic life uses developed in Subdocket C. The Board will discuss all of the constituents that have been proposed for adoption or repeal. The Board begins its discussion with Bubbly Creek and the water quality standards proposed for Bubbly Creek. The Board will then discuss the proposed repeal of certain water quality standards, moving then to the water quality standards that raised few, if any issues. The Board will then discuss total ammonia nitrogen, cadmium, copper, cyanide, fluoride and manganese, and selenium. The Board proceeds with a discussion on human health standards for phenols, benzene and mercury. Dissolved Oxygen and the proposed standards for DO will be addressed next, followed by a discussion regarding the Chloride standards. The next constituent discussed is temperature. The Board will then provide a discussion on miscellaneous changes to the rule and conclude with a discussion of issues raise by USEPA that have not been addressed in the preceding portions of the opinion.

Bubbly Creek

The South Fork of the South Branch of the Chicago River, known as Bubbly Creek, was removed from consideration of Aquatic Life Uses in Subdocket C. *See* Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(C), (Feb. 6, 2014). Bubbly Creek is 1.3 miles long and flows into the South Branch. The channel varies from 100 to 200 feet wide and 3 to 13 feet deep. Attach. B at 3-4. The majority of the bank consists of steeply sloped earth or rock materials, and there are several sections with vertical dock walls. *Id*. Bubbly Creek has been mostly filled in and is primarily a stagnant side-channel to the South Branch of the Chicago River. Attach. B at 3-5. Currently, there is virtually no natural flow into the system; the flow mainly consists of discharge from CSOs and from the District's Racine Avenue Pumping Station. *Id*. The flow coming from this pumping station is high in oxygen demanding compounds as well as floatable materials.

In Subdocket C, the Board stated:

> Even within CAWS, Bubbly Creek presents unique issues that need to be addressed. The effects of contaminated sediments on aquatic life, lack of habitat, and low flow point to a need for further examination of Bubbly Creek before an aquatic life use is designated. The USACE [U.S. Army Corps of Engineers] is developing a report on Bubbly Creek that may shed some light on these issues. Therefore, the Board agrees to the request by the Environmental Groups and the District to open another Subdocket to address Bubbly Creek. The Board will await submission of the USACE report and any comments on that report into the record before proceeding in the new Subdocket. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9(C), slip op. at 193 (Feb. 21, 2013).

IEPA recommends that Secondary Contact water quality standards remain in place for Bubbly Creek until Subdocket E issues are resolved. PC 1401 at 38.

On April 30, 2014, USEPA filed a comment indicating concerns with IEPA's proposal. PC 1404 at 8. USEPA noted that IEPA's proposal to replace CWA-effective criteria at Part 302, Subpart D, which currently applies to all of the CAWS and LDPR, with new and revised criteria for ALU A, ALU B, and UDIP ALU waters has the effect of removing all criteria applicable to Bubbly Creek. *Id*. USEPA noted that no new aquatic life use or criteria has been proposed for this water, and no criteria are in place to protect indigenous aquatic life. *Id*. Therefore, these changes do not appear to be consistent with 40 C.F.R. 131.5(a)(2), 131.5(c), and 131.11(a)(1). *Id*. USEPA recommends the Board remedy this by either retaining the existing criteria that apply to Bubbly Creek or temporarily place Bubbly Creek into one of the new aquatic life use designations until such time as site-specific uses and criteria are justified. *Id*.

The Board agrees that proposing to repeal Indigenous Aquatic Life standards would pose an issue for Bubbly Creek as no water quality standards would apply. Therefore, the Board will not propose deletion of the Indigenous Aquatic Life standards. Rather, the Board will propose language that establishes those standards for Bubbly Creek and include those standards with the standards proposed for ALU A, ALU B, and UDIP ALU waters. However, in continuing the application of the indigenous aquatic life standards, the Board is concerned that Bubbly Creek would be subject to an "anytime" DO standard of 4.0 mg/L, which appears to be more protective than the "anytime" DO standard of 3.5 mg/L applicable to CAWS ALU A, ALU B and UDIP waters. While the Board recognizes that higher use designation waters are subject to additional DO limitations, the Board seeks comments from the participants on whether the proposed DO standard for Bubbly Creek needs to be changed to reflect the "anytime" standard applicable to remaining portions of CAWS and LDPR

Repeal of Water Quality Standards

IEPA proposed the removal of barium, oil/fat/grease, phenols and total dissolved solids (TDS) standards as unnecessary. PC 1401 at 10. IEPA suggests that the standards are all out-of-date water quality standards, and USEPA has not adopted a federal national criteria document to protect aquatic life for any of these parameters. SR at 77. Further, IEPA believes that TDS

standards are no longer necessary due to improvements in water quality standards for sulfate, and General Use waters no longer have a TDS standard. PC 1401 at 10.

USEPA took issue with the removal of phenol and barium water quality standards and recommended that "if the proposed water quality standards are revised to include protection of human health," IEPA should "consider revising (rather than deleting) the water quality criteria for phenol and barium to be as protective as [USEPA]'s current human health water quality criteria recommendations for these parameters (860 mg/L and 1 mg/L, respectively)." PC 286 at 10.

In response to USEPA's concerns, IEPA is proposing to include human health criteria for phenol. Barium and oils will be protected by the effluent standard found in 35 Ill. Adm. Code 304.124. SR at 79 USEPA did not specifically address the issue of barium and phenol in its final comment; however, in a later comment USEPA indicated that IEPA's revisions follow national guidance. *See* PC 1404 at Enclosure 1 at 1.

The record contains no other evidence regarding barium, oil/fat/grease, phenols, and TDS. The Board is convinced that IEPA's addition of a human health standard for phenol and corresponding effluent standards are sufficient to protect the aquatic life uses for the CAWS and LDPR. Therefore, the Board will propose the repeal of barium, oil/fat/grease, and TDS water quality standards and propose a human health standard for phenol.

Water Quality Standards With Little Controversy

IEPA proposed several standards based either on the national criteria documents or the current General Use water quality standards. Those proposed water quality standards are for: pH, lead, chromium (hexavalent, total), benzene, ethylbenzene, toluene, xylene, nickel (dissolved), iron, and zinc (dissolved). Citgo/PDV commented that IEPA failed to submit testimony or address the economic reasonableness or technical feasibility of meeting some of the water quality standards including pH. PC 1402 at 3. Citgo/PDV noted that IEPA conceded that the pH standard would not be met under current conditions. *Id*. Further, USEPA initially questioned IEPA's standard for lead and the human health standard for benzene (*see* PC 286 at 9, 11); USEPA later indicated that the standard met the guidance (*see* PC 1404, Enclosure 1 at 1). No issues regarding IEPA's proposed water quality standards for benzene, ethylbenzene, toluene, xylene, nickel (dissolved), iron, and zinc (dissolved) were raised.

In some cases IEPA found that the national criteria were more current than the adopted General Use water quality standard and proposed those standards. IEPA proposed the more up-to-date standards for arsenic, chromium (trivalent, total), silver, and the aquatic life standard for mercury. While USEPA initially questioned IEPA's standard for silver (*see* PC 286 at 8); USEPA later indicated that the standard met the guidance (*see* PC 1404, Enclosure 1 at 1.). The human health standard for mercury has generated much comment; however, the aquatic life standard for mercury did not. For arsenic, chromium (trivalent, total), and silver, no participant raised an issue with IEPA's proposed standards, other than USEPA's comment, regarding silver.

After a careful review of the record, the Board finds that proceeding to first notice with IEPA's proposed water quality standards for pH, lead, chromium (hexavalent, total), benzene, ethylbenzene, toluene, xylene, nickel (dissolved), iron, zinc (dissolved), arsenic, chromium (trivalent, total), silver, and the aquatic life standard for mercury is warranted. While concerns were raised by participants regarding pH and silver, no suggestions were offered for alternative standards. Additionally, the record supports a finding that the proposed standards are either equivalent to the current General Use water quality standards or are based on the national criteria. Therefore, the Board will proceed to first notice with IEPA's proposed water quality standards for pH, lead, chromium (hexavalent, total), benzene, ethylbenzene, toluene, xylene, nickel (dissolved), iron, and zinc (dissolved), arsenic, chromium (trivalent. total), silver, and the aquatic life standard for mercury.

Total Ammonia Nitrogen

IEPA added Section 302.412, a stand alone provision to address the water quality standard for ammonia. SR at 91. IEPA noted that the language differs from the General Use water quality standard in order to address the applicability of the early life stage as absent year round in the ALU A and ALU B waters and present from March through October in UDIP. *Id.* IEPA noted that the proposed standards were based on the most recent national criteria document at the time of the proposal. PC 1401 at 5. IEPA stated that USEPA adopted a new ammonia criterion in April 2013; however, as IEPA will address the new criteria on a statewide basis, so its current proposal remains the same as originally proposed. *Id.*

USEPA questioned whether the proposed criteria would protect larval fish during early stages. PC 286 at 7. USEPA noted that there are "no proposed ammonia criteria for the protection of early life stages," yet "available data" suggests that "larval fish are present in the waters during these times." USEPA therefore questioned "whether a sufficient justification has been given to support the decision to omit criteria necessary to protect this life-stage." *Id.* USEPA insists that IEPA's proposed ammonia criteria are not consistent with the most recent 304(a) criteria toxicity data sets. PC 1404, Enclosure 1 at 2. Therefore, IEPA's revision does not comply with 40 C.F.R. 131.11(b)(1) and should be updated with the newest 304(a) Guidance, according to USEPA. *Id.*

While the Board shares USEPA's concern that the proposed ammonia standard does not comport with the 2013 national criteria, the Board notes that IEPA has indicated that it plans to address any changes based on the 2013 national criteria document on a statewide basis. The Board finds IEPA's approach to be acceptable because the proposed standards are based on the General Use ammonia standards. Additionally, the proposed ammonia standards at Section 302.412 afford early life stage protection for all CAWS and LDPR waters with the exception of CAWS and Brandon Pool ALU B waters. Therefore, the Board proposes IEPA's total ammonia standard for first notice. The Board seeks input from participants including IEPA regarding the applicability of the 2013 national criteria.

Cadmium

For cadmium, IEPA considered using the 2001 national guidance to develop a standard. SR at 66. However, IEPA determined that the derived standard needed adjustment, so IEPA proposed the General Use water quality standard for cadmium for the ALU A, ALU B, and UDIP ALU waters. IEPA investigated causes for exceedances of the national criteria for cadmium and found that sediment is the likely reason for the exceedances. PC 1401 at 7. IEPA has concerns with the data set used in the national criteria document and has raised those concerns with USEPA. *Id*. at 8. IEPA determined that at this time the dissolved cadmium water quality standard in the General Use water quality standards will protect the aquatic life uses of CAWS and LDPR. *Id*.

USEPA recommends that, while it is working to release a new 304(a) Guidance document for cadmium within the next year, the Board should proceed to adopt appropriate cadmium criteria without waiting for the new release. PC 1404 at 3.

Stepan argues that USEPA has concluded that IEPA's proposed criteria (4.35 µg/L at hardness of 50) are less than half what it should be (9 µg/L at hardness of 50), and the chronic criterion is also stringent by 12%. PC 1411 at 14. Stepan raises a series of issues with adopting these criteria for cadmium. *Id*. at 14-15. First, Stepan states it is questionable whether the Illinois General Assembly wants state agencies to adopt more stringent water quality standards than what is required by federal guidance. *Id*. at 15. Second, once the cadmium values are adopted as water quality criteria, they will be used as NPDES permit limits. *Id*. Finally, Stepan notes that water quality criteria are frequently used by other programs as cleanup and remediation goals. *Id*. Stepan urges the Board to adjust the formula for cadmium criteria to reflect the preliminary reassessment reported by USEPA. *Id.*

USEPA and Stepan raised concerns regarding IEPA's proposed cadmium standards. The Board appreciates these concerns; however, the Board is reluctant to update the cadmium standard based on USEPA's preliminary analysis in this rulemaking. As stated, with regard to total ammonia standard, the Board believes that any changes to the cadmium standard must be done on a statewide basis after a comprehensive evaluation of USEPA's guidance by IEPA. IEPA has stated that the current General Use water quality standard for cadmium is protective of the designated aquatic life uses in CAWS and LDPR. Further IEPA understands that contaminated sediments are the likely reason for the existing exceedances. Therefore, the Board will proceed to first notice with IEPA's proposed standard.

Copper

The acute and chronic copper water quality standards are based on the recalculation procedure established in the 1995 national criteria document and not the 2007 update. SR at 70-71. IEPA choose not to incorporate the 2007 criteria document as the new methodology was complex and a departure from the way copper water quality standards had been developed in the past. SR at 71.

USEPA suggested that IEPA "conduct a review of whether or not it is necessary to adopt numeric criteria for recently published 304(a) recommended criteria" including copper. PC 286

at 10. USEPA argues that the copper standard is not consistent with the national criteria and therefore contrary to the CWA. PC 1404, Enclosure 1 at 2.

Mr. Tischler, who testified on behalf of ExxonMobil, indicated that the General Use water quality standards being proposed for the UDIP are of concern especially regarding temperature, chloride, copper, dissolved oxygen, and mercury. *Id.* Mr. Tischler opines that "[d]epending upon the particular constituent that is causing the impairment, it may or may not be technically feasible or economically reasonable to achieve the numeric criterion in the discharge." Exh. 488 at 14. Therefore, Mr. Tischler suggests that variances are essential to assure that permittees can continue to operate their facilities in compliance. Exh. 488 at 15.

The Board shares USEPA's concern that the proposed copper standard may be insufficient to meet the national criteria. However, IEPA has indicated that the latest national criteria may not be workable in Illinois. The Board finds that the record supports proposing for first notice IEPA's recommended copper water quality standard. However, the Board asks IEPA and other participants to more fully explain why the 2007 national criterion is not workable and why IEPA's proposal is correct.

Cyanide

IEPA proposed a cyanide standard based on existing General Use water quality standards. These standards are identical to and based on the most recent USEPA national criteria document at the time the proposal was filed. SR at 63. Those proposed standards were 22 µg/L acute and 5.2 µg/L for chronic. However, IEPA amended the proposal and recalculated the chronic value for cyanide. IEPA removed rainbow trout from species list when considering a cyanide standard. As a result, the remaining four most sensitive species are brook trout, yellow perch, bluegill, and black crappie. *Id*. The calculated chronic value for cyanide then becomes 9.799 µg/L, which IEPA recommends rounding up to 10 µg/L. *Id*. IEPA also proposed moving cyanide to the tables in Section 302.407 from its own section in Section 302.410.

Ms. Wasik, testifying on behalf of the District, had pointed out that IEPA's original proposal failed to consider a site-specific cyanide standard adopted in 1996. *See* Petition of the Metropolitan Water Reclamation District of Greater Chicago for Site-Specific Water Quality Regulation: 35 Ill. Adm. Code Parts 302 thru 304, R95-14 (Feb. 1, 1996). Ms. Wasik noted that the chronic cyanide standard of 10 µg/L was applied to General Use waters located in Cook County in that rulemaking. She further noted that "the General Use chronic water quality standard for cyanide does not apply in Salt Creek, Higgins Creek, the West Branch of the DuPage River, and the Des Plaines River". *Id.*

IEPA's amended proposal addresses the concerns raised by Ms. Wasik and proposes the same chronic water quality standard for cyanide as the Board adopted in R95-14. The Board finds that the record supports IEPA's recommended cyanide water quality standards, and the Board will propose those standards for first notice.

Fluoride and Manganese

IEPA originally withdrew the fluoride and manganese standards but reinserted the standards in the amended proposal. Exh. 481 at 15-16. IEPA added these standards in response to concerns raised by USEPA. Exh. 480 at 3. IEPA proposed the same standards as the General Use water quality standards adopted in Triennial Review of Water Quality Standards for Boron, Fluoride and Manganese: Amendments to 35 Ill. Adm. Code 301.106, 302.Subparts B, C, E, F and 303.312, R11-18 (Nov. 15, 2012). *Id*. IEPA noted that fluoride and manganese have no national criteria developed for protection of aquatic life uses. *Id*.

The Board will propose for first notice water quality standards for fluoride and manganese. The Board adopted water quality standards for General Use waters, and the Board finds that that rulemaking supports adding fluoride and manganese water quality standards to protect aquatic life in CAWS and LDPR.

Selenium

IEPA proposed no changes in the selenium (total) water quality standard from that in the existing Secondary Contact and Indigenous Aquatic Life standard. SR at 74. IEPA offers that it did not use USEPA's criteria for selenium as there is "uncertainty surrounding the science used in developing" the most recent draft rules. PC 1401 at 29. If a national criteria document is finalized, IEPA will review the document and may propose statewide modifications. *Id*.

USEPA recommended that IEPA "consider revising [them] to be consistent with either the current chronic criteria recommendation of 5 ug/L or the draft fish tissue-based selenium criteria." PC 286 at 9-10. As with copper, USEPA argues that the selenium standard is not consistent with the national criteria and therefore contrary to the CWA. PC 1404, Enclosure 1 at 2.

As with copper, the Board shares USEPA's concern regarding IEPA's proposed selenium standard. However, the Board is equally concerned that the science used in developing USEPA's draft criterion may be in question. Therefore, the Board finds that the record supports proceeding to first notice with the selenium standard proposed by IEPA. The Board seeks input from the participants in order to more fully understand why USEPA's proposed national criterion for selenium should not be adopted by the Board.

Human Health Standards

USEPA noted that CAWS and LDPR are both used for fishing, and it is presumed that fish are "then eaten." PC 286 at 10. USEPA therefore recommended that IEPA "determine if additional human health criteria are warranted to adequately protect human health from the consumption of contaminated fish caught in CAWS and LDPR based upon review of all [USEPA] recommended criteria for the protection of human health (for consumption of organism only)." USEPA also recommended that "if the proposed water quality standards are revised to include protection of human health," IEPA should "consider revising (rather than deleting) the water quality criteria for phenol and barium to be as protective as [USEPA]'s current human health water quality criteria recommendations for these parameters (860mg/L and 1mg/L, respectively)." *Id*.

Phenol

As discussed above the Board will propose IEPA's suggested human health standard for phenol.

Benzene

USEPA expressed concern that the benzene human health standard proposed by IEPA is not as protective as required by national guidance. PC 286 at 11. USEPA stated that the record does not include justification that IEPA's proposed standard is appropriate. *Id*. IEPA noted that the benzene human health standard proposed is based on the existing General Use standards and is more up-to-date than the national criterion. Exh. 2 at 5.

The Board finds that there is evidence to support proceeding to first notice with IEPA's proposed human health standard for benzene. However, the Board invites additional comment from participants on whether or not this criterion is appropriate.

Mercury

IEPA proposes a human health standard for mercury that mirrors the human health standard found in the General Use water quality standards. IEPA suggests amending the original proposal to allow for a 12-month rolling average versus an annual average and removing the reference to harmonic mean flow. This change was suggested in response to questions by Citgo/PDV at hearings. PC 1401 at 21.

Citgo/PDV claims that the elevated levels of mercury in the CSSC are actually a product of re-suspension of sediments from higher ground. Citgo/PDV cited some sampling from 2008 and 2011, in which it was discovered that total dissolved mercury levels were low, but total mercury averaged 9.59 ng/L. It was noted that 20% of the time, the flow was above the harmonic mean, and the total mercury exceeded 12 ng/L. This was attributed to "re-suspension of sediment during higher flow periods". PC 1402 at 20-21. Based on this information, Citgo/PDV concludes that "the imposition of the 12 ng/L standard [for mercury] during periods when the flow is above the harmonic mean makes no sense technically, because to achieve this standard during higher flow periods requires dredging of the CSSC". PC 1402 at 21. Citgo/PDV urges the Board "not to include the Human Health Standard for mercury with respect to ALU B waters, "or at least those ALU B waters that have a use designation of Non-recreation". If the Board adopts a human health standard for mercury, Citgo/PDV suggests that the references to harmonic mean flow be removed.

ExxonMobil takes issue with IEPA's proposal to use the human health standard for mercury in these waters. *See generally* PC 1406 at 12-18. ExxonMobil argues that, while UDIP is listed as impaired for mercury, that impairment is based on fish tissue data, and not actual water column data. Because of the impairment, ExxonMobil expresses concern that mixing zones will not be allowed for mercury, and the 12 ng/L standard will have to be met in the discharge. ExxonMobil claims that states and USEPA have consistently found that impairment

of water quality by mercury is caused by atmospheric deposition rather than point sources. PC 1406 at 14. ExxonMobil also claims that "relying" on the NPDES program of point sources in order to remedy mercury impairments will have "virtually no effect" on the impairment because the source is "a non-point source – atmospheric deposition." ExxonMobil states that it is not aware of any "commercially available treatment process to treat mercury levels below 12 ng/L." PC 1406 at 16.

Because of its concerns, ExxonMobil proposes a "streamlined regulatory relief mechanism for addressing mercury." PC 1406 at 17-18. ExxonMobil worked "within restrictions imposed by the Illinois Environmental Protection Act regarding variances and adjusted standards," and was therefore able to identify the "adjusted standard mechanism as a feasible approach for addressing mercury discharges." PC 1406 at 18. ExxonMobil provides a regulation-specific justification for an adjusted standard. *Id*.

Although initially expressing concerns with IEPA's proposed mercury human health criterion, USEPA concludes that IEPA's proposed 12 ng/L mercury criterion could potentially be scientifically defensible and protective of the use designations. PC 1404 at 3. USEPA recommends that, when Illinois submits its water column criterion to USEPA, it should include information addressing the feasibility of site-specific BAFs, conversion factors, and bioaccumulation models, as well as documentation of CAWS-LDPR characteristics and applicability of the 12 ng/L criterion. *Id*. at 4.

The Board finds that IEPA's amended proposal for the human health standard for mercury is supported by the record. IEPA addressed concerns by Citgo/PDV by removing references to the harmonic mean flow and allowing a 12-month rolling average. Further, USEPA appears to be willing to approve the 12 ng/L standard, if more information is provided by IEPA when IEPA submits the rule for USEPA final review. Therefore, the Board will proceed to first notice with a mercury human health standard of 12 ng/L.

As to ExxonMobil's request that the Board provide a relief mechanism for mercury in this rule, the Board is disinclined to do so. The record does not include sufficient information on the water quality for mercury in the UDIP for the Board to determine that relief will even be necessary. Also, ExxonMobil indicated that it is unaware of a commercially available treatment process that would treat mercury to levels below 12 ng/L. PC 1406 at 16. However, the Board is setting the mercury human health standard at 12 ng/L.

The Board is also reluctant to establish a regulatory relief mechanism for a bioaccumulative chemical of concern, such as mercury, on this record. The Board invites ExxonMobil to provide more information during first-notice on this issue, and seeks comment from other participants on this proposed standard.

Dissolved Oxygen

IEPA originally proposed different DO standards for each of the three aquatic life uses, with different aquatic life use designations. IEPA proposed standards for UDIP ALU that are identical to those recommended for General Use waters. SR at 58. For CAWS ALU A waters,

IEPA proposed a standard that reflects the lower biological potential of these waters as compared to UDIP ALU. SR at 59. IEPA proposed one of the two types of chronic standards to protect against harmful effects of low DO. Specifically, IEPA did not propose a chronic criterion of 5.0 mg/L as a daily mean averaged over seven days for early life stages or an analogous standard for 4.0 mg/L for other life stages as both those standards are reflected in the daily minimum proposed. *Id*.

The District and Environmental Groups filed an agreement stating, "The DO criteria proposed by IEPA are appropriate to protect the 'A' and 'B' uses for which they are proposed." PC 1366 at 3. The agreement also stated, "A 5-year variance allowing the District time to work towards compliance with the proposed DO criteria is appropriate." PC 1366 at 2. A draft petition for variance was also filed with PC 1366 that the District would file after the Board adopts final DO standards. In addition, the District would extend the operational hours of its existing SEPA stations 3, 4, and 5 from April through October. In turn, the Environmental Groups have agreed to work with the District on agreed-upon habitat improvement projects in CAWS. The District would commit to providing up to $500,000 while additional funding from other parties would be applied toward those projects as well. PC 1366 at 2-3.

USEPA expresses concerns that the site-specific DO standard for the Lower North Shore Channel was inadvertently removed in the amendments made in Subdocket A (Water Quality Standards and Effluent Limitations for the Chicago Area Waterways System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(A) (Aug. 18, 2011)). USEPA recommends that the DO standard be restored.

The Board notes that IEPA's proposal includes standards for DO in all stream segments, including the Lower North Shore Channel. Therefore, USEPA's concern regarding DO appears to have been addressed. As to the agreement by the District and the Environmental Groups, the Board takes no position on whether or not a variance will be granted. Given the current status of variances, and USEPA's positon, the Board cannot predict whether or not a variance from the DO standards will be supported by IEPA and USEPA. Further, the Board cannot prejudge the request. The Board understands the significant costs and time commitment that the District will need to take to meet the proposed DO standards, and the Board will consider any request for regulatory relief.

No other comments regarding the proposed DO standards were received. The Board finds that the proposed DO standards are supported by the record. The Board will proceed to first-notice with the DO standards proposed by IEPA and as amended by IEPA in subsequent filings. The Board notes that the proposed standards are consistent with the General Use water quality standards.

Chloride Water Quality Standards

Another key issue in this subdocket is determining appropriate chloride water quality standards for CAWS and LDPR. As discussed below, the Board addresses IEPA's proposal, USEPA's national criteria, Citgo/PDV's site-specific proposal for winter standards, and mechanisms for compliance. The Board then proceeds to propose for first notice a year-round,

single-value 500 mg/L chloride water quality standard for the UDIP, ALU A, and ALU B waters as well as a site-specific rule for the CSSC applicable during the winter months of December 1 through April 30. The Board also proposes for first notice amendments to the NPDES permitting rules to incorporate federal provisions pertaining to the application of BMPs to achieve effluent limitations and standards.

IEPA's Proposed Single-Value Standard

IEPA's current proposal for chloride at Section 302.407(g) is a single-value standard: 500 mg/L applicable all year, which is also the current General Use standard under Section 302.208(g). Currently there is no chloride standard applicable to the new use designations of UDIP, ALU A, and ALU B or the Indigenous Aquatic Life Use. PC 1401 at 28.

IEPA stated that because the chloride standard was proposed in 2007, discussions with USEPA have been ongoing in an effort to resolve outstanding issues. PC 1401 at 28. USEPA commented that IEPA's proposed 500 mg/L chloride standard "would likely be sufficient to prevent acute toxicity to aquatic organisms present in CAWS and LDPR such that this acute criterion would likely be consistent with 40 C.F.R. 131.11(b)(1)" for criterion based on scientifically defensible methods. PC 1404 Enc. 1 at 1, 4-5. However, IEPA recognized the proposed 500 mg/L standard will be problematic in the winter months when road salting takes place. IEPA did not indicate if the 500 mg/L standard would be problematic in all segments of CAWA and LDPR, but industry representatives specifically identified this as an issue in the CSSC for Citgo/PDV, the UDIP for ExxonMobil, CAWS in general for the District, and waters in this rulemaking for facilities that use once-through cooling water. Exh. 488 at 5, 12, Exh. 493 at 7, 6, 12/17/13 Tr. at 10, PC 1406 at 2, PC 1402 at 2-3, 15.

IEPA stated that it is working with USEPA on a chloride proposal that might employ the single-value standard of 500 mg/L for non-winter months of May 1 through November 30, along with an approvable water body variance and BMPs for point sources and non-point sources. IEPA looked at twelve years of chloride data (2001-2012) from the District's sampling network, finding high chloride levels started in December and continued until the end of April. Although there were 4 locations on 4 separate years where the 500 mg/L value was exceeded in May, IEPA did not consider the occurrences significant enough to include May in the winter months. PC 1401 at 28-31The Board notes, that IEPA did not address what standard IEPA and USEPA are considering applying during the winter months of December 1 through April 30.

USEPA's 1988 Two-Number (Acute/Chronic) Criteria

USEPA's national criteria document for chloride (EPA 440/5-88-001, February 1988) puts forth a two-number standard: a Criterion Maximum Concentration (CMC), corresponding to an acute value of 860 mg/L and a Criterion Chronic Concentration (CCC), corresponding to a chronic value of 230 mg/L. However, IEPA proposed to carryover the single-value General Use chloride standard of 500 mg/L because the federal acute value is less restrictive and the chronic value is more restrictive. SR at 76. IEPA states that the 500 mg/L value "has been used by scientists in evaluating the toxicity of sulfate and chloride as the key toxic components of the total dissolved solids standard, and it would be inconsistent with the results of that research to

convert to the federal methodology…" SR at 76. As noted above, USEPA agreed the 500 mg/L standard would likely be sufficient for the waters in this rulemaking. PC 1404 Enc. 1 at 1, 4-5.

Both IEPA and USEPA point out that a new national criteria document for chloride is anticipated in the near future. PC 1401 at 30, PC1404 Enc. 1 at 5. IEPA commented that it "would be in the best interest of all to wait and see what the new criterion will look like before moving forward with a proposal." PC 1401 at 30. USEPA, on the other hand, states,

> [US]EPA recommends that the Board move forward to adopt appropriate chloride criteria without waiting for release of an updated [CWA Section] 304(a) Guidance. To the extent that [US]EPA issues a draft of its 304(a) Guidance for chloride prior to finalization of the Board's rulemaking for the CAWS, [US]EPA recommends that the Board consider that draft and any scientific studies referenced therein to ensure that any criteria that the Board ultimately adopts is based on sound scientific rationale. PC 1404 at 5.

USEPA explains the States' use of national criteria documents in developing enforceable water quality standards in the 1988 chloride criteria document,

> In [CWA] section 304, term ["water quality criteria"] represents a non-regulatory, scientific assessment of ecological effects. Criteria presented in this document are such scientific assessments. If water quality criteria associated with specific stream uses are adopted by a State as water quality standards under section 303, they become enforceable maximum acceptable pollutant concentrations in ambient waters within that State. Water quality criteria adopted in State water quality standards could have the same numerical values as criteria developed under section 302. However, in many situations States might want to adjust water quality criteria developed under section 304 to reflect local environmental conditions and human exposure patterns before incorporation into water quality standards. EPA 440/5-88-001 at iii.

USEPA states that, "If the Board wishes to adopt criteria that are not based on [US]EPA's current 304(a) Guidance [i.e. USEPA's 1988 national criteria document for chloride], the administrative record should demonstrate that any such criteria were developed using scientifically defensible methods." PC 1404 Enc. 1 at 1. For a scientifically defensible method, USEPA pointed to Chapter 3.7 of USEPA's Water Quality Standards Handbook along with the associated updates. PC 1404 Enc. 1 at 1. Specifically, USEPA states that deriving scientifically defensible criteria could be based on a toxicity database that includes only species that are expected to occur or are representative of other species that are expected to occur as described in USEPA's April 2013 guidance entitled "Revised Deletion Process for the Site-Specific Recalculation Procedures for Aquatic Life Criteria", EPA-823-R-13-001. PC 1404 Enc. 1 at 1.

Citgo/PDV Proposed Winter Two-Number Standard

Mr. Huff stated, "Summer time chloride are consistently well below the proposed 500 mg/L chloride water quality standard." Exh. 493 at 5. However, Mr. Huff stated, "Winter chloride levels as high as 1,099 mg/L have been recorded at the Lemont Refinery intake. The chloride level in the Ship Canal has remained above 500 mg/L for over three weeks at a time, such as from January 28, 2008 to sometime between February 16 and 18, 2008. Chloride concentrations above 500 mg/L occur nearly every winter." Exh. 493 at 5-6.

To reflect local environmental conditions and to use USEPA's April 2013 guidance on recalculation procedures, Citgo/PDV employed Huff & Huff to provide a recalculation of the 1988 federal recommended criteria to derive a two-number chloride water quality standard (chronic and acute) for the CSSC during winter months. Exh. 491 at 7. Mr. Klocek calculated winter site-specific criteria for chloride in the CSSC of 624 mg/L for chronic value and 991 mg/L for acute value. In terms of applying these criteria as water quality standards, Citgo/PDV proposed the following:

> November through April:
> 620 mg/L chronic
> 990 mg/L acute
> Exh. 491 at 10, PC 1402 at 13.

As to November 1 through April 30, Citgo/PDV acknowledges data from IEPA showing no instances of high chloride levels from May 1 through November 30 based on twelve years of chloride date (2001-2012) from the District sampling network. Mr. Klocek stated that Citgo/PDV's proposal included November, "just to give us a breathing space…" 12/17/13 Tr. at 171, PC 1401 at 30-31.

To limit the scope of the proposed winter criteria to just those waters from which Citgo/PDV drew data in its recalculation of the federal criteria, Citgo/PDV proposes applying the winter criteria to just the Lower CSSC or the ALU B waters upstream of the confluence of the CSSC with the LDPR, which would essentially entail the entire CSSC but not Brandon Pool. PC 1410 at 3. For waters below the Lockport Lock and Dam in Brandon Pool and other downstream segments, Citgo/PDV states that other recalculations of the federal criteria could be done to derive site-specific chloride values that would be protective of the aquatic life uses there. PC 1410 at 3.

Citgo/PDV states that the site-specific acute and chronic criteria derived using USEPA's 2013 recalculation procedures "reflect the available toxicity information, with appropriate adjustments for those species that are present and those that are absent". PC 1402 at 14.

Mr. Klocek explained that the USEPA 2013 recalculation procedures provide a means to adjust the national data set to reflect the species that actually reside at the site and remove those that do not or are not appropriate surrogates of resident species. Exh. 491 at 7. Whereas USEPA's national criteria for chloride was based on 29 species in the "Iowa list", Citgo/PDV's recalculation was based on 23 of those species that Citgo/PDV asserts are actually present in the CSSC during the winter season. In reducing the data set, Citgo/PDV used USEPA's procedure "to edit the taxonomic composition of the national toxicity dataset" to reflect species in the

Lower Ship Canal. Exh. 491 at 7-8. Citgo/PDV states that the six species that were excluded would not be expected to be present in the CSSC: three fish species (American eel, threespine stickleback, and guppy), one amphibian (chorus frog), and two invertebrates (*Ceriodaphnia* and *Sphaerium*) were eliminated from the CSSC list. Exh. 491 at 8-9. In turn, Citgo/PDV added one species as a close relative of the excluded *Sphaerium* that is present in the CSSC: the *Musculium* fingernail clam. PC Exh. 491 at 9, 1402 at 14.

USEPA questions whether Citgo/PDV's justification for removing 3 of the 6 species (*Ceriodaphnia* water flea, *Sphaerium* fingernail clam, and *Lampsilis* mussel) would be considered scientifically defensible in deriving site-specific criteria that would be consistent with 40 C.F.R. 131.11(a)(1) and (b)(1). PC 1404 Enc. 1 at 10-11. USEPA's preliminary review suggested that deletion of these 3 species would not be appropriate since the species should be either considered to occur at the site or as surrogates for other species at the site. PC 1404 Enc. 1 at 10. Of the 6 species, IEPA does not support removal of *Ceriodaphnia dubia*. PC 1401 at 38-39.

Ceriodaphnia. For *Ceriodaphnia* water fleas, USEPA states that the species in this genus have been recorded at the site. PC 1404 Enc. 1 at 10 *referring* to PC 1395, PC 1404 Enc. 4. USEPA states there is a lack of sufficient evidence showing that *Ceriodaphnia* are not present during November through April or are not reproducing in these waters. PC 1404 Enc. 1 at 10-11. USEPA notes that Citgo/PDV only presented one sample from November 2013 showing no *Ceriodaphnia* present in the winter months. USEPA states that *Ceriodaphnia* were "repeatedly present in the CSSC at some times of the year", citing INHS data from July-September 1978, and May-October 2010-2012, referenced in Mr. Klocek's testimony and public comment. PC 1404 Enc. 1 at 1, *citing* Exh. 491 Exh. B at 8, Table 7 and PC 1395. Based on the INHS data, USEPA notes *Ceriodaphnia's* presence at the Lockport Lock and Dam site and provided an evaluation of its ecological significance at that location during the winter. PC 1404 Enc. 1 at 11, Enc. 4.

Based on data for cladocerans (water fleas) at other locations, USEPA cites studies (Lampert et. al. 2010, 2012[12]) showing winter cladoceran populations including both adults and resting eggs. PC 1404 Enc. 4 at 1-2. USEPA also cites to the North Temperature Lakes Long Term Ecological Research[13] of eleven lakes in Wisconsin showing persistent winter populations of zooplankton. Based on studies, USEPA suggests cladoceran populations are likely to be present in the CSSC near the Lockport Lock and Dam in the winter, especially since it is anthropogenically-warmed. Even though overwintering populations may be low, USEPA states that mortality of these populations could have large effects on spring populations. Stating that

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[12] Lampert, W., Lamper, K.P, and LarssonP. 2010. Coexisting overwintering strategies in *Daphnia pulex*: A test of genetic differences and growth responses. Limnology and Oceanography 55:1893-2000, and
Lampert, W., Lamper, K.P, and LarssonP. 2010. Coexisting overwintering strategies in *Daphnia pulex*: Clonal differences in sexual reproduction. Fundamental and Applied Limnology 179:281-291. PC 1404 Enc. 4 at 1-2.

[13] USEPA cites to http://lter.limnology.wisc.edu/datacatalog/search (last visited September 2, 2014), which states, "Our primary study sites include a set of seven northern Wisconsin and four southern Wisconsin lakes and their surrounding landscapes."

although overwintering is a common and important phenomena in zooplankton, USEPA acknowledges that local environmental conditions could prevent overwintering of cladoceran. PC 1404 Enc. 5 at 1-2.

IEPA states that *Ceriodaphnia dubia* is a common test organism in aquatic toxicology that has nationally standardized testing procedures and is used as a surrogate species for other planktonic crustaceans that do not. IEPA does not support removal of *Ceriodaphnia dubia* from the data set, citing lack of research to verify its presence during the winter and its use in serving as a surrogate for other planktonic crustaceans. PC 1401 at 38-39.

In response to USEPA's comment regarding *Ceriodaphnia* presence at the Lockport Lock and Dam and its ecological significance at that location during the winter, Huff & Huff clarify that the location of the INHS Lockport Lock and Dam collections were approximately one mile downstream of the Lockport Lock and Dam and confluence of the CSSC with the Des Plaines River. As such, the *Ceriodaphnia* collections there were not representative of the CSSC itself, only the CSSC mixed with the Des Plaines River. PC 1410 Att. I at 2. Additionally, where USEPA cites INHS reports of populations of zooplankton in CAWS comparable to other Illinois rivers (PC 1404 Enc. 1 at 11), Huff & Huff clarify that the only station in CAWS sampled in the CSSC was at Western Avenue, Chicago, which showed plankton densities among the lowest in CAWS. PC 1410 at 3-4. Mr. Klocek observed *Ceriodaphnia* appear to be transitory individuals in CAWS that are carried from Lake Michigan and are not likely reproductive. PC 1395 at 1.

As to overwintering populations of *Ceriodaphnia*, Mr. Klocek explained that during the cooler months of the year when water temperatures reach 50 to 55 degrees, the water fleas disappear as their food source, algae, disappears. Mr. Klocek continued that Cladocerans, including *Ceriodaphnia*, then produce resting ("diapausing") eggs that are resistant to extreme conditions. PC 1395 at 2. The eggs are protected by a specialized hardened shell that can withstand periods of extreme cold or complete drying. Exh. 491 Exh. B at 8, *citing* Windsor and Innes 2002. The resting eggs rest in the sediment and can remain viable over the winter or even years, hatching when conditions are more favorable, typically when the water warms to approximately 55º F. Based on a 2004 study entitled, "Salinity tolerance of diapausing eggs of freshwater zooplankton", Mr. Klocek stated, "Elevated chloride in the CSSC at the levels we have historically seen during the winter months would likely have no effect on the hatchability of the resting eggs." PC 1395 at 2. Mr. Klocek concluded that the lack of or very low presence of *Ceriodaphnia* in the CSSC during the summer months when chloride levels are low is attributable to the lack of good habitat. As such, Mr. Klocek stated that Citgo/PDV's proposed elevated winter chloride standard would be protective of the aquatic life in the CSSC for November 1 through April 30. PC 1395 at 2.

In response to the comments of IEPA and USEPA citing lack of evidence for overwintering *Ceriodaphnia* populations, Huff & Huff provide additional stream survey data in the CSSC from July 2013, November 2013, and May 2014 as further verification. PC 1410 at 2. Neither the November 2013 nor the May 2014 surveys showed any *Ceriodaphnia* present, and the November 2013 survey showed a sharp drop in water fleas generally present compared to the July 2013 data. PC 1410 Att. I at 2, 12. Additionally, Huff & Huff provide data from the only

other zooplankton study of which it was aware in the northern latitudes of the U.S. during the winter: a 1908 study on the Illinois River (Kofoid, C.A., 1908, The Plankton of the Illinois River, 1894-1899 with Introductory Notes Upon the Hydrography of the Illinois River and its Basin. Part II. Constitute Organisms and their Seasonal Distribution. Bull. IL State Lab. Nat. Hist. Vol. VII Article 1.) PC 1410 Att. I at 2, 10. The study did not find any *Ceriodaphnia* present during the winter months, but did find them at other times of the year. PC 1410 Att. I at 2. In response to USEPA's reference to the studies by Lampert *et al.* in 2010 and 2012, Huff & Huff note that the studies were of relatively unpolluted lakes in Norway and that the dynamics of lake plankton and stream plankton are different. PC 1410 Att. I at 3.

In response to IEPA's comment that *Ceriodaphnia* is a nationally recognized surrogate species that has nationally standardized testing procedures where other species do not, Huff & Huff reiterate that *Ceriodaphnia* has never been found in the winter months in the CSSC. PC 1410 at 8. Instead, Mr. Klocek, in following USEPA's 2013 recalculation procedures, used the water flea genus *Daphnia* on the USEPA national dataset that was found in the CSSC, as opposed to *Ceriodaphnia* that has not been detected in the winter months and is rarely found even in the summer months. PC 1410 at 3. Although *Ceriodaphnia* water fleas were found in the CSSC during May to October, Mr. Klocek explained that *Bosmina longirostris* is the dominant water flea in the CSSC. When *Ceriodaphnia* was found in 1978, 2010, and 2012, *Bosmina* were found at concentrations approximately 250 to 310 times larger than *Ceriodaphnia*. Exh. 491 Exh. B Table 7, PC 1395. Mr. Klocek used *Daphnia* as a surrogate for *Bosmina* because the genus is protective of the fifth percentile for the 23 species in the CSSC. Exh. 491 at 9. Mr. Klocek pointed out that *Daphnia* were among the least tolerant invertebrates for chloride. Exh. 491 at 9.

Sphaerium. For *Sphaerium* fingernail clams, USEPA states that species in this genus have been recorded at the site, and information is available to support the use of *Sphaerium* for the derivation of a site-specific criteria in the CSSC. PC 1404 Enc. 1 at 11 referring to Enc. 5, PC 1395. USEPA cites to a lack of evidence showing that habitat, not water quality is responsible for the absence of fingernail clams in the CSSC. PC 1404 at 11.

In response, Huff & Huff explain that the *Musculium* fingernail clam was used as a close relative instead of *Sphaerium* because *Musculium* are regularly present in the CSSC, whereas *Sphaerium* are comparatively absent. PC 1410 Att. I at 4, PC Exh. 491 at 9, 1402 at 14. Huff & Huff explain that the family of Sphaeriidae clams in Illinois include four genera, all called fingernail calms, of which *Sphaerium* and *Musculium* are both members. PC 1410 at 4. Mr. Klocek noted that *Musculium* fingernail clams were the least tolerant of any organism for chloride in the data set, even less tolerant than *Daphnia*. Exh. 491 at 9. Based on 13 biological surveys covering the years 1975-2010 from the District, Huff & Huff observe that while *Musculium* and *Eupera* (another Sphaeriidae clam) were found in moderate numbers, *Sphaerium* had been reported only twice over this 35 year period. One instance was in the CSSC at Cicero Avenue where a single specimen was taken, and the other at Lockport. Unlike in the CSSC, *Sphaerium* are relatively abundant in the North Branch Chicago River and its forks. Huff & Huff reason that the regular presence of *Musculium* and the relative absence of *Sphaerium* in the CSSC scientifically justify the choice to use one over the other in the recalculation of the site-specific chloride criteria. PC 1410 at 4-6.

***Lampsilis*.** For *Lampsilis* mussels, USEPA questions Citgo/PDV's justification for removing the species from consideration of a site-specific criteria derivation. USEPA suggests the Board review USEPA's guidance regarding the occurrence of mussels for determining ammonia in order to evaluate the availability of data and whether the species should be considered. PC 1404 Enc. 1 at 11-12 *referring* to USEPA, "Technical Support Document for Conducting and Reviewing Freshwater Mussel Occurrence Surveys for the Development of Site-specific Water Quality Criteria for Ammonia", EPA 800-R-13-002, August 2013.

Huff & Huff respond that *Lampsilis* mussels were not included in the site-specific recalculation because they are not present in the CSSC. PC 1410 at 6. Of the two species of *Lampsilis* with GMAV values assigned by USEPA, the *Lampsilis fasciola* is a State endangered species only found in the Vermillion River, and the *Lampsilis siliquoidea* is common in Illinois streams, but absent in the CSSC. Huff & Huff explain that no native mussels are expected to be present in the CSSC because of the infestation of zebra mussels (an introduced species). The zebra mussels smother the native mussels by overgrowing the shell and siphons of the native mussel. In addition, the zebra mussels out-compete the native mussels and fingernail clams for food. PC 1410 at 6-7. In terms of available mussel data, INHS has one of the premier mussel databases in the U.S., which includes a cataloged collection of more than 144,000 specimens, predominately Illinois species. Huff & Huff's search of the INHS database for the CSSC returned results for three bivalve species—all introduced, non-native species: the zebra mussel (*Dreissena polymorpha*), the Asiatic clam *(Corbicula fluminea*), and the mottled fingernail clam (*Eupera cubensis*). Huff & Huff also searched District reports of the CSSC, finding the same three non-native species plus the single specimen of *Sphaerium* fingernail clam discussed above. Huff & Huff concludes that the absence or rarity of native mussels and fingernail clams in the CSSC may be best explained by the zebra mussel competition. PC 1410 at 6-7.

Additional species. USEPA also suggests the derivation of any site-specific criteria consider include acute rotifer LC50 and *Musculium* LC50 toxicity data. PC 1404 Enc. 1 at 12.

Huff & Huff respond by pointing out that *Musculium* fingernail clams were used in the site specific calculation as discussed above. PC 1410 at 7.

As for USEPA's suggestion to include *Brachionus* rotifers, Huff & Huff acknowledge that *Brachionus* rotifers are present in the CSSC; however, rotifers have not historically been included in USEPA's list of aquatic species used for deriving water quality standards. Although toxicity tests have been conducted on rotifers, Huff & Huff state that the applicability of the results to deriving water quality standards has not been established. Huff & Huff explain that the Brachionus produce overwintering eggs protected by a relatively impervious shell resistant to environmental shock and desiccation. Rotifers are routinely present in un-disinfected sewage in all life stages as long as the water temperatures are warm enough. With a 4-day reproductive cycle, Huff & Huff state, "[E]ven if due to elevated chloride they were wiped out, they would re-establish within days." PC 1410 at 7 (emphasis in original). The importance of rotifers in the CSSC is as a food source for water fleas and larval fish during the non-winter months. During the winter, the importance of rotifers is as a reservoir of overwintering eggs that when hatched later will serve as the first foods for the water fleas and larval fish. Based on Huff & Huff's

monitoring in May 2014, the rotifer population is healthy, despite the winter chloride concentrations above 500 mg/L over the preceding winter. Huff & Huff recommend that before rotifers be included in any water quality standard derivation, determinations need to be made regarding the rotifers presence as adults or overwintering eggs in northern climates and their ability to rapidly re-populate after stress. PC 1410 at 7-8.

Board Findings. The Board observes that the single-value 500 mg/L chloride water quality standard as proposed by IEPA is supported by IEPA, Citgo/PDV, and ExxonMobil during the summer months, while USEPA states the 500 mg/L standard would be sufficient, specifying no seasonal timeframe. PC 1401 at 28-30, PC 1404 Enc. 1 at 1, 4-5, Exh. 493 at 5, PC 1413 at 2. As to which months would be considered "summer", the Board finds that based on the 2001-2012 data from the District presented by IEPA showing no exceedances from May 1 through November 30, the appropriate timeframe for a summer chloride water quality standard would be May 1 through November 30. PC 1401 at 30-31, 12/17/13 Tr. at 171.

For the "winter" months of December 1 through April 30, the Board notes that, besides the single-value 500 mg/L standard for chloride, IEPA does not address what other standard IEPA and USEPA are considering that would apply during the winter. Other than Citgo/PDV's proposal for the CSSC, no party has proposed any other specific standard to apply during the winter. The record contains USEPA's current national criteria document for chloride, and IEPA's rationale for relying on a different methodology using the 500 mg/L value for evaluating the toxicity of chloride, as well as other relevant studies introduced in connection with Citgo/PDV's proposal. Although USEPA is planning to release an updated national chloride criteria document, USEPA recommends that the Board move forward without waiting. PC 1404 at 5. Therefore, the Board finds the record contains sufficient information at this time to proceed with adoption of chloride water quality standards for UDIP, ALU A and ALU B. If, as USEPA suggests (PC 1404 Enc. 1 at 5), the draft national criteria document for chloride is issued before the Board proceeds to final notice, the Board will consider the draft to ensure that the chloride standard adopted for these waters is based on the most currently applicable scientific rationale.

The Board finds that Citgo/PDV properly employed USEPA's 2013 recalculation procedures to derive scientifically defensible site-specific acute and chronic water quality criteria for chloride in the CSSC as USEPA stated could be done. PC 1404 Enc. 1 at 1. The Board finds that Citgo/PDV adequately responded to each of IEPA's and USEPA's concerns in the record to provide supplemental evidence and clarification of the site-specific derivation. The Board notes that Citgo/PDV's site-specific criteria derivation also underwent external peer review. 12/17/13 Tr. at 171.

The Board observes that Citgo/PDV's site-specific criteria derivation was specific to the CSSC and the winter months, and did not apply to all waters designated ALU B, in particular Brandon Pool. For all other segments in CAWS and LDPR, the Board notes that no other site-specific criteria were proposed or derived consistent with USEPA's 2013 recalculation procedures.

The Board understands that ExxonMobil also raised the issue of elevated chloride levels in the winter in the UDIP and requested "the Board should consider adopting a [chloride water

quality] standard that recognizes this use [of sodium chloride (salt) to deice roads in the area] of the waterway and is still protective of the [UDIP] ALU or, in the alternative, adopt an appropriate relief mechanism…" Exh. 488 at 5, 12, 12/17/13 Tr. at 10, PC 1406 at 2. ExxonMobil emphasized any chloride standards adopted for the UDIP would be the first to apply to these waters. PC 1406 at 5. Similarly, Mr. Huff pointed to the Illinois State Water Survey report that identified the District's treated wastewater as the third largest contributor of chloride to the Illinois waterways behind road salt followed by separate storm sewers throughout the region. As such, Citgo/PDV noted the District would be among those not allowed to discharge into CAWS during periods its effluent and the water quality exceeded 500 mg/L chloride. Exh. 493 at 7. Additionally, Huff noted that facilities that use once-through cooling water would not be allowed to add chlorine to control microbial growth and discharge the cooling water during periods when the receiving waters are above the chloride water quality standard because the chlorine would increase the chloride concentration in the effluent. Exh. 493 at 6. However, the Board notes that the only site-specific criteria proposed were by Citgo/PDV, and Citgo/PDV's data supported the criteria only for the CSSC. For waters below the Lockport Lock and Dam in Brandon Pool and other downstream segments, Citgo/PDV stated that other recalculations of the federal criteria could be done to derive site-specific chloride values that would be protective of the aquatic life uses there. PC 1410 at 3. The Board notes that anyone may file a site-specific rulemaking with the Board to establish different chloride water quality standards for other segments of CAWS and LDPR that would be protective of the designated uses.

Based on the current record, the Board proposes at first notice a year-round, single-value 500 mg/L chloride water quality standard applicable to CAWS and LDPR under Section 302.407(g). The Board also proposes a winter chloride water quality standard for the CSSC to apply instead of the standards of Section 302.407 during the winter months of December 1 through April 30. The proposal is a site-specific rule under Part 303 Subpart C: Site Specific Use Designations and Site Specific Water Quality Standards, Section 303.449. The Board will not propose a chloride water quality standard to apply in the Indigenous Aquatic Life Use waters, which would now only encompass Bubbly Creek, because no such standard has been proposed to the Board. As discussed below, the Board also proposes at first notice mechanisms for complying with the chloride water quality standard.

As discussed below, the Board notes that the CSSC and the associated chloride water quality standards will be regularly re-examined through the triennial review process under CWA Section 303 (40 C.F.R. §131.20(a)).

Based on the uses as designated in R08-9(C) pursuant to the 40 C.F.R. 131.10(g) factors, the Board will adopt the following chloride water quality standards as protective of the designated uses:

Section 302.407 Chemical Constituents

…

(g) Numeric Water Quality Standards for other chemical constituents

…

Constituent	Unit	Standard

Chloride	mg/L	500

Section 303.449 Chicago Sanitary and Ship Canal

The numeric water quality standard for chloride set forth at 35 Ill. Adm. Code 302.407(g) does not apply to the Chicago Sanitary and Ship Canal during the period of December 1 through April 30. Chloride levels in these waters must meet the numeric water quality standards for the protection of aquatic organisms of 620 mg/L as a chronic water quality standard and 990 mg/L as an acute water quality standard for chloride.

Compliance Mechanisms for Chloride Water Quality Standard

The Board has received suggestions, testimony, and public comment from IEPA, USEPA, and NPDES permitted dischargers on compliance mechanisms for any chloride water quality standard adopted under the proposed rule revisions. The suggested compliance mechanisms include multiple discharger variances, water body variances, revisions to the mixing zone rules, and use of BMPs. The Board discusses each of the suggestions below. As a compliance mechanism, the Board proposes for first notice amendments to the NPDES permitting rules to incorporate federal provisions pertaining to the application of BMPs to achieve effluent limitations and standards.

Multiple Discharger Variance or Water Body Variance

USEPA states, it "has been having discussions with Illinois EPA about the possibility of Illinois adopting a time-limited water body variance for chloride. Based on those discussions, [US]EPA believes that such a variance could be a viable option…" PC 1404 Enc. 1 at 5. USEPA also recommends the Board consider specific USEPA's requirements for variances, including multiple discharger variances. PC 1404 Enc. 1 at 5. Similarly, IEPA states that it is working with USEPA on an approvable variance that would be water body specific and meet the requirements set forth in the proposed rule 40 C.F.R. Part 131. PC 1401 at 29-30. USEPA explains that in order for USEPA to approve a water body variance under CWA Section 303(c), the state must demonstrate one of the six reasons set forth in 40 C.F.R. 131.10(g). PC 1404 Enc. 1 at 5.

To explain the concept of a water body variance and multiple discharger variances, USEPA refers to a USEPA document entitled, "Discharger-specific Variances on a Broader Scale: Developing Credible Rationales for Variances that Apply to Multiple Dischargers" (USEPA Multiple Dischargers Rationales), March 2013, EPA-820-F-13-012[14]. USEPA also refers to its Federal Register Notice regarding proposed regulatory clarifications, 78 FR 54518 et seq. (September 4, 2013). PC1404 Enc. 1 at 5. As to a water body variance, USEPA states,

[14] Available at http://water.epa.gov/scitech/swguidance/standards/upload/Discharger-specific-Variances-on-a-Broader-Scale-Developing-Credible-Rationales-for-Variances-that-Apply-to-Multiple-Dischargers-Frequently-Asked-Questions.pdf, last visited August 29, 2014. PC1404 Enc. 1 at 5.

A water quality standards variance is a time limited designated use and criterion (i.e., interim requirements) that is targeted to a specific pollutant(s), source(s), and/or waterbody segment(s) that reflects the highest attainable condition [] during the specified time period. As such, a variance requires a public process and EPA review and approval under CWA 303(c). While the designated use and criterion reflect what is ultimately attainable, the variance reflects the highest attainable condition for a specific timeframe and is therefore less stringent.[] However, a state or tribe may adopt such interim requirements only if it is able to demonstrate that it is not feasible to attain the currently applicable designated use and criterion during the period of the variance due to one of the factors listed at 40 C.F.R. 131.10(g).[] Where the currently applicable designated use and criterion are not being met, WQS variances that reflect a less stringent, time limited designated use and criterion allow states, tribes and stakeholders additional time to implement adaptive management approaches to improve water quality, but still retain the currently applicable designated use as a long term goal for the waterbody. States have adopted, and EPA has approved, water quality standards variances that apply to individual dischargers, variances that apply to multiple dischargers, and variances that apply to entire waterbodies or segments.

The interim requirements specified in the variance apply only for CWA section 402 permitting purposes and in issuing certifications under section 401 of the Act for the pollutant(s), permittee(s) and /or waterbody or water body segment(s) covered by the variance. Specifically, the variance serves as the basis for the WQBEL in National Pollutant Discharge Elimination System (NPDES) permits. However, the interim requirements do not replace the designated use and criteria for the water body as a whole, therefore, any implementation of CWA section 303(d) to list impaired waters must continue to be based on the designated uses and criteria for the waterbody rather than the interim requirements.

…

The [US]EPA interprets its regulation to authorize the use of a WQS variance where a state or tribe meets the same procedural and substantive requirements as removing a designated use. Therefore, variances can be granted based on any one of the six factors listed at 40 C.F.R. 131.10(g). USEPA Multiple Dischargers Rationales at 2-4.

Where a state or tribe can demonstrate that the designated use and criterion currently in place for a specific pollutant is not attainable immediately (or for a limited period of time) for an entire water body, the state or tribe may adopt a waterbody variance as an alternative to a designated use change for the water body so long as the variance is consistent with the CWA and implementing regulation. In such an instance, the variance applies to the water body itself, rather than to any specific source or sources. A waterbody variance provides time for the state or tribe to work with both point and nonpoint sources to determine and implement adaptive management approaches on a waterbody/watershed scale to

> achieve pollutant reductions and strive toward attaining the water body's designated use and associated criteria. 78 FR 54532 (September 4, 2013).

As to a multiple discharger variance, USEPA explains,

> If a state or tribe believes that the designated use and criterion are unattainable as they apply to multiple permittees because they are all experiencing challenges in meeting their WQBELs for the same pollutant(s) for the same reason, regardless of whether or not they are located on the same waterbody, a state or tribe may streamline its WQS variance process. To do so, the state or tribe would adopt one variance that applies to all of these permittees (i.e., a multiple discharger variance) so long as the variance is consistent with the CWA and implementing regulation at 40 C.F.R. 131.10 (for example, all the dischargers in the group cannot meet the required WQBEL to protect aquatic life for a period of time due to substantial and widespread economic and social impact).
> …
> Any multiple discharger variance should:
>
> (1) Include a justifiable expiration date, consistent with the analysis provided, for each permittee or group of permittees covered by the variance….
>
> (2) Provide that any renewal of a multiple discharger variance includes…documentation of the feasible progress that has been made by each permittee covered by the renewal.
>
> * * *
>
> It is important to note that even though the duration of a variance may be longer than 3 years, a variance is a water quality standard that must be reviewed every 3 years, consistent with 40 C.F.R. 131.20 (a). USEPA Multiple Dischargers Rationales at 6.

Board Findings. The Board observes that a time-limited water body variance or multiple discharger variance as suggested by USEPA and IEPA assumes by its very nature that the situation is temporary. Such a variance also assumes that a compliance plan could be implemented by the NPDES permitted dischargers to achieve a standard considered protective of the designated use or to eventually attain uses specified in CWA Section 101(a)(2). Although Citgo/PDV has provided information in the record that measures are being taken by various applicators to reduce the quantity of road salt for deicing, such as anti-icing techniques and use of beet juice, there is no information in the record that demonstrates such sources are planning to reduce the use of road salt to the point of compliance with the 500, 620, or 990 mg/L chloride water quality standards during the winter in the foreseeable future. Although USEPA acknowledges that the duration of a water body or multiple discharger variance may be longer than 3 years, USEPA also states it must also be reviewed every 3 years consistent with 40 C.F.R. § 131.20(a) [CWA Section 303, 33 U.S.C. § 1313(c)(1)]. With no feasible alternative to chloride deicing salts on the horizon, the Board notes that relief for 3 years does not reflect the enduring

reality that as long as it snows and water freezes on the roadways in this highly urbanized watershed, chloride will continue to be used for road safety in the foreseeable future. This use results in non-point source and municipal separate storm sewer system contributions of chloride to CAWS and LDPR.

Additionally, USEPA states that the renewal of a multiple discharger variance must include "documentation of the feasible progress that has been made by each permittee". USEPA Multiple Dischargers Rationales at 6. The Board notes that the nature of a multiple discharger variance assumes the dischargers themselves could implement an effective compliance plan or show feasible progress. However, it is unclear how the NPDES permitted point-source dischargers that participated in this subdocket would implement an effective compliance plan or show feasible progress when the exceedances of the proposed chloride water quality standards would be due to mainly to dischargers who discharge only storm water, such as non-point sources and municipal separate storm sewer systems.

USEPA also explains that states can adopt water body variances "where it is not feasible to immediately attain criteria necessary to protect a designated use". PC 1404 Enc. 1 at 5. The Board understands that IEPA is still working with USEPA on an approvable water body variance and best management practices for point sources and non-point sources. PC 1401 at 28-30. At this time, the record contains USEPA's current national criteria document for chloride, and IEPA's rationale for relying on a different methodology using the 500 mg/L value for evaluating the toxicity of chloride, as well as other relevant studies introduced in connection with Citgo/PDV's proposal. Although USEPA is planning for a release of an updated national chloride criteria document, USEPA recommends that the Board move forward without waiting. PC 1404 at 5. Therefore, the Board is proceeding with the only information available in the record, noting that anyone may file a new rulemaking or a site-specific rulemaking with the Board to establish different chloride water quality standards that would be protective of the designated uses as further scientifically defensible information is brought to bear. Nonetheless, the Board notes that through the triennial review process under CWA Section 303 [40 C.F.R. 131.20(a)], the State has the responsibility to re-examine these water bodies to determine if a revision in the standards would be warranted to protect the designated uses or if uses specified in CWA Section 101(a)(2) become attainable.

Mixing Zone Rule Amendments

If chloride water quality standards are adopted where none before existed, Mr. Huff chronicled the next actions IEPA would take. First, IEPA would place water bodies not meeting the new chloride water quality standard on the 303(d) list. Then, once on the list, the stream segments would go through a process to establish a TMDL, which Mr. Huff expected could take years. While the TMDL process ensues, Mr. Huff explained that IEPA will begin to impose effluent limits in NPDES permits equal to the water quality standard, even for dischargers who constitute very minor sources. Exh. 493 at 4.

With any chloride water quality criteria adopted, industry representatives indicated there would still be issues of being able to discharge at times when the receiving waters exceed the criteria. Currently, no mixing zone is allowed during such times pursuant to 35 Ill. Adm. Code

302.102(b)(9). As such, Mr. Huff stated some dischargers would not be allowed to discharge during those times and emphasized, "To discontinue discharging would entail ceasing operations for most industries, which has its own economic ramifications." Exh. 493 at 6. Industry representatives indicated this would become an issue specifically in the CSSC for Citgo/PDV, the UDIP for ExxonMobil, CAWS in general for the District, and waters in this rulemaking for facilities that use once-through cooling water. Exh. 488 at 5, 12, Exh. 493 at 7, 6, 12/17/13 Tr. at 10, PC 1406 at 2, PC 1402 at 2-3, 15. Even with a site-specific rule for the CSSC, Citgo/PDV indicated there still might be times when the chloride water quality standards are exceeded. PC 1402 at 10.

In Mr. Huff's and Mr. Tyler's prefiled testimony, one of the recommendations presented involved amending the mixing zone rule at 35 Ill. Adm. Code 302.102 to provide the opportunity for a mixing zone even when the applicable water quality standards are exceeded if the NPDES-permitted discharger employs a BMP plan for the particular pollutant. Citgo/PDV reasoned that with BMPs offsetting the contribution, the discharger would be eligible for a mixing zone because it would no longer be causing or contributing to water quality exceedances. Exh 492 at 12, Exh. 492 at 13. At hearing on December 17, 2013, the Board asked Citgo/PDV to consider proposing language to amend the mixing zone rule and provide for BMP implementation. Given that the TMDL process might take several years, Citgo/PDV proposed the following and suggested the rule sunset in 10 to 20 years:

35 Ill. Adm. Code 302.102 Allowed Mixing, Mixing Zones and ZIDs

(j) Notwithstanding the provisions of 302.102(b)(9), a mixing zone shall be allowed if the following are demonstrated:

(1) The exceedance of the water quality standard is in a water body which is a Use B" water body; and

(2) The discharger uses an intake from that water body for supply of at least 50% of its process water (including for cooling use) on an annual basis; and

(3) The chemical for which the water quality standard is exceeded in the water intake referred to in (2) above, or the water body is listed as impaired for that chemical; and

(4) Until a total maximum daily load ("TMDL") allocation is effective, the discharger employs Best Management Practices for the pollutant of concern during the times that the exceedance of the applicable water quality standard occurs; and

(5) Either of the following is demonstrated by the Best Management Practices Plan:

(i) the BMP plan has as its objective to reduce the amount of the discharge of the pollutant of concern by the amount by which the discharger would exceed the allowable discharge during the exceedances in the receiving stream; or

(ii) Compliance is determined by comparing the predicted concentration at the edge of the mixing zone as within the precision of the test method for the subject pollutant. PC 1394, PC 1402, PC 1410 at 7.

ExxonMobil agrees with Citgo/PDV's proposal if it is also applied to UDIP as well. ExxonMobil states that the LDPR is effluent dominated and similar to ALUB waters in experiencing elevated chloride levels leading to exceedances. ExxonMobil requested that other waterways such as UDIP should also have access to the mixing zone relief as proposed by Citgo/PDV. PC 1406 at 12.

In its comments, USEPA explains that the CWA allows states to adopt mixing zone provisions if they are protective of designated uses. USEPA states that a mixing zone provision that is considered protective of designated uses would allow chronic criteria to be exceeded within a mixing zone as long as conditions ensure chronic effects are not observed in aquatic life and acute toxicity criteria is not exceeded within the mixing zone. USEPA interprets Citgo/PDV's proposed mixing zone amendments as allowing for chronic criteria to be exceeded outside of the mixing zone. USEPA comments that based on this interpretation, it "does not believe that such a provision can be deemed to be protective of applicable aquatic life use designations." PC 1404 Enc. 1 at 12.

In response, Citgo/PDV replies that their mixing zone proposal does not propose that the chronic criteria be exceeded outside the mixing zone, but that an opportunity for a mixing zone be provided if the discharger would not be causing or contributing to water quality violations. Exh. 492 at 13, Exh. 493 at 12-13, PC 1410 at 6.

Board Findings. The Board's current rules state, "No mixing is allowed where the water quality standard for the constituent in question is already violated in the receiving water." 35 Ill. Adm. Code 302.102(b)(9). In addition, IEPA's proposal includes the following provision for CAWS/LDPR: "The CS [chronic standard] shall not be exceeded outside of waters in which mixing is allowed pursuant to Section 302.102 of this Part." *See* proposed 35 Ill. Adm. Code 302.407(d)(2), s*ee also* proposed 35 Ill. Adm. Code 307.410(d).

As USEPA points out, USEPA's Water Quality Standards Handbook states, "Chronic aquatic life criteria are to be met at the edge of the mixing zone." USEPA, "Water Quality Standards Handbook: Second Edition." August 1994 (EPA-823-B-94-005a) at 3-20.

While Citgo/PDV sought the inclusion of a mixing zone provision, the Board believes that the December 1 to April 30 standard for the CSSC may be sufficient to address Citgo/PDV's concerns. Additionally, while ExxonMobil supported Citgo/PDV's proposed mixing zone revisions, as with the request for a different chloride standard for UDIP, the Board finds that the

record lacks support for a mixing zone change in the UDIP. Therefore, the Board is not proposing Citgo/PDV's suggested revisions to the mixing zone. The Board encourages participants to provide additional comment, including specific language and data to support a change in the rule at second notice.

The Board notes that Citgo/PDV stated, "We are not wedded to the mixing zone as the regulatory solution", and the NPDES "regulations to implement a BMP approach already exist." PC 1410 at 7, PC 1402 at 11. The Board next addresses the issue of BMPs and how they will be incorporated into the rule language.

Best Management Practices.

One element of Citgo/PDV's proposal addresses the use of BMPs to allowed continued discharges by offsetting chloride contributions to the receiving waters such that the discharger would no longer be considered as causing or contributing to water quality exceedances. Exh 492 at 12, Exh. 492 at 13.

Under the federal NPDES Program,

> Best management practices ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the U.S.." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. 40 C.F.R. §122.2

40 C.F.R. §122(k) provides that NPDES permits may contain BMPs "to control or abate the discharge of pollutants when…(2) Authorized under section 402(p) of the CWA for the control of storm water discharges;…or (4) The practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA. " 40 C.F.R. §122(k)(2).

IEPA states that it is in discussion with USEPA on a winter concept that would utilize BMPs for point sources and non-point sources, but that this is still a preliminary concept needing additional time to consider stakeholder input. PC 1401 at 30. The Board notes that IEPA has already issued NPDES storm water permits to municipalities requiring the implementation of BMPs and other programs to minimize storm related water quality impacts from salts and other contaminants. SR at 77. Although IEPA asked for more time, the Board notes that the key stakeholders, NPDES-permitted point sources, non-point sources, environmental groups, IEPA, and USEPA, have already been given the opportunity to provide their input regarding chloride in this rulemaking. In this regard, the point sources, IEPA and USEPA have provided specific input.

Citgo/PDV notes that IEPA has already issued NPDES General permits to small municipal separate storm sewer systems (MS4s), as defined in 40 C.F.R. §122.26(b)(16) and designated for permit authorization pursuant to 40 C.F.R. §122.32, that require BMPs.

Citgo/PDV points to these as a regulatory framework for BMPs that already exists. PC 1402 at 11. The MS4 permits state, "Your discharges, alone or in combination with other sources, shall not cause or contribute to a violation of any applicable water quality standards outlined in 35 Ill. Adm. Code 302" but that in such a case, "different limitations and/or requirements" may be imposed. PC 1402 at 11, Att. II. BMPs are included among these different limitations and/or requirements. PC 1402 at 11, Att. II. Citgo/PDV pointed to the special conditions under MS4 NPDES permits that also address TMDLs, suggesting that the BMP approach could be interpreted as an interim step to a TMDL. Citgo/PDV suggested that BMPs could be included in an NPDES Permit compliance plan for other dischargers besides MS4s. PC 1402 at 11-12.

IEPA states that Citgo/PDV's proposed amendments to the mixing zone rules addressing BMPs appear contrary to federal law because compliance would be determined by whether the facility is complying with the BMPs and not by measuring the effluent or receiving stream. PC 1401 at 39. The Board notes that the MS4 NPDES permits requiring BMPs to determine compliance by using other "measurable goals" besides measuring the effluent or the receiving stream. PC 1402 at Att. II at 2. These other measurable goals under the MS4 BMPs include: public education and outreach on storm water impacts, public involvement/participation, illicit discharge detection and elimination, construction site storm water runoff control, post-construction storm water management in new development and redevelopment, and pollution prevention/good housekeeping for municipal operations. PC 1402 Att. II at 5-8.

As Mr. Huff explained, Citgo/PDV's BMP plan would actually use verifiable monitoring to quantify the waste load reduction of their BMPs by quantifying how much deicing salt was used at the facility and the mass in their effluent. 12/17/13 Tr. at 183. To get the necessary offsets, Mr. Huff testified that Citgo/PDV has already begun an aggressive plan to reduce salt usage and has had preliminary talks with two local communities about providing an offsite reduction to the same waterway as part of Citgo/PDV's offset. 12/17/13 Tr. at 190.

Citgo/PDV states that the concept of using BMPs for chloride is "a realistic tool for compliance. It is practical and brings in non-point source and stormwater sources into the process of reducing chloride discharge[s]. Reducing those discharges, through the use of BMP is practical and can be done quickly using existing permit procedures." PC 1410 at 5. Citgo/PDV further states, "The net result would be that such a commitment would be essentially offsetting a discharger's contribution to water quality exceedances, and therefore would be eligible for a mixing zone for chloride because it would no longer be causing or contributing to water quality exceedances. (Exhibit 493 at 12-13.)" PC 1402 at 10.

Board Findings. As evidenced in the record, the major cause and contributor to winter chloride levels in CAWS and LDPR are the storm water discharges from road salting activities, through the nonpoint sources and municipal separate storm sewer systems. SR at 76, PC 1401 at 29. The Board notes that MS4s are being addressed through the NPDES General Permit to reduce discharge of pollutants like chloride over time. However, with major point source dischargers like Citgo/PDV contributing on the order of 0.2% of the quantity of chloride in the CSSC when concentrations are above 500 mg/L (PC 1410 at 6), the high chloride concentrations that occur in the winter will continue to occur into the foreseeable future even without the input of these point source dischargers.

Several parties have requested that the Board consider compliance mechanisms for complying with any new chloride water quality standards. IEPA and USEPA continue to discuss the prospects of a water body variance and BMPs for point sources and non-point sources (PC 1401 at 28-30), and potentially site specific criteria are pursued for other segments of CAWS and LDPR beyond the CSSC. The Board finds that revisions to the NPDES rules incorporating BMPs can provide for one type of compliance mechanism that could be incorporated into an NPDES permit compliance plan.

Currently, Illinois NPDES permitting rules incorporate the federal provision of 40 C.F.R. 122.44(d)(1)(ii) at 35 Ill. Adm. Code 309.143(a):

> In determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water.

However, the federal provision describing the use of BMPs in NPDES permitting under 40 C.F.R. 122.44(k) does not appear in the Board's NPDES permitting rules under Part 309. To facilitate the use of BMPs in the context of the NPDES permitting rules for not only MS4s, the Board will propose for first notice the addition of the substantive language 40 C.F.R. 122.44(k) to Part 309. This language provides that NPDES permits may contain BMPs "to control or abate the discharge of pollutants when…(2) Authorized under section 402(p) of the CWA for the control of storm water discharges;…or (4) The practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA. ". 40 C.F.R. §122(k)(2). This provision allows the use of BMPs to achieve effluent limitations. In order to achieve effluent limitations, Citgo/PDV proposes a BMP plan as part of an NPDES compliance plan that would use verifiable monitoring to quantify the waste load reduction of their BMPs by quantifying how much deicing salt was used at the facility and the mass in their effluent. 12/17/13 Tr. at 183.

The Board notes the type of BMPs contemplated by Citgo/PDV, in working with local communities to provide an offsite reduction as part of Citgo/PDV's offset, could spur public-private partnerships[15] to address not only the point source dischargers, but also the municipal

[15] USEPA states, "A public-private partnership is a contractual relationship between a locality and a private company that commits both parties to providing an environmental service…The partnership approach means sharing responsibility and risk for any one of the following activities: Deciding to provide an environmental service in a community; Financing the project using public and/or private funds; Designing and/or constructing the facility; and Operating and maintaining (O & M) the facility or service." USEPA, "Public-Private Partnerships for

storm water sources that have been identified as the main cause of the high chloride levels. As a part of any successful petition for a water body variance or multiple discharger variance, USEPA states the variance must be designed to show "feasible progress" and "implement adaptive management approaches on a waterbody/watershed scale to achieve pollutant reductions …" USEPA Multiple Dischargers Rationales at 6, 78 FR 54532 (September 4, 2013). Because chloride pollution is a waterbody/watershed scale issue, the Board notes that such adaptive management approaches could include BMPs with onsite and offsite offsets as well as public-private partnerships.

The Board has recognized in the past a similar watershed opportunity providing offsite offsets though a public-private partnership incorporated into an NPDES permit. In AS 99-6, the Board found a cooperative agreement between a public utility and a charitable non-profit land trust for an environmental project to reduce sediment loading into a creek "is a much better and more cost effective way to obtain sediment loading reductions in the watershed than employing other options to remove residuals from [the public utility's wastewater]." Petition of Illinois American Water Company's (IAWC) Alton Public Water Supply Replacement Facility Discharge to the Mississippi River for an Adjusted Standard from 35 Ill. Adm. Code 302.203, 304.106, and 304.124, AS 99-6, slip op. at 20 (September 7, 2000).

Other than the General NPDES permit for MS4s, the record does not contain any information showing that IEPA has employed the BMP concept in any other NPDES permits to achieve effluent limitations and standards. The Board notes that IEPA has the authority under the Act to include conditions to implement BMPs in NPDES permits to control or abate discharges of pollutants consistent with 40 C.F.R. 122.44(k). See Section 39(b) of the Act (415 ILCS 5/39(b) (2012)) However, in order to facilitate the use of BMPs in Illinois NPDES permits for chloride, the Board amends 35 Ill. Adm. Code 309.141 to include the federal applicable provisions of the rule at 40 C.F.R. 122.44(k) under 35 Ill. Adm. Code 309.143(c), limited to chloride. This addition, the Board notes is is not intended to limit the scope of the federal rule in Illinois. The federal rule at 40 C.F.R. 122.44(k) is broader in referring to "pollutants" in general and still applies to the State NPDES program.

The Board welcomes comments on the proposed first notice language for 35 Ill. Adm. Code 309. In particular, the Board requests comments on how the provisions of 40 C.F.R. 122.44(k) can be used to achieve chloride effluent limitations and standards, especially when water quality standards are exceeded, to address compliance and mixing zone issues for dischargers such as Citgo/PDV, ExxonMobil, the District, and entities that discharge once through cooling water,

The Board welcomes comments on the proposed first notice language for 35 Ill. Adm. Code 309.

First Notice Language

Environmental Facilities: A Self-Help Guide for Local Governments" (20M-2003), July 1991 at 3.

For first notice, the Board proposes the following amendments to the NPDES permitting rules at Part 309:

309.141 Terms and Conditions of NPDES Permits

(i) Best management practices (BMPs) to control or abate the discharge of chloride when:

(1) Authorized under section 402(p) of the CWA for the control of storm water discharges;

(2) Numeric effluent limitations are infeasible; or

(3) The practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

Temperature Standards

In addition to the temperature standards proposed by IEPA for CAWS and LDPR, the Board received alternate proposals from Midwest Generation and the Environmental Groups. While the proposals from IEPA and the Environmental Groups addressed temperature standards for UDIP, CAWS ALU A, and ALU B, Midwest Generation proposals focused on UDIP and CAWS ALU B. The Board appreciates the time and effort devoted by the participants in developing the various proposals. However, for the reasons explained below, the Board declines to move forward with either of the participants' thermal standards proposals, but instead adopts the General Use temperature standards for all three aquatic life use designations in CAWS and LDPR.

IEPA's and Environmental Groups' Proposals

IEPA's proposal includes temperature standards specifically developed for CAWS and LDPR. These standards, the Board notes, are based on the temperature criteria options developed by MBI. *See supra* at 23. As explained by Mr. Twait, IEPA's thermal standards for CAWS and LDPR are more stringent than the current General Use standards for months of April through November and approximately equivalent to the General Use standards over the remaining months. Exh. 2 at 14. Likewise, the Environmental Groups' proposal, which builds on IEPA's thermal standards, is also more stringent than the General Use standards. Thus, the adoption of either IEPA's or Environmental Groups' proposal would result in the application of more stringent standards to waters designated for the protection of lower aquatic life use than the General Use waters. Because there is no proposal before the Board to update the General Use thermal standards to be more stringent than the current General Use standards, the Board finds that it would be inappropriate to adopt thermal standards for CAWS and LDPR that are more stringent than the current General Use standards.

In addition to the conceptual problems with adopting more stringent standards than General Use standards for lower aquatic life use waters, the Board notes that the participants, including Midwest Generation, Stepan, and ExxonMobil have raised significant concerns regarding the methodology and the science used by MBI in developing the thermal criteria options relied upon by IEPA and the Environmental Groups. *See supra* at 170. In this regard, the Board agrees with Midwest Generation that adopting thermal standards based on questionable methodology would set an untenable precedent for any review of the current General Use standards. Thus, the Board believes that it would be premature to adopt IEPA's or Environmental Groups' thermal standards for CAWS and LDPR without first addressing the General Use waters.

Further, as noted by the Environmental Groups, the Board believes that the General Use thermal standards may need to be revised to reflect the current science and methodologies. See PC 1412 at 2. For the reasons discussed above, the Board strongly believes that any revision of the Board's thermal standards must start with the General Use standards before being extended to other use designations. By doing so, the Board believes that temperature standards could be developed systematically based on the degree of protection dictated by the designated aquatic life uses. In light of this, the Board declines to adopt thermal standards proposed by IEPA and the Environmental Groups.

Midwest Generation's Proposals

Midwest Generation offered three alternate proposals for Board consideration in its final comments: 2003 EA thermal standards; 2007 EA thermal standards; and the 1996 Adjusted Thermal Standards. PC 1403 at 37-43, Attach. C and D. These proposals address temperature standards for UDIP. In addition, Midwest Generation proposes that CAWS and Brandon Pool ALU B waters be subject to the existing secondary contact Indigenous Aquatic Life thermal standards. PC 1403 at 41. A comparison of the principal elements of the Midwest Generation's proposals with the current Secondary Contact and General Use standards, IEPA proposal, and the Environmental Groups proposal is presented in Table 1.

TABLE 1
Comparison of Proposed UDIP Temperature Standards

Time Period	UDIP Temperature Standards (°F)									
	Current Secon. Contact	General Use	IEPA Proposal		Environ. Groups Proposal		Midwest Generation Proposals			
							AS 96-10	*EA 2003*	*EA 2007*[e]	
	Daily Max[a]	*Daily Max*[b]	*Period Avg*	*Daily Max*[c]	*Period Avg*	*Daily Max*	*Daily Avg. Max*[d]	*Daily Avg. Max*	*Monthly Avg. Max*	*Daily Avg. Max*
January 1-31	93	60	54.3	88.7	38.4	46.6	60	72		
February 1-28	93	60	53.6	88.7	41.7	51.7	60	77		
March 1-31	93	60	54.4	88.7	47.0	57.3	65	82		
April 1-15	93	90	58.9	88.7	54.0	59.9	73	90		
April 16-30	93	90	62.9	88.7	57.3	67.7	80	90		
May 1-15	93	90	68.1	88.7	63.7	71.6	85	92		
May 16-31	93	90	70.4	88.7	65.1	71.2	90	93		
June 1-15	93	90	75.5	88.7	69.8	77.8	90	93	90	93
June 16-30	93	90	85.1	88.7	81.5	85.1	91	93	90	93
July 1-31	93	90	85.1	88.7	81.5	85.1	91	93	90	93
August 1-31	93	90	85.1	88.7	81.5	85.1	91	93	90	93
September 1-15	93	90	85.1	88.7	81.5	85.1	90	93	90	93
September 16-30	93	90	76.5	88.7	69.9	75.7	90	93	90	93
October 1-15	93	90	73.2	88.7	63.7	71.2	85	92		
October 16-31	93	90	69.4	88.7	59.8	68.0	85	92		
November 1-30	93	90	66.2	88.7	53.0	63.6	75	90		
December 1-31	93	60	59.9	88.7	43.4	56.9	65	82		

(a) Not to be exceeded more than 5% of the time.
(b) Not to be exceeded by no more than 2.8° F more than 1% of the hours in the 12-month period ending with any month.

(c) Not to be exceeded more than 2% of the hours in the 12-month period ending with any month. At no time shall the water temperature at such locations exceed the maximum limits by more than 3.6° F (2° C).

(d) May be exceeded by no more than 3° F during 2 % of the hours in the 12-month period ending in December 31, at no time shall exceed 93° F at I-55 Bridge.

(e) Cold shock provision that prohibits a change in the ambient temperatures of more than 27° F applies during non-summer months.

2003 EA Thermal Standards. The 2003 EA thermal limits are patterned after the existing thermal regime in the waterway to reflect the seasonal fluctuations and human-induced waterway conditions. PC 1403 at 40. For summer months, the proposal sets forth the daily average maximum at 93° F, which is the same level as the daily maximum for Secondary Contact and Indigenous Aquatic Life use standard. Further, the proposal appears to rely on the "Upper Lethal Temp." of various Des Plaines River Representative Important Species (RIS) to support the proposed thermal standards. (PC 1403, Att. D at 43, 51-52, Table 2). The EA 2003 proposal states, "All the Des Plaines River RIS except for redhorse, have upper temperature tolerances in the mid to high 30 °C (95-100° F) (Table 2). Thus, Midwest Generation argues that occasional exposure to temperatures in the mid to high 90s (°F) should have little effect on these species. PC 1403, Att. D at 43.

However, the Board notes that the RIS selected in the EA 2003 proposal do not include the same breadth of fish species considered in IEPA's proposal or the 2007 EA proposal. Specifically, temperature sensitive species like white sucker and walleye are not included in the RIS. Additionally, IEPA states that it reviewed and rejected the 2003 EA proposal even before the filing of IEPA's proposal in 2007. The Board also has significant concerns applying standards based on existing thermal regime to waters being upgraded from Indigenous ALU to UDIP ALU. Particularly, since the proposal may not be protective of temperature sensitive species expected to be present in UDIP.

2007 EA Thermal Standards. This proposal recommends a summer maximum monthly average temperature of 90° F, with a maximum daily average temperature not to exceed 93°F. For the non-summer months, the proposal includes a provision prohibiting a change in the ambient temperatures of more than 27° F to address USEPA's concerns regarding cold shock. EA performed statistical analyses of "species richness" and "modified Index of Wellbeing" (IWBmod) related to the fish taxa collected in the field, and determined a temperature where these two measures declined significantly as a basis for proposing thermal monthly average maximum. PC 1403, Att. C. at 6. However in considering the overall fish community, the EA 2007 proposal does not appear to give "special consideration" to the most thermally sensitive important species. As USEPA states,

> The influence that management objectives and selection of species have on the application of temperature criteria is extremely important, especially if an inappropriate, but very temperature-sensitive, species is included. In such a case, unnecessarily restrictive criteria will be derived. Conversely, if the most sensitive important species is not considered, the resultant criteria will not be protective. USEPA, "Temperature Criteria for Freshwater Fish: Protocol and Procedures," May 1977, EPA-600/3-77-061.

Further, USEPA states,

> The most thermally sensitive species (and species group) in the local area should be identified and their importance should be given special consideration, since such species (or species groups) might be most readily eliminated from the

> community if effluent limitations allowed existing water temperatures to be altered. Consideration of the most sensitive species will best involve a total aquatic community viewpoint. USEPA, "InterIEPA 316(a) Technical Guidance Manual and Guide for Thermal Effects Sections of Nuclear Facilities Environmental Impact Statements (DRAFT)," May 1, 1977 at 37.

In addition, the Environmental Groups have raised several concerns regarding the 2007 EA Thermal Standards with respect to lack of consideration of sensitive species. They cite to testimony of Dr. David Thomas to argue that species sensitive to temperature, such as white sucker, redhorse, walleye, and smallmouth bass would occur in UDIP if temperature is lowered. PC 1412 at 4 citing 8/14/09Tr. at 114, Exh. 327 at 4-6.

AS 96-10 Thermal Standards. Midwest Generation offers AS 96-10 thermal standards as an alternative, if the Board decides not to rely on either the 2003 or 2007 EA proposals. The AS 96-10 temperature standards increase in gradual increments from 60° F in January to 90 to 91° F during the summer months (August thru September), and then decrease back to 60° F. Because the "daily maximum" adjusted temperature standards apply at the I-55 Bridge, Midwest Generation states that the application of those standards to UDIP as a whole must be on a daily "average maximum" basis. Otherwise, Midwest Generation asserts that the standards would be stricter than what is necessary to protect the aquatic life present or expected to be present in UDIP waters. PC 1403 at 43. The Board notes that during summer months, the AS 96-10 daily average maximum temperature standards are the most stringent standards among the three Midwest Generation's proposals.

Although Midwest Generation argues that AS 96-10 standards are based on sound science and reliable data, and have been reviewed by the Board, federal and state regulators, and public entities, the Board notes that AS 96-10 was a site-specific determination made almost twenty years ago. As noted by IEPA, this proposal does not address conditions that have changed since the Board granted the adjusted standard. In addition to installation of helper cooling towers at Joliet 9 facility, the Board is also aware of the elimination of heat discharges to CAWS with the closing of Crawford and Fisk plants on CAWS. In light of this, the Board finds that the application of AS 96-10 thermal standards to UDIP is not justified without further evaluation based on the current conditions of the waterways.

Reliance on Field Data to Establish Thermal Standards. Midwest Generation asserts that its proposals should be considered by the Board because they are based on extensive field data, which is preferred by USEPA for deriving national water quality criteria. The Environmental Groups argue that Midwest Generation's field data represents "conditions affected by huge MWG thermal discharges into a relatively low-flow water body". PC 1412 at 6. In this regard, the Board notes that the USEPA guideline states,

> If it were feasible, a freshwater (or saltwater) numerical aquatic life national criterion[] for a material should be determined by conducting field tests on a wide variety of *unpolluted bodies of fresh (or salt) water*…Because it is not feasible to determine national criteria by conducting such field tests, these Guidelines…describe an objective, internally consistent, appropriate, and feasible

> way of deriving national criteria… USEPA, "Guidelines for Deriving Numerical National water Quality Criteria for the Protection of Aquatic Organisms and Their Uses", PB85-227049, 1985 at 1 (emphasis added).

While Midwest Generation's proposals are based on extensive field aquatic life data, the data comes from CAWS and LDPR segments impacted by temperature discharge and not from "unpolluted bodies" of water, as preferred by USEPA. Although Midwest Generation contends that the lack of a balanced indigenous community in the affected waters is primarily due to poor habitat quality and sediment contamination, the Board is not convinced that long-term thermal discharge is not a factor affecting aquatic life in CAWS and LDPR. As noted by the Environmental Groups, "the major object[ive] of Subdocket D is to protect the kinds and quantities of aquatic life that *could* live in the waters under consideration if water quality is improved." PC 1412 at 4. Regarding the list of species to be protected in CAWS, USEPA's letter to IEPA dated 2007 states that the list must include, "species assemblage that ought to be present in the different segments of the CAWS in the absence of thermal impacts." Exh. 4 at 6.

Board Findings. In light of the misgivings raised by IEPA and the Environmental Groups as well as the Board's own concerns, the Board declines to adopt the alternate proposals put forth by Midwest Generation for first notice. First, the Board finds that the proposal based on AS 96-10 is not appropriate for CAWS and LDPR without further evaluation of the current conditions in CAWS and LDPR. The Board believes that more current data reflecting recent changes in thermal regime is needed before considering a standard adopted 20 years ago.

Next, the Board finds that while the methodology used in the EA proposals may have some merits, the proposed thermal standards may not be protective of the aquatic life expected to be in the UDIP waters. While the Board noted in Subdocket C that the "UDIP may not fully meet the CWA aquatic life goal" and noted that "[t]he Board is mindful that, particularly in the area of temperature, water quality standards may need to be adapted for the UDIP", the Board does not believe that the EA proposals will be protective of aquatic life expected to be present in UDIP waters. *See* Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9(C), slip op. at 10-11 (Feb. 6, 2014).

Additionally, the Board agrees with IEPA that the timing of Midwest Generation's submittal of the alternate proposals with its final pre-first notice comments without supporting testimony in Subdocket D prevented participants from cross-examining Midwest Generation's experts on the three proposals. While Midwest Generation witnesses testified in this rulemaking, as noted by IEPA, a thorough examination of the proposals by the participants was not possible since participants were directed to address issues concerning thermal standards specifically in Subdocket D. For the foregoing reasons, the Board declines to move forward with Midwest Generation's proposals.

Board's First Notice Proposal

The Board will adopt for first notice the General Use temperature standards for UDIP, CAWS ALU A, and CAWS and Brandon Pool ALU B waters. As discussed above, the Board

finds that the thermal standards proposed by IEPA and the Environmental Groups are inappropriate for CAWS and UDIP since they are more stringent than General Use standards. Further, Midwest Generation's proposals are not protective of the designated aquatic life use of UDIP waters. Additionally, the Board finds that the existing Secondary Contact and Indigenous ALU standards are inadequate to protect the new aquatic life use designations adopted by the Board in Subdocket C. Given the significant issues associated with the various alternate proposals in the record, the Board finds that the existing General Use temperature standards provide the most appropriate alternative for protecting aquatic life in UDIP, CAWS ALU A, and CAWS ALU B waters.

The existing General Use thermal standards, which have been effective since the Board adopted them early in 1970s, provide a federally-approved alternative to the various proposals in the record. In this regard, the Board notes that when faced with a similar situation regarding bacterial water quality standards in Subdocket B, the USEPA recommended the Board use existing federally-approved fecal coliform criteria in Subdocket B:

> U.S. EPA also recommends that the Board clarify in its second notice opinion, order and rule that Illinois' existing, federally-approved fecal coliform criteria for protection of primary contact recreation, 35 Ill. Adm. Code 302.209, apply to these five segments. PC 994.

In R08-9(B), the Board stated,

> Therefore, because the General Use water quality standard has been adopted by the Board and approved by the USEPA for statewide implementation, the Board will adopt the fecal coliform water quality standard for protected waters found in Section 302.209, for the protection of Primary Contact Recreation waters. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(B), slip op. at 7 (Feb. 2, 2012).

While the Board recognizes that the General Use fecal coliform standard was adopted for Primary Contact Recreational Use waters, the application of General Use thermal standards to lesser use designations is justified due to the lack of viable alternative options. Further, the Board notes that most of the other water quality standards proposed for CAWS and UDIP waters are the same as General Use, with the exceptions of: dissolved oxygen and total ammonia standards for ALU A and ALU B waters; and arsenic, chromium, mercury, phenols and silver, which reflect more current National Criteria Documents than what was considered for General Use.

UDIP

In Subdocket C, the Board found that UDIP waters almost meet the CWA goals, while recognizing that thermal standards may need to be adapted for certain dischargers. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower

Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(C), slip op. at 43 (Feb. 21, 2013). While the Board intends to consider any adjustment of the thermal standards adopted for UDIP for specific dischargers based on site-specific conditions, including technical feasibility and economic reasonableness of complying with the generally applicable standards, the Board finds that the thermal standards for UDIP must be based on protection of designated aquatic life use rather than the needs of individual dischargers. As such, the Board finds that thermal standards consistent with General Use would be protective of the designated aquatic life uses in the UDIP.

CAWS ALU A and ALU B

For CAWS ALU A waters, the record does not indicate concern regarding IEPA's proposed thermal standards from any thermal dischargers. Regarding ALU B waters, the significant thermal discharges include the District's Stickney water reclamation plant (WRP) (CSSC) and Midwest Generation's Will County Station (Des Plaines River). The District has not indicated any concern with the Stickney WRP discharge complying with IEPA's proposed temperature standards, which are more stringent than the General Use standards. Further, Midwest Generation states that it may need some sort of compliance relief regardless of whether the Board adopts IEPA's proposed thermal standards or any of the other thermal standard options discussed above. PC 1403 at 47. As such, the Board finds it appropriate to apply the General Use thermal standards to CAWS ALU A and ALU B waters. Again, the Board notes that this approach is consistent with IEPA's proposal to apply General Use standards for a number of other constituents to ALU A and ALU B waters.

Excursion Hours

Next, the Board will address the issue of whether to include the excursion hours allowed in the General Use thermal standards at 35 Ill. Adm. Code 302.211 in the proposed thermal standards for CAWs and LDPR. Section 302.211 allows an increase of up to 2.8° F to occur for 1% of the hours in a 12-month period. See 35 Ill. Adm. Code 302.211. The Board notes that while IEPA's proposal included excursion hours similar to the General Use standards, the Environmental Groups' proposal did not. USEPA voiced concern regarding the allowance of excursion hours above the daily maximum temperature limit. USEPA questions whether such allowance is consistent with the requirements of 40 C.F.R. 131.11(a)(1) that criteria be based upon a sound scientific rationale. PC 1404 at 2. USEPA suggests that the Board could eliminate the excursion provision to address the concerns regarding excursion hours.

The Board notes that the excursion hours allow for occasional exceedances of thermal limits. Such exceedances, Mr. Yoder explained, are inevitable and may not necessarily result in biologically impaired use because of short-term survival of fish by avoidance. Exh. 13 at 12 and 8/31/08Tr. at 163. He noted that avoidance for a short period of time such as the excursion hours does not deprive the fish of the habitat in a section of the river on a permanent or semi-permanent basis. The fish will find refuge, either downstream or in deeper waters, where temperature is not as hot and fish will move back when temperature cools. *Id.* The Board notes that the excursion hours above the thermal limits have been part of the Board's General Use Standards since they were adopted in the early 1970s. Further, as explained by Mr. Yoder, there

is a biological basis for allowing excursions above the thermal limits for a short time period. In light of this, the Board will retain the excursion hours provision in the first notice temperature standards for CAWS and UDIP. However, the Board invites comments from IEPA and other participants on this issue.

Cold Shock

Another issue raised concerning temperature standards deals with the protection of aquatic life from "cold shock." IEPA added a provision at Section 302.408(e) that requires, "(w)ater temperatures of discharges to the CAWS Aquatic Life Use A Waters and CAWS and Brandon Pool Aquatic Life Use B Waters shall be controlled in a manner to protect fish and aquatic life uses from the deleterious effects of cold shock." Exh. 481 at 18-20. Although IEPA was not aware of cold shock being a concern in CAWS, Mr. Twait stated that the provision was added to address USEPA's concern. Exh. 481 at 9.

Several participants questioned the need for the cold shock provision when IEPA is not aware of any cold shock incident in Illinois waters. *See generally* 7/29/13Tr. at 175-87, PC 1403 at 26-27, PC 1406 at 31, and PC 1413 at 4. Further, Midwest Generation argues that the proposed language is vague and does not provide implementation guidance. Midwest Generation proposes an alternative cold shock provision based on studies performed by Brungs and Jones (1977) that prohibits a change in the ambient temperatures in the stream of more than 27° F during non-summer months. PC 1403 at 38 citing Attach. C at 9.

The Board agrees that the cold shock provision, as proposed by IEPA, is vague and raises implementation issues. Further, the Board is concerned that the General Use water quality standards do not include a standard for cold shock, but IEPA is proposing the inclusion of a standard here. Regarding the occurrence of cold shock, Mr. Twait testified that he was not aware of cold shock being an issue with waterways like CAWS and LDPR. However, he was aware of cold shock in perched lakes resulting from power plant shut down. 3/11/14Tr. at 236 – 237. The Board notes that while CAWS and LDPR receive discharges from power plants, a significant portion of the flow in these waterways comes from MWRD's water reclamation plants that may help regulate the temperature of the waterways against cold shock during winter months.

Given that the General Use standards do not include a cold shock standard and the lack of any documented incidents of cold shock in CAWS and LDPR, the Board declines to propose a cold shock provision at first notice. However, the Board invites IEPA and other participants to specifically address: whether the proposed General Use standard is protective of cold shock in CAWS and LDPR; if a cold shock standard is necessary, whether such a standard be based on a narrative standard like the one proposed by IEPA or a numeric standard similar to the one proposed by Midwest Generation; and if a numeric standard is appropriate, whether the standard proposed by Midwest Generation provides protection against cold shock.

Summary

In light of above, the Board will adopt the numeric temperature standards based on the General Use temperature standards found at 35 Ill. Adm. Code 302.211(e) for CAWS ALU A,

CAWS and Brandon Pool ALU B, and UDIP ALU waters. In proposing the temperature standards, the Board agrees with the Environmental Groups that the General Use thermal standards may need to be revised to reflect the current science and methodologies. PC 1412 at 2. For the reasons discussed above, the Board strongly believes that any revision of the Board's thermal standards based on current science and methodologies must start with the General Use standards before being extended to other use designations. By doing so, the Board believes that temperature standards appropriate for various aquatic life uses could be developed without issuing more stringent standards for waters designated for lesser aquatic life uses. Therefore, the Board urges IEPA to consider possible revision of the General Use thermal standards as a part of its next triennial review.

The Board proposes the following changes to IEPA's proposal at Section 302.408:

Section 302.408 Temperature

a) For South Fork of the South Branch of the Chicago River (Bubbly Creek), temperature ~~Temperature~~ (STORET number (^{o} F) 00011 and (^{o} C) 00010) shall not exceed 34^{o} C (93^{o} F) more than 5% of the time, or 37.8^{o} C (100^{o} F) at any time.

b) Water temperature shall not exceed the maximum limits in the applicable tables in subsections (b), (c) and (d), below, during more than one percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature exceed the maximum limits in the applicable table that follows by more than 1.7^{o} C (3.0^{o} F).

c) Water temperature in the Chicago Area Waterway System Aquatic Life Use A waters listed in 35 Ill. Adm. Code 303.230 shall not exceed the limits in the following table in accordance with subsection (a), above:

Months	Daily Maximum (^{o} F)
January	60
February	60
March	60
April	90
May	90
June	90
July	90
August	90
September	90
October	90
November	90
December	60

d Water temperature in the Chicago Area Waterway System and Brandon Pool Aquatic Life Use B waters listed in 35 Ill. Adm. Code 303.325, shall not exceed the limits in the following table in accordance with subsection (a), above:

Months	Daily Maximum (^{o}F)
January	60
February	60
March	60
April	90
May	90
June	90
July	90
August	90
September	90
October	90
November	90
December	60

e) Water temperature for the Upper Dresden Island Pool Aquatic Life Use waters, as defined in 35 Ill. Adm. Code 303.237, shall not exceed the limits in the following table in accordance with subsection (a), above:

Months	Daily Maximum (^{o}F)
January	60
February	60
March	60
April	90
May	90
June	90
July	90
August	90
September	90
October	90
November	90
December	60

Compliance Alternatives

Midwest Generation, ExxonMobil, and Stepan ask that the Board consider relief mechanisms such as a multi-discharger variance or delay the effective date to allow additional

time for dischargers to attain compliance with or seek relief from the proposed thermal standards. PC 1403 at 3, 1413 at 4-6, and 1405 at 20. Midwest Generation notes that, "regardless of which thermal standards the Board adopts, it is likely that Midwest Generation will need to seek regulatory relief from the Use B and UDIP Use thermal standards because the technical feasibility and economic reasonableness of compliance is at best uncertain and more likely unsustainable." PC 1403 at 3. Midwest Generation states that the Board needs to provide guidance regarding regulatory relief, especially due to uncertainty regarding the demonstration required to obtain a water quality variance. Midwest Generation maintains that USEPA's interpretation that a water quality variance is allowed only if one or more of the UAA Factors is met because such a variance constitutes the temporary removal of the designated use poses a significant concern. PC 1403 at 48, citing PC 1367. In order for some of these issues to be clarified, Midwest Generation requests "that the Board either delay the effective date of these rules or incorporate variance relief as part of its Subdocket D decision consistent with U.S. EPA guidance." PC 1403 at 3.

Other participants including Stepan and ExxonMobil echo Midwest Generation's concerns regarding compliance relief. ExxonMobil urges the Board to consider delaying the effective date of the thermal standards to allow larger dischargers time to achieve compliance or seek relief, while protecting smaller dischargers that are not contributing to elevated temperatures. PC 1413 at 5-6. IEPA agreed with ExxonMobil regarding the potential need for a variance for thermal dischargers, and noted that it is still working with USEPA to address the concerns raised by USEPA's disapproval of Citgo/PDV's variance. PC 1401 at 37.

The Board appreciates participants' concerns regarding immediate compliance with the proposed thermal standards upon final adoption by the Board. The record is clear that thermal dischargers to CAWS and LDPR may need some type of short-term or long-term relief to achieve compliance with the temperature standards. Further, the Board agrees with the participants that USEPA's disapproval of Citgo/PDV's chloride water quality variance granted by the Board raises significant concerns regarding the Board's variance procedure under the Act. *See* PC 1367. USEPA's interpretation that "the CWA and federal regulations do not allow states to remove designated uses or modify criteria simply because a state believes that such standards 'would impose an arbitrary or unreasonable hardship'" makes the availability of variance under Section 35 of the Act problematic for the affected dischargers because relief granted by the Board must be approved by USEPA. *Id.* and 9/23/13Tr. at 55. USEPA has proposed new water quality variance provisions in its Clarifications Rule to clarify the availability of a variance under the CWA. *See* 78 FR 54517 (Sept. 4, 2013). The Board believes that it would be premature to provide any clarity on the variance issues while USEPA's rulemaking is still underway, and IEPA is still working with USEPA on a workable variance approach.

In light of this, the Board finds that delaying the effective date of the thermal standards would allow time for dischargers to achieve compliance or seek relief. A delay of the effective date would also provide time for IEPA to resolve pending variance issues with USEPA. The Board recognizes that the NPDES permitting regulations at 35 Ill. Adm. Code 309.148 allow IEPA to establish compliance schedules in individual permits. However, given the uncertainty regarding the approvability of variances at the federal level and multiple dischargers affected by the proposed thermal standards, the Board proposes to delay the effective date of the thermal

standards by eighteen months for CAWS and Brandon Pool ALU B and UDIP waters. The Board is not extending the delayed effective date of thermal standards to CAWS ALU A waters, because the Board is not aware of any thermal discharger to those waters that may be impacted by the proposed standards. The Board believes that the proposed eighteen-month delay provides sufficient time for dischargers to achieve compliance or seek relief from the proposed standards. The Board invites participants to comment on the proposed delayed effective date of the thermal standards.

Miscellaneous Changes to IEPA's Proposal

The Board indicated in Subdocket C that when proceeding in Subdocket D, the Board would move each aquatic life use to its own section. *See* Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, And 304, R08-9(C), slip op. at 61 (Nov. 21, 2013). Therefore, the proposed rule moves ALU B from Section 303.235 to its own section at Section 303.240. As a result references to Section 303.240 have been added where appropriate.

In Section 302.408, IEPA in its amended proposal removed the phrase "on an average basis" from the subsection dealing with temperature in the ALU A waters. IEPA did not proposal removal from the subsections dealing with ALU B waters or UDIP waters. The Board proceeds to first notice removing that language from all the subsections.

Miscellaneous Issues Raised by the United States Environmental Protection Agency

On April 30, 2014, USEPA filed comments on CAWS Subdocket D, with a request that the Board "make the necessary changes to Illinois' water quality standards" provided by USEPA in its May 16, 2012 letter (PC 1338). PC 1404 at 1.

It is important to note that the comments provided by USEPA in PC 1338 were submitted prior to the Board's adoption of a second notice opinion and order in Subdocket C on November 21, 2013, with final adoption of these rules occurring on February 28, 2014. As a result, many of the issues raised by USEPA were addressed in Subdocket C, or are not within the scope for consideration in Subdocket D.

USEPA disapproves of the removal of the General Use designation for the Chicago River. PC 1338 at 3. In the rules proposed by IEPA on October 26, 2007, IEPA proposed to designate the Chicago River as an ALU B water, which suggests this segment of CAWS is of lesser quality than a general use water. SR at 45-46. The Board determined that retaining the General Use standard for the Chicago River was appropriate as the Chicago River can meet the CWA goals in the foreseeable future. The Board, therefore, adopted a rule with no changes in the aquatic life use designation for the Chicago River. The Chicago River will continue to be designated as General Use. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(C), slip op. at 190 (Feb. 21, 2013); *see also* R08-9(C) (Feb. 6, 2013). In order to make clear that the aquatic life standards for General Use waters apply to

the Chicago River, the Board will amend Section 303.204 to make clear that those standards apply to the Chicago River.

USEPA also disapproves of the removal of the General Use designation for the Upper North Shore Channel from the Wilmette Pumping Station to the North Side Water Reclamation Plant and Calumet River from Lake Michigan to the O'Brien Locks and Dam. PC 1338 at 4. USEPA claims that "no adequate rationale has been provided as required by 40 C.F.R. 131.6(a), (b), (c), and (f), 131.10(g), and 131.11(a). *Id.* In the rules proposed by IEPA on October 26, 2007, IEPA proposed to designate the Upper North Channel as an ALU A water and the Calumet River from Lake Michigan to the O'Brien Locks and Dam as an ALU B water. SR at 45-46. The Board adopted a final rule that designated these two CAWS segments as ALU A waters. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(C), slip op. at 190 (Feb. 21, 2013); *see also* R08-9(C) (Feb. 6, 2013).

USEPA disapproves of the removal of the Secondary Contact recreational use designation from the CSSC and the LDPR from the CSSC to the Brandon Road Lock and Dam, asserting that "no adequate rationale has been provided for removal as required by 40 C.F.R. 131.6(a) and 131.10(g). PC 1338 at 5. USEPA suggests the Board "must revise its water quality standards to either: 1) reinstate the Secondary Contact recreational use, or 2) adopt a recreational use that is substantively the same as the Secondary Contact recreational use designation. *Id.* The Board adopted a final rule that designated the lower CSSC and the LDPR from the CSSC to the Brandon Road Lock and Dam as a Non-recreational use. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments, R08-9(A) slip op. at 42, 49 (June 16, 2011); *see also* R08-9(A) (Aug. 18, 2011).

In response to these concerns, the Board reminds that the issue of use designation is not within the scope of subdocket D, which is to address water quality standards to protect the aquatic life use designations adopted by the Board in subdocket C. Use designations cannot, therefore, be considered at this time. Second, while use designations are not being addressed in subdocket D, the Board notes that it provided extensive documentation at first notice in subdocket C to support the ALU A designation for both segments of concern to USEPA. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(C), slip op. at 182, 203 (Feb. 21, 2013). The Board continues to believe that UAA Factors 3, 4, and 5 prevent the attainment of the General Use designation for both segments. *Id.*

Further, the Board notes that recreational use was addressed in Subdocket A, and the Board believes that it provided extensive documentation to support the uses adopted by the Board for recreation as well as the standards adopted in Subdocket B. Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304, R08-9(A), slip op. at 42, 49 (June 16, 2011); *see also* R08-9(A) (Aug. 18, 2011).

If anyone believes that the Board's conclusions on uses, both aquatic life and recreational, are incorrect, the Board encourages the filing of a new proposal. However, at this time the Board is not reexamining use determinations.

CONCLUSION

The Board today proposes water quality standards for CAWS and LDPR that are necessary to meet the aquatic life uses for those waterways. The Board is proceeding with the standards for many constituents as proposed by the IEPA, with two notable exceptions. The Board finds that the 500 mg/L chloride standard must be adapted for the CSSC from December 1 until April 30. Therefore the Board proposes for the CSSC a numeric standard of 620 mg/L as a chronic water quality standard and 990 mg/L as an acute water quality standard for chloride from December 1 until April 30.

The Board also finds that the temperature water quality standards proposed by the IEPA as well as those suggested by other participants are not appropriate. Therefore, the Board proposes that the General Use temperature standards apply to the waterways.

The Board also declines to proceed with mixing zones for chloride or with site-specific relief for dischargers at this time. The Board seeks additional input from participants on these issues.

ORDER

The Board directs the Clerk to cause the publication of the following rule in the *Illinois Register* for first notice:

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE C: WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 302
WATER QUALITY STANDARDS

SUBPART A: GENERAL WATER QUALITY PROVISIONS

Section
302.100 Definitions
302.101 Scope and Applicability
302.102 Allowed Mixing, Mixing Zones and ZIDs
302.103 Stream Flows
302.104 Main River Temperatures
302.105 Antidegradation

SUBPART B: GENERAL USE WATER QUALITY STANDARDS

Section
302.201 Scope and Applicability
302.202 Purpose
302.203 Offensive Conditions
302.204 pH
302.205 Phosphorus
302.206 Dissolved Oxygen
302.207 Radioactivity
302.208 Numeric Standards for Chemical Constituents
302.209 Fecal Coliform
302.210 Other Toxic Substances
302.211 Temperature
302.212 Total Ammonia Nitrogen
302.213 Effluent Modified Waters (Ammonia)(Repealed)

SUBPART C: PUBLIC AND FOOD PROCESSING WATER SUPPLY STANDARDS

Section
302.301 Scope and Applicability
302.302 Algicide Permits
302.303 Finished Water Standards
302.304 Chemical Constituents
302.305 Other Contaminants
302.306 Fecal Coliform
302.3~~2~~07 Radium 226 and 228

SUBPART D: CHICAGO AREA WATERWAY SYSTEM AND LOWER DES PLAINES RIVER WATER QUALITY ~~SECONDARY CONTACT~~ AND INDIGENOUS AQUATIC LIFE STANDARDS

Section
302.401 Scope and Applicability
302.402 Purpose
302.403 Unnatural Sludge
302.404 pH
302.405 Dissolved Oxygen
302.406 Fecal Coliform (Repealed)
302.407 Chemical Constituents
302.408 Temperature
302.409 Cyanide
302.410 Substances Toxic to Aquatic Life
302.412 Total Ammonia Nitrogen

SUBPART E: LAKE MICHIGAN BASIN WATER QUALITY STANDARDS

Section	
302.501	Scope, Applicability, and Definitions
302.502	Dissolved Oxygen
302.503	pH
302.504	Chemical Constituents
302.505	Fecal Coliform
302.506	Temperature
302.507	Thermal Standards for Existing Sources on January 1, 1971
302.508	Thermal Standards for Sources Under Construction But Not In Operation on January 1, 1971
302.509	Other Sources
302.510	Incorporations by Reference
302.515	Offensive Conditions
302.520	Regulation and Designation of Bioaccumulative Chemicals of Concern (BCCs)
302.521	Supplemental Antidegradation Provisions for Bioaccumulative Chemicals of Concern (BCCs)
302.525	Radioactivity
302.530	Supplemental Mixing Provisions for Bioaccumulative Chemicals of Concern (BCCs)
302.535	Ammonia Nitrogen
302.540	Other Toxic Substances
302.545	Data Requirements
302.550	Analytical Testing
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AUTHORITY: Implementing Section 13 and authorized by Sections 11(b) and 27 of the Environmental Protection Act [415 ILCS 5/13, 11(b), and 27]

SOURCE: Filed with the Secretary of State January 1, 1978; amended at 2 Ill. Reg. 44, p. 151, effective November 2, 1978; amended at 3 Ill. Reg. 20, p. 95, effective May 17, 1979; amended at 3 Ill. Reg. 25, p. 190, effective June 21, 1979; codified at 6 Ill. Reg. 7818; amended at 6 Ill. Reg. 11161, effective September 7, 1982; amended at 6 Ill. Reg. 13750, effective October 26, 1982; amended at 8 Ill. Reg. 1629, effective January 18, 1984; peremptory amendments at 10 Ill. Reg. 461, effective December 23, 1985; amended at R87-27 at 12 Ill. Reg. 9911, effective May 27, 1988; amended at R85-29 at 12 Ill. Reg. 12082, effective July 11, 1988; amended in R88-1 at 13 Ill. Reg. 5998, effective April 18, 1989; amended in R88-21(A) at 14 Ill. Reg. 2899, effective February 13, 1990; amended in R88-21(B) at 14 Ill. Reg. 11974, effective July 9, 1990; amended in R94-1(A) at 20 Ill. Reg. 7682, effective May 24, 1996; amended in R94-1(B) at 21 Ill. Reg. 370, effective December 23, 1996; expedited correction at 21 Ill. Reg. 6273, effective December 23, 1996; amended in R97-25 at 22 Ill. Reg. 1356, effective December 24, 1997; amended in R99-8 at 23 Ill. Reg. 11249, effective August 26, 1999; amended in R01-13 at 26 Ill. Reg. 3505, effective February 22, 2002; amended in R02-19 at 26 Ill. Reg. 16931, effective November 8, 2002; amended in R02-11 at 27 Ill. Reg. 166, effective December 20, 2002; amended in R04-21 at 30 Ill. Reg. 4919, effective March 1, 2006; amended in R04-25 at 32 Ill. Reg. 2254, effective January 28, 2008; amended in R07-9 at 32 Ill. Reg. 14978, effective September 8, 2008; amended in R11-18 at 36 Ill. Reg. 18871, effective December 12, 2012; amended at in R08-09(D)_____ at 38 Ill. Reg. _____, effective _____.

SUBPART A: GENERAL WATER QUALITY PROVISIONS

Section 302.101 Scope and Applicability

a) This Part contains schedules of water quality standards which are applicable throughout the State as designated in 35 Ill. Adm. Code 303. Site specific water quality standards are found with the water use designations in 35 Ill. Adm. Code 303.

b) Subpart B contains general use water quality standards which must be met in waters of the State for which there is no specific designation (35 Ill. Adm. Code 303.201).

c) Subpart C contains the public and food processing water supply standards. These are cumulative with Subpart B and must be met by all designated waters at the point at which water is drawn for treatment and distribution as a potable supply or for food processing (35 Ill. Adm. Code 303.202).

d) Subpart D contains the Chicago Area Waterway System and the Lower Des Plaines River water quality ~~secondary contact and indigenous aquatic life~~ standards. These standards must be met only by certain waters designated in 35 Ill. Adm. Code 303.204, 303.220, 303.225, 303.227, 303.230, 303.235 and 303.240 ~~303.441~~. Subpart D also contains water quality standards applicable to

indigenous aquatic life waters found only in the South Fork of the South Branch of the Chicago River (Bubbly Creek).

e) Subpart E contains the Lake Michigan Basin water quality standards. These must be met in the waters of the Lake Michigan Basin as designated in 35 Ill. Adm. Code 303.443.

f) Subpart F contains the procedures for determining each of the criteria designated in Sections 302.210 and 302.410.

g) Unless the contrary is clearly indicated, all references to "Parts" or "Sections" are to Ill. Adm. Code, Title 35: Environmental Protection. For example, "Part 309" is 35 Ill. Adm. Code 309, and "Section 309.101" is 35 Ill. Adm. Code 309.101.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.102 Allowed Mixing, Mixing Zones and ZIDs

a) Whenever a water quality standard is more restrictive than its corresponding effluent standard, or where there is no corresponding effluent standard specified at 35 Ill. Adm. Code 304, an opportunity shall be allowed for compliance with 35 Ill. Adm. Code 304.105 by mixture of an effluent with its receiving waters, provided the discharger has made every effort to comply with the requirements of 35 Ill. Adm. Code 304.102.

b) The portion, volume and area of any receiving waters within which mixing is allowed pursuant to subsection (a) shall be limited by the following:

1) Mixing must be confined in an area or volume of the receiving water no larger than the area or volume which would result after incorporation of outfall design measures to attain optimal mixing efficiency of effluent and receiving waters. Such measures may include, but are not limited to, use of diffusers and engineered location and configuration of discharge points.

2) Mixing is not allowed in waters which include a tributary stream entrance if such mixing occludes the tributary mouth or otherwise restricts the movement of aquatic life into or out of the tributary.

3) Mixing is not allowed in water adjacent to bathing beaches, bank fishing areas, boat ramps or dockages or any other public access area.

4) Mixing is not allowed in waters containing mussel beds, endangered species habitat, fish spawning areas, areas of important aquatic life habitat, or any other natural features vital to the well being of aquatic life in such a manner that the maintenance of aquatic life in the body of water as a whole would be adversely affected.

5) Mixing is not allowed in waters which contain intake structures of public or food processing water supplies, points of withdrawal of water for irrigation, or watering areas accessed by wild or domestic animals.

6) Mixing must allow for a zone of passage for aquatic life in which water quality standards are met. However, a zone of passage is not required in receiving streams that have zero flow for at least seven consecutive days recurring on average in nine years out of ten.

7) The area and volume in which mixing occurs, alone or in combination with other areas and volumes of mixing, must not intersect any area of any body of water in such a manner that the maintenance of aquatic life in the body of water as a whole would be adversely affected.

8) The area and volume in which mixing occurs, alone or in combination with other areas and volumes of mixing must not contain more than 25% of the cross-sectional area or volume of flow of a stream except for those streams where the dilution ratio is less than 3:1. In streams where the dilution ratio is less than 3:1, the volume in which mixing occurs, alone or in combination with other volumes of mixing, must not contain more than 50 % of the volume flow unless an applicant for an NPDES permit demonstrates, pursuant subsection (d) of this section, that an adequate zone of passage is provided for pursuant to Section 302.102(b)(6).

9) No mixing is allowed where the water quality standard for the constituent in question is already violated in the receiving water.

10) No body of water may be used totally for mixing of single outfall or combination of outfalls, except as provided in Section 302.102(b)(6).

11) Single sources of effluents which have more than one outfall shall be limited to a total area and volume of mixing no larger than that allowable if a single outfall were used.

12) The area and volume in which mixing occurs must be as small as is practicable under the limitations prescribed in this subsection, and in no circumstances may the mixing encompass a surface area larger than 26 acres.

c) All water quality standards of this Part must be met at every point outside of the area and volume of the receiving water within which mixing is allowed. The acute toxicity standards of this Part ~~Sections 302.208 and 302.210~~ must be met within the area and volume within which mixing is allowed, except as provided in subsection (e).

d) Pursuant to the procedures of Section 39 of the Act and 35 Ill. Adm. Code 309, a person may apply to the Agency to include as a condition in an NPDES permit formal definition of the area and volume of the waters of the State within which mixing is allowed for the NPDES discharge in question. Such formally defined area and volume of allowed mixing shall constitute a "mixing zone" for the purposes of 35 Ill. Adm. Code: Subtitle C. Upon proof by the applicant that a proposed mixing zone conforms with the requirements of Section 39 of the Act, this Section and any additional limitations as may be imposed by the Clean Water Act (CWA) (33 USC 1251 et seq.), the Act or Board regulations, the Agency shall, pursuant to Section 39(b) of the Act, include within the NPDES permit a condition defining the mixing zone.

e) Pursuant to the procedures of Section 39 of the Act and 35 Ill. Adm. Code 309, a person may apply to the Agency to include as a condition in an NPDES permit a ZID as a component portion of a mixing zone. Such ZID shall, at a minimum, be limited to waters within which effluent dispersion is immediate and rapid. For the purposes of this subsection, "immediate" dispersion means an effluent's merging with receiving waters without delay in time after its discharge and within close proximity of the end of the discharge pipe, so as to minimize the length of exposure time of aquatic life to undiluted effluent, and "rapid" dispersion means an effluent's merging with receiving waters so as to minimize the length of exposure time of aquatic life to undiluted effluent. Upon proof by the applicant that a proposed ZID conforms with the requirements of Section 39 of the Act and this Section, the Agency shall, pursuant to Section 39(b) of the Act, include within the NPDES permit a condition defining the ZID.

f) Pursuant to Section 39 of the Act and 35 Ill. Adm. Code 309.103, an applicant for an NPDES permit shall submit data to allow the Agency to determine that the nature of any mixing zone or mixing zone in combination with a ZID conforms with the requirements of Section 39 of the Act and of this Section. A permittee may appeal Agency determinations concerning a mixing zone or ZID pursuant to the procedures of Section 40 of the Act and 35 Ill. Adm. Code 309.181.

g) Where a mixing zone is defined in an NPDES permit, the waters within that mixing zone, for the duration of that NPDES permit, shall constitute the sole waters within which mixing is allowed for the permitted discharge. It shall not be a defense in any action brought pursuant to 35 Ill. Adm. Code 304.105 that the area and volume of waters within which mixing may be allowed pursuant to subsection (b) is less restrictive than the area or volume or waters encompassed in the mixing zone.

h) Where a mixing zone is explicitly denied in a NPDES permit, no waters may be used for mixing by the discharge to which the NPDES permit applies, all other provisions of this Section notwithstanding.

i) Where an NPDES permit is silent on the matter of a mixing zone, or where no NPDES permit is in effect, the burden of proof shall be on the discharger to demonstrate compliance with this Section in any action brought pursuant to 35 Ill. Adm. Code 304.105.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

SUBPART D: CHICAGO AREA WATERWAY SYSTEM AND LOWER DES PLAINES RIVER WATER QUALITY STANDARDS ~~SECONDARY CONTACT~~ AND INDIGENOUS AQUATIC LIFE STANDARDS

Section 302.401 Scope and Applicability

a) Subpart D contains the ~~secondary contact and~~ indigenous aquatic life standards. These must be met only by the South Fork of the South Branch of the Chicago River (Bubbly Creek) ~~certain waters specifically designated in Part 303~~. The Subpart B general use and Subpart C public and food processing water supply standards of this Part do not apply to Bubbly Creek ~~designated for secondary contact and indigenous aquatic life (Section 303.204~~

b) Subpart D also contains the Chicago Area Waterway System and Lower Des Plaines River water quality standards. These must be met only by waters specifically designated in Part 303. The Subpart B general use and Subpart C public and food processing water supply standards of this Part do not apply to waters described in 35 Ill. Adm. Code 303.204 as the Chicago Area Waterway System or Lower Des Plaines River and listed in 35 Ill. Adm. Code 303.220 through 303.240, except that waters designated as Primary Contact Recreation Waters in 35 Ill. Adm. Code 303.220 must meet the numeric water quality standard for bacteria applicable to protected waters in 35 Ill. Adm. Code 302.209.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.402 Purpose

The Chicago Area Waterway System and Lower Des Plaines River standards shall protect primary contact**,** incidental contact or non-contact recreational uses (except where designated as non-recreational waters), commercial activity, including navigation and industrial water supply uses; and the highest quality aquatic life and wildlife that is attainable, limited only by the physical condition of these waters and hydrologic modifications to these waters. The numeric and narrative standards contained in this Part will assure the protection of the aquatic life and recreational uses of the Chicago Area Waterway System and Lower Des Plaines River as those uses are defined in 35 Ill. Adm. Code Part 301 and designated in 35 Ill. Adm. Code Part 303. ~~Secondary contact and indigenous~~ Indigenous aquatic life standards are intended ~~for those waters not suited for general use activities but which will be appropriate for all secondary contact uses and which~~ for the South Fork of the South Branch of the Chicago River (Bubbly Creek), which ~~will be~~ is capable of supporting an indigenous aquatic life limited only by the physical

configuration of the body of water, characteristics and origin of the water and the presence of contaminants in amounts that do not exceed the water quality standards listed in Subpart ~~D.~~

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.404 pH

pH ~~(STORET number 00400)~~ shall be within the range of 6.5 ~~6.0~~ to 9.0 except for natural causes, except for South Fork of the South Branch of the Chicago River (Bubbly Creek) where pH shall be within the range of 6.0 to 9.0 except for natural causes.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.405 Dissolved Oxygen

Dissolved oxygen ~~(STORET number 00300)~~ concentrations shall not be less than the applicable values in subsections (a), (b), (c), and (d) of this Section ~~4.0 mg/l at any time except that the Calumet-Sag Channel shall not be less than 3.0 mg/1 at any time~~.

a) For South Fork of the South Branch of the Chicago River (Bubbly Creek) dissolved oxygen concentrations shall not be less than 4.0 mg/L at any time.

b) For the Upper Dresden Island Pool Aquatic Life Use waters listed in Section 303.230,

1) during the period of March through July:

A) 6.0 mg/L as a daily mean averaged over 7 days, and

B) 5.0 mg/L at any time; and

2) during the period of August through February:

A) 5.5 mg/L as a daily mean averaged over 30 days,

B) 4.0 mg/L as a daily minimum averaged over 7 days, and

C) 3.5 mg/L at any time.

c) For the Chicago Area Waterway System Aquatic Life Use A waters listed in Section 303.235,

1) during the period of March through July, 5.0 mg/L at any time; and

2) during the period of August through February:

A) 4.0 mg/L as a daily minimum averaged over 7 days, and

B) 3.5 mg/L at any time.

d) For the Chicago Area Waterway System and Brandon Pool Aquatic Life Use B waters listed in Section 303.240,

1) 4.0 mg/L as a daily minimum averaged over 7 days, and

2) 3.5 mg/L at any time.

e) Assessing attainment of dissolved oxygen mean and minimum values.

1) Daily mean is the arithmetic mean of dissolved oxygen concentrations in 24 consecutive hours.

2) Daily minimum is the minimum dissolved oxygen concentration in 24 consecutive hours.

3) The measurements of dissolved oxygen used to determine attainment or lack of attainment with any of the dissolved oxygen standards in this Section must assure daily minima and daily means that represent the true daily minima and daily means.

4) The dissolved oxygen concentrations used to determine a daily mean or daily minimum should not exceed the air-equilibrated concentration.

5) "Daily minimum averaged over 7 days" means the arithmetic mean of daily minimum dissolved oxygen concentrations in 7 consecutive 24-hour periods.

6) "Daily mean averaged over 7 days" means the arithmetic mean of daily mean dissolved oxygen concentrations in 7 consecutive 24-hour periods.

7) "Daily mean averaged over 30 days" means the arithmetic mean of daily mean dissolved oxygen concentrations in 30 consecutive 24-hour periods.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.407 Chemical Constituents

a) The acute standard (AS) for the chemical constituents listed in subsection (e) shall not be exceeded at any time except as provided in subsection (d).

b) The chronic standard (CS) for the chemical constituents listed in subsection (e) shall not be exceeded by the arithmetic average of at least four consecutive

samples collected over any period of at least four days, except as provided in subsection (d). The samples used to demonstrate attainment or lack of attainment with a CS must be collected in a manner that assures an average representative of the sampling period. For the chemical constituents that have water quality based standards dependent upon hardness, the chronic water quality standard will be calculated according to subsection (e) using the hardness of the water body at the time the sample was collected. To calculate attainment status of chronic standards, the concentration of the chemical constituent in each sample is divided by the calculated water quality standard for the sample to determine a quotient. The water quality standard is attained if the mean of the sample quotients is less than or equal to one for the duration of the averaging period.

c) The human health standard (HHS) for the chemical constituents listed in subsection (f) shall not be exceeded, on a 12-month rolling average based on at least eight samples, collected in a manner representative of the sampling period, except as provided in subsection (d).

d) In waters where mixing is allowed pursuant to Section 302.102 of this Part, the following apply:

1) The AS shall not be exceeded in any waters except for those waters for which a zone of initial dilution (ZID) applies pursuant to Section 302.102 of this Part.

2) The CS shall not be exceeded outside of waters in which mixing is allowed pursuant to Section 302.102 of this Part.

3) The HHS shall not be exceeded outside of waters in which mixing is allowed pursuant to Section 302.102 of this Part.

e) Numeric Water Quality Standards for the Protection of Aquatic Organisms

Constituent	AS (µg/L)	CS (µg/L)
Arsenic (trivalent, dissolved)	340 X 1.0*=340	150 X 1.0*=150
Benzene	4200	860
Cadmium (dissolved)	exp[A+Bln(H)] X {1.138672-[(lnH)(0.041838)]}*, where A=-2.918 and B=1.128	exp[A+Bln(H)] X {1.101672-[(lnH)(0.041838)]}*, where A= -3.490 and B=0.7852
Chromium (hexavalent, total)	16	11
Chromium (trivalent,	exp[A+Bln(H)] X 0.316*, where A=3.7256 and	exp[A+Bln(H)] X 0.860*, where A=0.6848 and

dissolved)	B=0.8190	B=0.8190
Copper (dissolved)	exp[A+Bln(H)] X 0.960*, where A=-1.645 and B=0.9422	exp[A+Bln(H)] X 0.960*. where A=-1.646 and B=0.8545
Cyanide**	22	10
Ethylbenzene	150	14
Flouride (total)	$e^{A+B\ln(H)}$ where A = 6.7319 and B = 0.5394	$e^{A+B\ln(H)}$, but shall not exceed 4.0 mg/L where A = 6.0445 and B = 0.5394
Lead (dissolved)	exp[A+Bln(H)] X {1.46203-[(lnH)(0.145712)]}*, where A=-1.301 and B=1.273	exp[A+Bln(H)] X {1.46203-[(lnH)(0.145712)]}*, where A=-2.863 and B=1.273
Manganese (dissolved)	$e^{A+B\ln(H)}$ X 0.9812* where A = 4.9187 and B = 0.7467	$e^{A+B\ln(H)}$ X 0.9812* where A = 4.0635 and B = 0.7467
Mercury (dissolved)	1.4 X 0.85*=1.2	0.77 X 0.85*=0.65
Nickel (dissolved)	exp[A+Bln(H)] X 0.998*, where A=0.5173 and B=0.8460	exp[A+Bln(H)] X 0.997*, where A=-2.286 and B=0.8460
Toluene	2000	600
TRC	19	11
Xylene(s)	920	360
Zinc (dissolved)	exp[A+Bln(H)] X 0.978*, where A=0.9035 and B=0.8473	exp[A+Bln(H)] X 0.986*, where A=-0.4456 and B=0.8473

where: µg/L = microgram per liter,

exp[x] = base of natural logarithms raised to the x- power,

ln(H) = natural logarithm of Hardness in milligrams per liter,

* = conversion factor multiplier for dissolved metals, and

** = standard to be evaluated using either of the following USEPA approved methods, incorporated by reference at 35 Ill. Adm. Code 301.106: Method OIA-1677, DW: Available Cyanide by Flow Injection, Ligand Exchange, and Amperometry, January 2004, Document Number EPA-821-R-04-001 or Cyanide Amenable to Chlorination, Standard Methods 4500-CN-G (40 CFR 136.3).

f) Numeric Water Quality Standard for the Protection of Human Health

Constituent	HHS in micrograms per liter (µg/L)
Benzene	310
Mercury (total)	0.012
Phenols	860,000

g) Numeric Water Quality Standards for other chemical constituents

Concentrations of the following chemical constituents shall not be exceeded except in waters for which mixing is allowed pursuant to Section 302.102 of this Part.

Constituent	Unit	Standard
Chloride	mg/L	500
Iron (dissolved)	mg/L	1.0
Selenium (total)	mg/L	1.0
Silver (dissolved)	µg/L	exp[A+Bln(H)] X 0.85*, where A=-6.52 and B=1.72
Sulfate (where H is ≥ 100 but ≤ 500 and C is ≥ 25 but ≤ 500)	mg/L	[1276.7+5.508(H)-1.457(C)] X 0.65
Sulfate (where H is ≥ 100 but ≤ 500 and C is ≥ 5 but < 25)	mg/L	[-57.478 + 5.79(H) + 54.163(C)] X 0.65
Sulfate (where H > 500 and C ≥ 5)	mg/L	2,000

where: mg/L = milligram per liter,

µg/L = microgram per liter,

H = Hardness concentration of receiving water in mg/L as $CaCO_3$,

C = Chloride concentration of receiving water in mg/L,

exp[x] = base of natural logarithms raised to the x-power,

ln(H) = natural logarithm of Hardness in milligrams per liter, and

* = conversion factor multiplier for dissolved metals

h) Concentrations of other chemical constituents in South Fork of the South Branch of the Chicago River (Bubbly Creek) shall not exceed the following standards:

CONSTITUENTS	STORET NUMBER	CONCENTRATION (mg/L)
Ammonia Un-ionized (as N*)	00612	0.1
Arsenic (total)	01002	1.0
Barium (total)	01007	5.0
Cadmium (total)	01027	0.15
Chromium (total hexavalent)	01032	0.3
Chromium (total trivalent)	01033	1.0
Copper (total)	01042	1.0
Cyanide (total)	00720	0.10
Fluoride (total)	00951	15.0
Iron (total)	01045	2.0
Iron (dissolved)	01046	0.5
Lead (total)	01051	0.1
Manganese (total)	01055	1.0
Mercury (total)	71900	0.0005
Nickel (total)	01067	1.0
Oil, fats and grease	00550, 00556 or 00560	15.0**
Phenols	32730	0.3
Selenium (total)	01147	1.0
Silver	01077	1.1
Zinc (total)	01092	1.0
Total Dissolved Solids	70300	1500

*For purposes of this section the concentration of un-ionized ammonia shall be computed according to the following equation:

$$U = \frac{N}{[0.94412(1 + 10^{X}) + 0.0559]}$$ where:

$$X = 0.09018 + \frac{2729.92}{(T + 273.16)} - pH$$

U = Concentration of un-ionized ammonia as N in mg/L
N = Concentration of ammonia nitrogen as N in mg/L
T = Temperature in degrees Celsius

**Oil shall be analytically separated into polar and non-polar components if the total concentration exceeds 15 mg/L. In no case shall either of the components exceed 15 mg/L (i.e., 15 mg/L polar materials and 15 mg/L non-polar materials).

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.408 Temperature

a) For South Fork of the South Branch of the Chicago River (Bubbly Creek), temperature ~~Temperature~~ (STORET number (^{o} F) 00011 and (^{o} C) 00010) shall not exceed 34^{o} C (93^{o} F) more than 5% of the time, or 37.8^{o} C (100^{o} F) at any time.

b) Water temperature shall not exceed the maximum limits in the applicable table in subsections (b), (c) and (d), below, during more than one percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature exceed the maximum limits in the applicable table that follows by more than 1.7 ^{o}C (3.0^{o} F).

c) Water temperature in the Chicago Area Waterway System Aquatic Life Use A waters listed in 35 Ill. Adm. Code 303.230 shall not exceed the limits in the following table in accordance with subsection (a), above:

Months	Daily Maximum (^{o}F)
January	60
February	60
March	60
April	90
May	90
June	90
July	90
August	90
September	90
October	90
November	90
December	60

d) Water temperature in the Chicago Area Waterway System and Brandon Pool Aquatic Life Use B waters listed in 35 Ill. Adm. Code 303.325, shall not exceed the limits in the following table in accordance with subsection (a), above:

Months	Daily Maximum (^{o}F)
January	60
February	60
March	60
April	90
May	90
June	90
July	90
August	90
September	90
October	90
November	90
December	60

e) Water temperature for the Upper Dresden Island Pool Aquatic Life Use waters, as defined in 35 Ill. Adm. Code 303.237, shall not exceed the limits in the following table in accordance with subsection (a), above:

Months		Daily Maximum (^{o}F)
January		60
February		60
March		60
April		90
May		90
June		90
July		90
August		90
September		90
October		90
November		90
December		60

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.409 Cyanide for South Fork of the South Branch of the Chicago River (Bubbly Creek)

Cyanide (total) shall not exceed 0.10 mg/~~l~~L in South Fork of the South Branch of the Chicago River (Bubbly Creek).

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.410 Substances Toxic to Aquatic Life

Any substance or combination of substances toxic to aquatic life not listed in Section 302.407 shall not be present in amounts toxic or harmful to human health, aquatic life or wildlife; except for South Fork of the South Branch of the Chicago River (Bubbly Creek) where the substance shall not exceed one half of the 96-hour median tolerance limit (96-hour TL_m) for native fish or essential fish food organisms.

a) Any substance or combination of substances shall be deemed to be toxic or harmful to aquatic life if present in concentrations that exceed the following:

1) An Acute Aquatic Toxicity Criterion (AATC) validly derived and correctly applied pursuant to procedures set forth in Sections 302.612 through 302.618 or in Section 302.621; or

2) A Chronic Aquatic Toxicity Criterion (CATC) validly derived and correctly applied pursuant to procedures set forth in Sections 302.627 or 302.630.

b) Any substance or combination of substances shall be deemed to be toxic or harmful to wild or domestic animal life if present in concentrations that exceed any Wild and Domestic Animal Protection Criterion (WDAPC) validly derived and correctly applied pursuant to Section 302.633.

c) Any substance or combination of substances shall be deemed to be toxic or harmful to human health if present in concentrations that exceed criteria, validly derived and correctly applied, based on either of the following:

1) Disease or functional impairment due to a physiological mechanism for which there is a threshold dose below which no damage occurs calculated pursuant to Sections 302.642 through 302.648 (Human Threshold Criterion); or

2) Disease or functional impairment due to a physiological mechanism for which any dose may cause some risk of damage calculated pursuant to Sections 302.651 through 302.658 (Human Nonthreshold Criterion).

d) The most stringent criterion of subsections (a), (b) and (c) shall apply at all points outside of any waters within which, mixing is allowed pursuant to Section 302.102. In addition, the AATC derived pursuant to subsection (a)(1) shall apply in all waters except that it shall not apply within a ZID that is prescribed in accordance with Section 302.102.

e) The procedures of Subpart F set forth minimum data requirements, appropriate test protocols, and data assessment methods for establishing criteria pursuant to subsections (a), (b) and (c). No other procedures may be used to establish such criteria unless approved by the Board in a rulemaking or adjusted standard proceeding pursuant to Title VII of the Act. The validity and applicability of the Subpart F procedures may not be challenged in any proceeding brought pursuant to Titles VIII or X of the Act, although the validity and correctness of application of the numeric criteria derived pursuant to Subpart F may be challenged in such proceedings pursuant to subsection (f).

f) Agency derived criteria may be challenged as follows:

1) A permittee may challenge the validity and correctness of application of a criterion derived by the Agency pursuant to this Section only at the time such criterion is first applied in an NPDES permit pursuant to 35 Ill. Adm. Code 309.152 or in an action pursuant to Title VIII of the Act for violation of the toxicity water quality standard. Failure of a person to challenge the validity of a criterion at the time of its first application shall constitute a waiver of such challenge in any subsequent proceeding involving application of the criterion to that person.

2) Consistent with subsection (f)(1), if a criterion is included as, or is used to derive, a condition of an NPDES discharge permit, a permittee may challenge the criterion in a permit appeal pursuant to Section 40 of the Act and 35 Ill. Adm. Code 309.181. In any such action, the Agency shall include in the record all information upon which it has relied in developing and applying the criterion, whether such information was developed by the Agency or submitted by the Petitioner. THE BURDEN OF PROOF SHALL BE ON THE PETITIONER TO DEMONSTRATE THAT THE CRITERION-BASED CONDITION IS NOT NECESSARY TO ACCOMPLISH THE PURPOSES OF SUBSECTION (a) (Section 40(a)(1) of the Act), but there is no presumption in favor of the general validity and correctness of the application of the criterion as reflected in the challenged condition.

3) Consistent with subsection (f)(1), in an action where alleged violation of the toxicity water quality standard is based on alleged excursion of a criterion, the person bringing such action shall have the burdens of going forward with proof and of persuasion regarding the general validity and correctness of application of the criterion.

g) Subsections (a) through (e) do not apply to USEPA registered pesticides approved for aquatic application and applied pursuant to the following conditions:

1) Application shall be made in strict accordance with label directions;

2) Applicator shall be properly certified under the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 135 et seq. (1972)); and

3) Applications of aquatic pesticides must be in accordance with the laws, regulations and guidelines of all state and federal agencies authorized by law to regulate, use or supervise pesticide applications.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.412 Total Ammonia Nitrogen

a) This section does not apply to South Fork of the South Branch of the Chicago River (Bubbly Creek).

b) For the Chicago Area Waterway System and the Lower Des Plaines River described in 35 Ill. Adm. Code 303.204 and listed in 35 Ill. Adm. Code 303.220 through 303.240, total ammonia nitrogen must in no case exceed 15 mg/L.

c) The total ammonia nitrogen acute, chronic, and sub-chronic standards are determined in accordance with the equations given in subsections (c)(1) and (c)(2) of this Section. Attainment of each standard must be determined in accordance with subsections (d) and (e) of this Section in mg/L.

1) The acute standard (AS) is calculated using the following equation:

$$AS = \frac{0.411}{1 + 10^{7.204-pH}} + \frac{58.4}{1 + 10^{pH-7.204}}$$

2) The chronic standard (CS) is calculated using the following equations:

A) During the Early Life Stage Present period, as defined in subsection (e) of this Section:

i) When water temperature is less than or equal to 14.51ºC:

$$CS = \left\{ \frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}} \right\} (2.85)$$

ii) When water temperature is above 14.51ºC:

$$CS = \left\{ \frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}} \right\} \left(1.45 * 10^{0.028*(25-T)} \right)$$

Where T = Water Temperature, degrees Celsius

B) During the Early Life Stage Absent period, as defined in subsection (e) of this Section:

i) When water temperature is less than or equal to 7ºC:

$$CS = \left\{ \frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}} \right\} \left(1.45 * 10^{0.504} \right)$$

ii) When water temperature is greater than 7ºC:

$$CS = \left\{ \frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}} \right\} \left(1.45 * 10^{0.028(25-T)} \right)$$

Where T = Water Temperature, degrees Celsius

3) The sub-chronic standard is equal to 2.5 times the chronic standard.

d) Attainment of the Total Ammonia Nitrogen Water Quality Standards.

1) The acute standard for total ammonia nitrogen (in mg/L) must not be exceeded at any time except in those waters for which the Agency has approved a ZID pursuant to Section 302.102 of this Part.

2) The 30-day average concentration of total ammonia nitrogen (in mg/L) must not exceed the chronic standard (CS) except in those waters in which mixing is allowed pursuant to Section 302.102 of this Part. Attainment of the chronic standard (CS) is determined in accordance with subsection (d) of this Section by averaging at least four samples collected at weekly intervals or at other sampling intervals that statistically represent a 30-day sampling period. The samples must be collected in a manner that assures a representative sampling period.

3) The 4-day average concentration of total ammonia nitrogen (in mg/L) must not exceed the sub-chronic standard except in those waters in which mixing is allowed pursuant to Section 302.102. Attainment of the sub-chronic standard determined in accordance with subsection (d) of this Section by averaging daily sample results collected over a period of four

consecutive days within the 30-day averaging period. The samples must be collected in a manner that assures a representative sampling period.

e) The water quality standard for each water body must be calculated based on the temperature and pH of the water body measured at the time of each ammonia sample. The concentration of total ammonia in each sample must be divided by the calculated water quality standard for the sample to determine a quotient. The water quality standard is attained if the mean of the sample quotients is less than or equal to one for the duration of the averaging period.

f) The Early Life Stage Present period occurs from March through October. All other periods are subject to the Early Life Stage Absent period, except that waters listed in Section 303.240 are not subject to Early Life Stage Present ammonia limits at any time.

BOARD NOTE: Acute and chronic standard concentrations for total ammonia nitrogen (in mg/L) for different combinations of pH and temperature are shown in Appendix C.

(Source: Added at 38 Ill. Reg. _____ effective_____)

SUBPART F: PROCEDURES FOR DETERMINING WATER QUALITY CRITERIA

Section 302.601 Scope and Applicability

This Subpart contains the procedures for determining the water quality criteria set forth in Sections~~Section~~ 302.210(a), (b) and (c) and 302.410(a), (b) and (c).

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.648 Determining the Human Threshold Criterion

The HTC is calculated according to the equation:

HTC = ADI/[W + (F x BCF)]

where:

HTC = Human health protection criterion in milligrams per liter (mg/L);

ADI = Acceptable daily intake of substance in milligrams per day (mg/d) as specified in Section 302.645;

W = Per capita daily water consumption equal to 2 liters per day (L/d) for surface waters at the point of intake of a public or food processing water supply, or equal to 0.01 liters per day (L/d) which represents incidental exposure through contact or ingestion of small volumes of water while swimming or during other recreational activities for areas which are determined to be public access areas pursuant to Section 302.102 (b)(3), or 0.001 liters per day (L/d) for other ~~General Use~~ waters;

F = Assumed daily fish consumption in the United States equal to 0.020 kilograms per day (kg/d); and

BCF = Aquatic organism Bioconcentration Factor with units of liter per kilogram (L/kg) as derived in Sections 302.660 through 302.666.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 302.657 Determining the Human Nonthreshold Criterion

The HNC is calculated according to the equation:

HNC = RAI/[W + (F x BCF)]

where:

HNC = Human Nonthreshold Protection Criterion in milligrams per liter (mg/L);

RAI = Risk Associated Intake of a substance in milligrams per day (mg/d) which is associated with a lifetime cancer risk level equal to a ratio of one to 1,000,000 as derived in Section 302.654;

W = Per capita daily water consumption equal to 2 liters per day (L/d) for surface waters at the point of intake of a public or food processing water supply, or equal to 0.01 liters per day (L/d) which represents incidental exposure through contact or ingestion of small volumes of water while swimming or during other recreational activities for areas which are determined to be public access areas pursuant to Section 302.102(b)(3), or 0.001 liters per day (L/d) for other ~~General Use~~ waters;

F = Assumed daily fish consumption in the United States equal to 0.020 kilograms per day (kg/d); and

BCF = Aquatic Life Bioconcentration Factor with units of liter per kilogram (L/kg) as derived in Section 302.663.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE C: WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 303
WATER USE DESIGNATIONS AND SITE-SPECIFIC WATER QUALITY STANDARDS

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303.201 General Use Waters
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303.240 Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters

SUBPART C: SPECIFIC USE DESIGNATIONS AND SITE SPECIFIC WATER QUALITY STANDARDS

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303.321 Wabash River Temperature
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303.443 Lake Michigan Basin
303.444 Salt Creek, Higgins Creek, West Branch of the DuPage River, Des Plaines River
303.445 Total Dissolved Solids Water Quality Standard for the Lower Des Plaines River
303.446 Boron Water Quality Standard for Segments of the Sangamon River and the Illinois River
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SUBPART D: THERMAL DISCHARGES

Section
303.500 Scope and Applicability
303.502 Lake Sangchris Thermal Discharges

303.APPENDIX A References to Previous Rules
303.APPENDIX B Sources of Codified Sections

AUTHORITY: Implementing Section 13 and authorized by Sections 11(b) and 27 of the Environmental Protection Act [415 ILCS 5/13, 11(b) and 27].SOURCE: Filed with the Secretary of State January 1, 1978; amended at 2 Ill. Reg. 27, p. 221, effective July 5, 1978; amended at 3 Ill. Reg. 20, p. 95, effective May 17, 1979; amended at 5 Ill. Reg. 11592, effective October 19, 1981; codified at 6 Ill. Reg. 7818; amended at 6 Ill. Reg. 11161, effective September 7, 1982; amended at 7 Ill. Reg. 8111, effective June 23, 1983; amended in R87-27 at 12 Ill. Reg. 9917, effective May 27, 1988; amended in R87-2 at 13 Ill. Reg. 15649, effective September 22, 1989; amended in R87-36 at 14 Ill. Reg. 9460, effective May 31, 1990; amended in R86-14 at 14 Ill. Reg. 20724, effective December 18, 1990; amended in R89-14(C) at 16 Ill. Reg. 14684, effective September 10, 1992; amended in R92-17 at 18 Ill. Reg. 2981, effective February 14, 1994; amended in R91-23 at 18 Ill. Reg. 13457, effective August 19, 1994; amended in R93-13 at 19 Ill. Reg. 1310, effective January 30, 1995; amended in R95-14 at 20 Ill. Reg. 3534, effective February 8, 1996; amended in R97-25 at 22 Ill. Reg. 1403, effective December 24, 1997; amended in R01-13 at 26 Ill. Reg. 3517, effective February 22, 2002; amended in R03-11 at 28 Ill. Reg. 3071, effective February 4, 2004; amended in R06-24 at 31 Ill. Reg. 4440, effective February 27, 2007; amended in R09-8 at 33 Ill. Reg. 7903, effective May 29, 2009;

amended in R09-11 at 33 Ill. Reg. 12258, effective August 11, 2009; amended in R08-9(A) at 35 Ill. Reg. 15078, effective August 23, 2011; amended in R11-18 at 36 Ill. Reg. 18898, effective December 12, 2012; amended in R08-9(C) at 38 Ill. Reg. 5517, effective February 13, 2014; amended in R08-09(D) at 38 Ill. Reg._____, effective _____>

SUBPART B: NONSPECIFIC WATER USE DESIGNATIONS

Section 303.204 Chicago Area Waterway System and Lower Des Plaines River

The Chicago Area Waterway System and Lower Des Plaines River Waters are designated to protect for primary contact recreation, incidental contact or non-contact recreational uses (except where designated as non-recreational waters), commercial activity (including navigation and industrial water supply uses) and the highest quality aquatic life and wildlife attainable, limited only by the physical condition of these waters and hydrologic modifications to these waters. Except for the Chicago River, these ~~These~~ waters are required to meet ~~the secondary contact and indigenous~~ aquatic life standards contained in 35 Ill. Adm. Code 302, Subpart D, but are not required to meet the general use standards or the public and food processing water supply standards of 35 Ill. Adm. Code 302, Subpart B and C, except that the waters designated as Primary Contact Recreation Waters in Section 303.220 must meet the numeric water quality standard for fecal coliform bacteria applicable to protected waters in 35 Ill. Adm. Code 302.209. Designated recreational uses and aquatic life use for each segment of the Chicago Area Waterway System and Lower Des Plaines River are identified in this Subpart. The Chicago River must meet the General Use standards for the protection of aquatic life as well as the numeric water quality standard for fecal coliform bacteria applicable to protected waters in 35 Ill. Adm. Code 302.209.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 303.235 Chicago Area Waterway System Aquatic Life Use A Waters ~~and Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters~~

a) Waters designated as Chicago Area Waterway System Aquatic Life Use A Waters are capable of maintaining, and shall have quality sufficient to protect, aquatic-life populations predominated by individuals of tolerant and intermediately tolerant types that are adaptive to the unique physical conditions, flow patterns, and operational controls necessary to maintain navigational use, flood control, and drainage functions of the waterway system. Such aquatic life may include, but is not limited to, fish species such as channel catfish, largemouth bass, bluegill, black crappie, spotfin shiner, orangespotted sunfish, common carp, and goldfish.

b) Waters designated as Chicago Area Waterway System Aquatic Life Use A Waters are not capable of attaining an aquatic life use consistent with the section 101(a)(2) of the Clean Water Act goal (33 USC 1251(a)(2)).

c) The following waters are designated as Chicago Area Waterway System Aquatic Life Use A Waters and must meet the water quality standards of 35 Ill. Adm. Code 302. Subpart D:

1) Upper North Shore Channel from Wilmette Pumping Station to North Side Water Reclamation Plant;

2) Lower North Shore Channel from North Side Water Reclamation Plant to confluence with North Branch of the Chicago River;

3) North Branch of the Chicago River from its confluence with North Shore Channel to its confluence with South Branch of the Chicago River and Chicago River;

4) South Branch of the Chicago River;

5) Calumet-Sag Channel;

6) Calumet River from Lake Michigan to its confluence with Grand Calumet River and Little Calumet River;

7) Little Calumet River from its confluence with Calumet River and Grand Calumet River to its confluence with Calumet-Sag Channel;

8) Grand Calumet River;

9) Lake Calumet; and

10) Lake Calumet Connecting Channel.

~~b) Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters~~

~~1) Waters designated as Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters are capable of maintaining, and shall have quality sufficient to protect, aquatic life populations predominated by individuals of tolerant types that are adaptive to unique physical conditions and modifications of long duration, including artificially constructed channels consisting of vertical sheet-pile, concrete and rip-rap walls designed to support commercial navigation, flood control, and drainage functions in deep-draft, steep-walled shipping channels. Such aquatic life may include, but is not limited to, fish species such as common carp, golden shiner, bluntnose minnow, yellow bullhead and green sunfish.~~

~~2) Waters designated as Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters are not capable of attaining an aquatic life use consistent with the section 101(a)(2) of the Clean Water Act goal (33 USC 1251(a)(2)).~~

~~3)~~ ~~The following waters are designated as Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters and must meet the water quality standards of 35 Ill. Adm. Code 302. Subpart D:~~

~~A)~~ ~~Chicago Sanitary and Ship Canal; and~~

~~B)~~ ~~Lower Des Plaines River from its confluence with Chicago Sanitary and Ship Canal to the Brandon Road Lock and Dam (Brandon Pool).~~

(Source: Amended at 38 Ill. Reg. _____ effective_____)

Section 303.240 Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters

a) Waters designated as Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters are capable of maintaining, and shall have quality sufficient to protect, aquatic life populations predominated by individuals of tolerant types that are adaptive to unique physical conditions and modifications of long duration, including artificially constructed channels consisting of vertical sheet-pile, concrete and rip-rap walls designed to support commercial navigation, flood control, and drainage functions in deep-draft, steep-walled shipping channels. Such aquatic life may include, but is not limited to, fish species such as common carp, golden shiner, bluntnose minnow, yellow bullhead and green sunfish.

b) Waters designated as Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters are not capable of attaining an aquatic life use consistent with the section 101(a)(2) of the Clean Water Act goal (33 USC 1251(a)(2)).

c) The following waters are designated as Chicago Area Waterway System and Brandon Pool Aquatic Life Use B Waters and must meet the water quality standards of 35 Ill. Adm. Code 302. Subpart D:

1) Chicago Sanitary and Ship Canal; and

2) Lower Des Plaines River from its confluence with Chicago Sanitary and Ship Canal to the Brandon Road Lock and Dam (Brandon Pool).

(Source: Added at 38 Ill. Reg. _____ effective_____)

SUBPART C: SPECIFIC USE DESIGNATIONS AND SITE SPECIFIC WATER QUALITY STANDARDS

Section 303.449 Chicago Sanitary and Ship Canal

The numeric water quality standard for chloride set forth at 35 Ill. Adm. Code 302.407(g) does not apply to the Chicago Sanitary and Ship Canal during the period of December 1 through April 30. Chloride levels in these waters must meet the numeric water quality standards for the protection of aquatic organisms of 620 mg/L as a chronic water quality standard and 990 mg/L as an acute water quality standard for chloride.

(Source: Added at 38 Ill. Reg. _____ effective_____)

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE C: WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 309
PERMITS

SUBPART A: NPDES PERMITS

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309.Appendix A References to Previous Rules

AUTHORITY: Implementing Sections 13 and 13.3 and authorized by Section 27 of the Environmental Protection Act [415 ILCS 5/13, 13.3 and 27].

SOURCE: Adopted in R71-14, at 4 PCB 3, March 7, 1972; amended in R73-11, 12, at 14 PCB 661, December 5, 1974, at 16 PCB 511, April 24, 1975, and at 28 PCB 509, December 20, 1977; amended in R73-11, 12, at 29 PCB 477, at 2 Ill. Reg. 16, p. 20, effective April 20, 1978; amended in R79-13, at 39 PCB 263, at 4 Ill. Reg. 34, p. 159, effective August 7, 1980; amended in R77-12B, at 41 PCB 369, at 5 Ill. Reg. 6384, effective May 28, 1981; amended in R76-21, at 44 PCB 203, at 6 Ill. Reg. 563, effective December 24, 1981; codified at 6 Ill. Reg. 7818; amended in R82-5, 10, at 54 PCB 411, at 8 Ill. Reg. 1612, effective January 18, 1984; amended in R86-44 at 12 Ill. Reg. 2495, effective January 13, 1988; amended in R88-1 at 13 Ill. Reg. 5993, effective April 18, 1989; amended in R88-21(A) at 14 Ill. Reg. 2892, effective February 13, 1990; amended in R91-5 at 16 Ill. Reg. 7339, effective April 27, 1992; amended in R95-22 at 20 Ill. Reg. 5526, effective April 1, 1996; amended in R99-8 at 23 Ill. Reg. 11287, effective August 26, 1999; amended in R02-11 at 27 Ill. Reg. 202, effective December 20, 2002; amended in R03-19 at 28 Ill. Reg. 7310, effective May 7, 2004; amended in R07-9 at 32 Ill. Reg. 14978, effective September 8, 2008; amended at in R08-09(D)_____ at 38 Ill. Reg. _____, effective _____.

SUBPART A NPDES PERMITS

Section 309.141 Terms and Conditions of NPDES Permits

In establishing the terms and conditions of each issued NPDES Permit, the Agency shall apply and ensure compliance with all of the following, whenever applicable:

a) Effluent limitations under Sections 301 and 302 of the CWA;

b) Standards of performance for new sources under Section 306 of the CWA;

c) Effluent standards, effluent prohibitions, and pretreatment standards under Section 307 of the CWA;

d) Any more stringent limitation, including those:

1) necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any Illinois statute or regulation (under authority preserved by Section 510 of the CWA),

2) necessary to meet any other federal law or regulation, or

3) required to implement any applicable water quality standards, such limitations to include any legally applicable requirements necessary to implement total maximum daily loads established pursuant to Section 303(d) of the CWA and incorporated in the continuing planning process

approved under Section 303(e) of the CWA and any regulations or guidelines issued pursuant thereto;

e) Any more stringent legally applicable requirements necessary to comply with a plan approved pursuant to Section 208(b) of the CWA;

f) Prior to promulgation by the Administrator of the U.S. Environmental Protection Agency of applicable effluent standards and limitations pursuant to Sections 301, 302, 306 and 307 of the CWA, such conditions as the Agency determines are necessary to carry out the provisions of the CWA;

g) If the NPDES Permit is for the discharge of pollutants into navigable waters from a vessel or other floating craft (except that no NPDES Permit shall be issued for the discharge of pollutants from a vessel or other floating craft into Lake Michigan), any applicable regulations promulgated by the Secretary of the Department in which the Coast Guard is operating, establishing specifications for safe transportation, handling, carriage, storage and stowage of pollutants; and

h) If the NPDES Permit is for the discharge of pollutants from other than wet weather point sources into the Lake Michigan Basin as defined at 35 Ill. Adm. Code 303.443:

1) Total Maximum Daily Loads (TMDLs) and Waste Load Allocation (WLA) will be established through either the LaMP or a RAP for an Area of Concern. If a LaMP or RAP has not been completed and adopted, effluent limits shall be established consistent with the other provisions of this Section, including, but not limited to, Additivity, Intake Pollutants, Loading Limits, Level of Detection/Level of Quantification and Compliance Schedules. When calculation of TMDLs or a WLA is incomplete and it is expected that limits established through other provisions will be superseded upon completion of the TMDL or WLA process, those limits shall be identified as interim and the permit shall include a reopener clause triggered by completion of a TMDL or WLA determination. Any new limits brought about through exercise of the reopener clause shall be eligible for delayed compliance dates and compliance schedules consistent with Section 39(b) of the Act [415 ILCS 5/39(b)], 35 Ill. Adm. Code 309.148, and 35 Ill. Adm. Code 352.Subpart H.

2) 35 Ill. Adm. Code 302.590 establishes an acceptable additive risk level of one in 100,000 (10^5) for establishing Tier I criteria and Tier II values for combinations of substances exhibiting a carcinogenic or other nonthreshold toxic mechanism. For those discharges containing multiple nonthreshold substances application of this additive standard shall be consistent with subsection (h).

A) For discharges in the Lake Michigan Basin containing one or more 2,3,7,8-substituted chlorinated dibenzo-p-dioxins or 2,3,7,8-substituted dibenzofurans, the tetrachloro dibenzo-p-dioxin 2,3,7,8-TCDD toxicity equivalence concentration (TEC_{TCDD}) shall be determined as outlined in subsection (h)(2)(B).

B) The values listed in the following Table shall be used to determine the 2,3,7,8-TCDD toxicity equivalence concentrations using the following equation:

$$(TEC)_{TCDD} = \sum (C)_x (TEF)_x (BEF)_x$$

WHERE:

$(TEC)_{TCDD}$ = 2,3,7,8-TCDD toxicity equivalence concentration in effluent
$(C)_x$ = Concentration of total chemical x in effluent
$(TEF)_x$ = TCDD toxicity equivalency factor for x
$(BEF)_x$ = TCDD bioaccumulation equivalency factor for x

TABLE

Congener	TEF	BEF
2,3,7,8-TCDD	1.0	1.0
1,2,3,7,8-PeCDD	0.5	0.9
1,2,3,4,7,8-HxCDD	0.1	0.3
1,2,3,6,7,8-HxCDD	0.1	0.1
1,2,3,7,8,9-HxCDD	0.1	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.0
OCDD	0.001	0.0
2,3,7,8-TCDF	0.1	0.8
1,2,3,7,8-PeCDF	0.05	0.2
2,3,4,7,8-PeCDF	0.5	1.6
1,2,3,4,7,8-HxCDF	0.1	0.0
1,2,3,6,7,8-HxCDF	0.1	0.2
2,3,4,6,7,8-HxCDF	0.1	0.7
1,2,3,7,8,9-HxCDF	0.1	0.6
1,2,3,4,6,7,8-HpCDF	0.01	0.0
1,2,3,4,7,8,9-HpCDF	0.01	0.4
OCDF	0.001	0.0

C) Any combination of carcinogenic or otherwise nonthreshold toxic substances shall be assessed on a case-by-case basis. The Agency shall only consider such additivity for chemicals that exhibit the same type of effect and the same mechanism of toxicity, based on available scientific information that supports a reasonable.

3) Reasonable potential to exceed.

A) The first step in determining if a reasonable potential to exceed the water quality standard exists for any particular pollutant parameter is the estimation of the maximum expected effluent concentration for that substance. That estimation will be completed for both acute and chronic exposure periods and is termed the PEQ. The PEQ shall be derived from representative facility-specific data to reflect a 95 percent confidence level for the 95th percentile value. These data will be presumed to adhere to a lognormal distribution pattern unless the actual effluent data demonstrates a different distribution pattern. If facility-specific data in excess of 10 data

values is available, a coefficient of variation that is the ratio of the standard deviation to the arithmetic average shall be calculated by the Agency. The PEQ is derived as the upper bound of a 95 percent confidence bracket around the 95th percentile value through a multiplier from the following table applied to the maximum value in the data set that has its quality assured consistent with 35 Ill. Adm. Code 352.410 as appropriate for acute and chronic data sets.

PEQ = (maximum data point)(statistical multiplier)

Coefficient of Variation

No. Samples	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
1	1.4	1.9	2.6	3.6	4.7	6.2	8.0	10.1	12.6	15.5	18.7	22.3	26.4
2	1.3	1.6	2.0	2.5	3.1	3.8	4.6	5.4	6.4	7.4	8.5	9.7	10.9
3	1.2	1.5	1.8	2.1	2.5	3.0	3.5	4.0	4.6	5.2	5.8	6.5	7.2
4	1.2	1.4	1.7	1.9	2.2	2.6	2.9	3.3	3.7	4.2	4.6	5.0	5.5
5	1.2	1.4	1.6	1.8	2.1	2.3	2.6	2.9	3.2	3.6	3.9	4.2	4.5
6	1.1	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1	3.4	3.7	3.9
7	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.1	3.3	3.5
8	1.1	1.3	1.4	1.6	1.7	1.9	2.1	2.3	2.4	2.6	2.8	3.0	3.2
9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.8	2.9
10	1.1	1.2	1.3	1.5	1.6	1.7	1.9	2.0	2.2	2.3	2.4	2.6	2.7
11	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9	2.1	2.2	2.3	2.4	2.5
12	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.9	2.0	2.1	2.2	2.3	2.4
13	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3
14	1.1	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2
15	1.1	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1
16	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.6	1.7	1.8	1.9	1.9	2.0
17	1.1	1.1	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.7	1.8	1.9	1.9
18	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.6	1.7	1.7	1.8	1.9
19	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.8
20	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.7

30	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4
40	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2
50	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1
60 or greater	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

i) If the PEQ is less than or equal to the water quality standard, there is no reasonable potential and no limit will be established in the permit.

ii) If the PEQ is more than the water quality standard, the Agency will proceed to consideration of dilution and mixing pursuant to subsection (h)(4).

B) If facility-specific data of 10 or less data values is available, an alternative PEQ shall be derived using the table in subsection (h)(3)(A) assuming a coefficient of variation of 0.6, applied to the maximum value in the data set that has its quality assured consistent with 35 Ill. Adm. Code 352.410.

i) If the PEQ is less than or equal to the water quality standard, there is no reasonable potential and no limit will be established in the permit.

ii) If the PEQ exceeds the water quality standard, an alternative PEQ will be calculated using the maximum value in the data set and a multiplier of 1.4. If the alternative PEQ also exceeds the water quality standard, the Agency will proceed to consider dilution and mixing pursuant to subsection (h)(4).

iii) If the PEQ exceeds the water quality standard but the alternative PEQ is less than or equal to the standard, the Agency will either proceed to consider dilution and mixing pursuant to subsection (h)(4), or will incorporate a monitoring requirement and reopener clause to reassess the potential to exceed within a specified time schedule, not to exceed one year. In determining which of these options to use in any individual application, the Agency shall consider the operational and economic impacts on the permittee and the effect, if any, deferral of a final decision would have on an ultimate compliance schedule if a permit limit were subsequently determined to be necessary.

C) The Agency shall compare monthly average effluent data values, when available, with chronic aquatic life, human health and

wildlife standards to evaluate the need for monthly average water quality based effluent limitations (WQBELs). The Agency shall use daily effluent data values to determine whether a potential exists to exceed acute aquatic life water quality standards.

D) The Agency may apply other scientifically defensible statistical methods for calculating PEQ for use in the reasonable potential

analysis as provided for in Procedure 5.b.2 of Appendix F to 40 CFR 132, incorporated by reference at 35 Ill. Adm. Code 301.106.

E) Regardless of the statistical procedure used, if the PEQ for the parameter is less than or equal to the water quality standard for that parameter, the Agency shall deem the discharge not to have a reasonable potential to exceed, and a WQBEL shall not be required unless otherwise required under 35 Ill. Adm. Code 352.430.

4) If the PEQ for a parameter is greater than the particular water quality standard, criteria or value for that parameter, the Agency will assess the level of treatment being provided by the discharger. If the discharger is providing (or will be providing) a level of treatment consistent with the best degree of treatment required by 35 Ill. Adm. Code 304.102(a), the PEQ derived under subsection (h)(3) shall be compared to a preliminary effluent limitation (PEL) determined by applying an appropriate mixing zone or a default mixing zone to the discharge. Mixing opportunity and dilution credit will be considered as follows:

A) Discharges to tributaries of the Lake Michigan Basin shall be considered to have no available dilution for either acute or chronic exposures, and the PEL will be set equivalent to the water quality standard unless dilution is documented through a mixing zone study.

B) Bioaccumulative chemicals of concern (BCCs):

i) No mixing shall be allowed for new discharges of BCCs commencing on or after December 24, 1997. The PEL will be set equivalent to the water quality standard.

ii) Mixing shall be allowed for discharges of BCCs which existed as of December 24, 1997 in accordance with the requirements of 35 Ill. Adm. Code 302.530.

C) Direct discharges to the Open Waters of Lake Michigan shall have a default mixing allowance of 2:1 for acute standards, criteria or values and 10:1 for chronic standards, criteria or values if the

discharge configuration indicates that the effluent readily and rapidly mixes with the receiving waters. If ready and rapid mixing is in doubt the Agency shall deny any default dilution or mixing allowance and require a mixing or dispersion study to determine the proper dilution allowance. If the discharger applies for more than the default dilution or mixing allowance, it must submit a mixing or dispersion study to justify its request. Whenever a mixing or dispersion study is available, it shall be used to determine dilution or mixing allowance in lieu of the default allowance.

5) Preliminary effluent limitations calculations.

A) The preliminary effluent limitation (PEL) is calculated in a simple mass balance approach reflecting the dilution allowance established in subsection (h)(4):

WQS = [(Qe)(PEL) + (Qd)(Cd)] / [Qe + Qd] or
PEL = [WQS(Qe + Qd) - (Qd)(Cd)] / Qe

WHERE:

WQS = applicable water quality standard, criteria or value
Qe = effluent flowrate
Qd = allowable dilution flowrate
Cd = background pollutant concentration in dilution water

B) The representative background concentration of pollutants to develop TMDLs and WLAs calculated in the absence of a TMDL shall be established as follows:

i) "Background" represents all pollutant loadings, specifically loadings that flow from upstream waters into the specified watershed, water body, or water body segment for which a TMDL or WLA in the absence of a TMDL is being developed and enter the specified watershed, water body, or water body segment through atmospheric deposition, chemical reaction, or sediment release or resuspension.

ii) When determining what available data are acceptable for use in calculating background, the Agency shall use its best professional judgment, including consideration of the sampling location and the reliability of the data through comparison, in part, to detection and quantification levels. When data in more than 1 of the data sets or categories described in subsection (h)(5)(B)(iii) exists, best

professional judgment shall be used to select the data that most accurately reflects or estimates background

concentrations. Pollutant degradation and transport information may be considered when using pollutant loading data to estimate a water column concentration.

iii) The representative background concentration for a pollutant in the specified watershed, water body, or water body segment shall be established on a case-by-case basis as the geometric mean of: acceptable water column data; water column concentrations estimated through use of acceptable caged or resident fish tissue data; or water column concentrations estimated through the use of acceptable or projected pollutant loading data. When determining the geometric mean of the data for a pollutant that includes values both above and below the detection level, commonly accepted statistical techniques shall be used to evaluate the data. If all of the acceptable data in a data set are below the detection level for a pollutant, then all the data for the pollutant in that data set shall be assumed to be zero.

6) Water quality based effluent limitations.

A) If the PEQ is less than or equal to the PEL, it will be concluded that there is no reasonable potential to exceed. Under such circumstances a permit limit for that contaminant will not be set unless otherwise justified under one or more provisions of 35 Ill. Adm. Code 352.430.

B) If the PEQ is equal to or greater than the PEL, and the PEQ was calculated using a data set of more than 10 values, a WQBEL will be included in the permit. If the PEQ was calculated using a data set of less than or equal to 10 values, and the alternative PEQ calculated under subsection (h)(3) (B) also exceeds the PEL, a WQBEL will be included in the permit.

C) If the PEQ was calculated using a data set of less than or equal to 10 values, and the PEQ is greater than the PEL but the alternative PEQ is less than the PEL, the Agency will either establish a WQBEL in the permit or incorporate a monitoring requirement and reopener clause to reassess potential to exceed within a specified time schedule, not to exceed one year. In determining which of these options to use in any individual application, the Agency shall consider the operational and economic impacts on the permittee and the effect, if any, deferral of a final decision would have on an

ultimate compliance schedule if a permit limit were subsequently determined to be necessary.

D) The WQBEL will be set at the PEL, unless the PEL is appropriately modified to reflect credit for intake pollutants when the discharged water originates in the same water body to which it is being discharged. Consideration of intake credit will be limited to the provisions of 35 Ill. Adm. Code 352.425.

E) The reasonable potential analysis shall be completed separately for acute and chronic aquatic life effects. When WQBELs are based on acute impacts, the limit will be expressed as a daily maximum. When the WQBEL is based on chronic effects, the limit will be expressed as a monthly average. Human health and wildlife based WQBELs will be expressed as monthly averages. If circumstances warrant, the Agency shall consider alternatives to daily and monthly limits.

(i) Best management practices (BMPs) to control or abate the discharge of chloride when:

(1) Authorized under section 402(p) of the CWA for the control of storm water discharges;

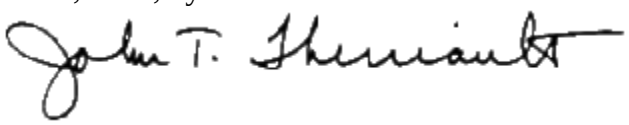
(2) Numeric effluent limitations are infeasible; or

(3) The practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

(Source: Amended at 38 Ill. Reg. _____ effective_____)

IT IS SO ORDERED.

I, John T. Therriault, Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above opinion and order on September 18, 2014, by a vote of 4-0.



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John T. Therriault, Clerk
Illinois Pollution Control Board