

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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)	

NOTICE OF FILING

TO:

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

Marie Tipsord, Hearing Officer
 Illinois Pollution Control Board
 James R. Thompson Center
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 Chicago, IL 60601

Persons included on the attached Service List

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the
 Pollution Control Board the SUBDOCKET D POST-HEARING COMMENTS OF STEPAN
 COMPANY, a copy of which is herewith served upon you.

STEPAN COMPANY

DATE: April 30, 2014

/s/ Thomas W. Dimond
 Thomas W. Dimond

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CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 30th day of April 2014, I have served electronically the attached SUBDOCKET D POST-HEARING COMMENTS OF STEPAN COMPANY, and NOTICE OF FILING upon the following person:

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

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

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WATER QUALITY STANDARDS AND) R08-9 Subdocket D
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SUBDOCKET D POST-HEARING COMMENTS OF STEPAN COMPANY

Stepan Company ("Stepan") appreciates the opportunity to provide post-hearing comments to the Illinois Pollution Control Board ("Board") in Subdocket D of this regulatory proceeding on proposed water quality criteria and standards for the Chicago Area Waterway System ("CAWS") and Lower Des Plaines River ("LDPR").

I. Introduction

Stepan is a global producer of specialty and intermediate chemicals used in consumer products and industrial applications. Hearing Exhibit 318, 2 (hereafter, "Hearing Ex."). Its Millsdale, Illinois plant was initially constructed in 1954 and is located in an unincorporated area in the southern half of Will County. *Id.* The plant is only about one mile from Midwest Generation's coal-fired Joliet Station 9 and there is a direct power line from Station 9 that supplies power to Stepan's plant. Hearing Transcript, Aug. 13, 2009, AM, 46-47 (hereafter abbreviated, "HT, [date], AM or PM (if needed)"). While Stepan's plant does receive some power from the grid, the direct line from Joliet Station 9 makes it reasonable to assume that most of Stepan's power is generated from a coal-fired utility. *Id.* The plant produces 1,200 to 1,500 products that depend on particular customer specifications, and employs about 400 people, 230 of whom are union members. Hearing Ex. 318, 2-3.

The plant has constructed and operates a complex wastewater treatment system. That system utilizes over 15 tanks and numerous processes, including decantation, equalization, two aeration stages, clarification, two aerobic digestion stages, and activated sludge with dual media filtration. *Id.*, 3. As described by Dr. Carl Adams, the activated sludge and dual filtration system is "very sophisticated" and is "beyond best" technology for a plant in the organic chemical, plastics and synthetic fiber ("OCPSF") category. HT, 8/13/09, AM, 86-87. The effluent from the treatment system is discharged into a buried pipeline that discharges to the LDPR at approximately river mile 280, which is 2-3 river miles upstream from the I-55 bridge. Hearing Ex. 318, 3. The discharge point is in the portion of the LDPR referred to as the Upper Dresden Island Pool ("UDIP") in the water quality standard proposal of the Illinois Environmental Protection Agency (the "Agency"). *Id.*

Stepan's discharge is regulated pursuant to a National Pollutant Discharge Elimination System ("NPDES") permit that was last renewed in April 2008. The permit authorizes the discharge of wastewater from process operations, cooling tower blowdown, sanitary waste and storm water. *Id.* The plant discharge averages 0.88 million gallons per day ("MGD") and is monitored and regulated for 68 parameters, most of which are based on best available treatment technology for the organic chemicals industry. *Id.* The NPDES permit contains no current limits related to temperature or dissolved oxygen, *id.*, 3, 12, and the treatment system has no related components designed to specifically address the temperature or dissolved oxygen level of the discharge.

II. The Statutory Framework Requires the Board to Adopt Water Quality Criteria to Protect Designated Uses and to Consider the Economic Reasonableness and Technical Feasibility of the Proposed Criteria.

Illinois undertakes modifying its water quality standards under the general provisions of Section 303 of the Federal Water Pollution Control Act (commonly known as the Clean Water

Act and hereafter, the "CWA"), 33 U.S.C. § 1313. In now familiar language, those standards are to consist of "designated uses . . . and the water quality criteria . . . based upon such uses." 33

U.S.C. § 1313(c)(2)(A). Overall, the standards are to be set:

to protect the public health or welfare, enhance the quality of water and serve the purposes of this chapter. Such standards shall be established taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into consideration their use and value for navigation.

Id. While it often gets lost in the focus on recreational and fishing uses, it is important to recall that Congress expressly recognized that uses of water for industrial and navigational uses must be recognized and protected as well as other uses.

The Board has already proposed aquatic life uses ("ALUs") for the CAWS and LDPR, including the UDIP, in Subdocket C of this rulemaking proceeding. While Stepan disagrees with the UDIP ALU adopted by the Board in Subdocket C, without waiving its position on the ALU, the task at hand here is the second step in setting a water quality standard, i.e., the adoption of water quality criteria. Under federal regulations, the criteria must "protect the designated use" and "must be based on sound scientific rationale . . ." 40 C.F.R. § 131.11(a)(1).

As the Agency recognized in submitting its proposal, the CWA assigns the primary responsibility for considering and balancing water uses to the States. Agency Statement of Reasons ("*Agency SOR*"), 3. The Illinois General Assembly, in turn, has accepted the mantle given it by Congress and authorized the Board to adopt water quality standards. 415 ILCS 5/13(a)(1). Like Congress, the General Assembly believed that the waters of the state needed to support public health and welfare, aquatic life and also "agricultural, industrial, recreational, and other legitimate beneficial uses of water . . ." 415 ILCS 5/12(a)(1). It is also clear that the General Assembly's goal was to eliminate discharges of pollutants unless they were treated or

controlled as "necessary to prevent pollution . . ." 415 ILCS 5/11(b). This goal incorporates the General Assembly's definition of "water pollution," which is defined as follows:

"Water pollution" is such alteration of the physical, thermal, chemical, biological or radioactive properties of any waters of the State, or such discharge of any contaminant into any waters of the State, as will or is likely to create a nuisance or render such waters harmful or detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate uses, or to livestock, wild animals, birds, fish, or other aquatic life.

415 ILCS 5/3.545.

By not assigning the Board's rulemaking authority regarding water quality standards to one of the specialized rulemaking procedures, the General Assembly has left such standards to be adopted under the general rulemaking requirements of Section 27 of the Illinois Environmental Protection Act (the "Act"). Section 27 specifies that the Board

"shall 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). Thus, all of these factors, including the economic reasonableness and technical feasibility of controls, are legitimate for the Board to consider in adopting water quality standards.

The LDPR is a water body with a long legal history. In 1966 and 1968, the Illinois Sanitary Water Board designated the LDPR for use as an "Industrial Water Supply Sector" with numeric criteria appropriate to use for industrial cooling and processing or other industrial uses. Illinois Sanitary Water Board, Rule SWB-8, §§ 1.02 and 1.07. In 1972, the Board adopted the Secondary Contact and Indigenous Aquatic Life Uses for the LDPR upstream of the I-55 bridge in part because the cost of achieving aquatic life temperature standards would impose significant costs without any reasonable prospect of resulting stream improvements. *In the Matter of: Water*

Quality Standards Revisions, PCB R71-14, Opinion of the Board, 11 (Mar. 7, 1972). In a later decision, the Board further explained its rationale for separating the Secondary Contact waters from general use waters at the I-55 bridge as follows:

"[T]he location of the bridge corresponds to changes in the physical environmental characteristics of the area. Above the bridge, the river has been greatly altered by man so that it is not as suited for recreation, and water quality is such that at the present time it is not capable of supporting a diverse aquatic life."

In the Matter of: Water Quality Standards Revisions, PCB R72-4, Opinion and Order of the Board, 6 (Nov. 8, 1973) (record citations omitted) (describing basis for decision in PCB R71-14).

And, U.S. EPA approved this classification of the LDPR in the 1980's. *Agency SOR*, Att. A, 1-22.

In setting numeric criteria for the UDP, the Board should consider all information relevant under Illinois law for the adoption of water quality criteria pursuant to Section 27 of the Act, including the technical feasibility and economic reasonableness of the proposed water quality criteria. Moreover, whatever marginal improvements may have occurred in some aspects of water quality since the early 1970's, it is worth noting that the fundamental characteristics of the LDPR between the Chicago Sanitary and Ship Canal and the I-55 bridge that underlay the Board's decision in 1972 have not changed. The LDPR is still a river that is dominated by effluent discharges, heavy industrialization and heavy barge traffic. Just as changes to the water temperature were unlikely to result in improvements to the aquatic community in 1972, they are equally unlikely to do so today.

III. Given the Board's Designated Use for the UDIP, the Board Should Reject the Agency's Proposed Numeric Temperature Criteria and Adopt One of Several More Reasonable Alternatives.

In its post-hearing comments in Subdocket C of this rulemaking, Stepan opposed the designation of upgraded ALUs for the UDIP because the evidence supported the application of

several use attainability analysis ("UAA") factors to the UDIP. The Board ultimately disagreed, found that none of the UAA factors were applicable to the UDIP and adopted a modified ALU.

In the Matter of: 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, Proposed Rule, Proposed Second Notice Notice, Opinion and Order of the Board, 54-55 (November 21, 2013) (hereafter, "*Second Notice Opinion*"). In doing so, the Board clarified its views that the UDIP "does not presently fully attain the CWA aquatic use goal," *id.* at 55, but "that the CWA aquatic life goal is attainable in the UDIP." *Id.* at 54. The Board's designated ALU for the UDIP was intended to reflect its view that the "biologic condition in UDIP may not fully meet the CWA aquatic life goal" and that particularly as to temperature criteria, numeric criteria specific to the UDIP may need to be considered. *Second Notice Opinion*, 54. The Board also stated that its ALU was "consistent with IEPA's finding that UDIP minimally meets the CWA aquatic life goal." *Id.* Without waiving its position that the UDIP use designation should not have been modified, in light of the Board's decision, Stepan suggests that the Agency's proposed temperature criteria for the UDIP would be inconsistent with the ALU adopted by the Board and, particularly as to the non-summer periods, lack a sound scientific basis. There are other alternatives that were discussed in the hearings that more closely fit the Board's position as to the current biological condition of the UDIP and its future potential condition.

Before discussing what numeric criteria should apply to the UDIP, it will be helpful to summarize the criteria that currently apply as well as those that have been proposed or discussed in the hearings. At present, the UDIP is subject to the temperature criteria for Secondary Contact waters. The current Secondary Contact standards applicable in the UDIP have numeric temperature criteria of 93°F, which is not to be exceeded more than 5% of the time, and an

absolute maximum of 100°F. 35 Ill. Adm. Code 302.408. The water quality criteria for General Use waters are applicable at the downstream boundary of the UDIP, i.e., the I-55 bridge, and establish hourly criteria of 60°F for December-March and 90°F for April-November. These criteria are not to be exceeded more than 1% of the hours during any 12 month period. *See* 35 Ill. Adm. Code 302.211(e). The General Use criteria also apply an absolute maximum temperature of 63°F in December-March and 93°F in April-November. *Id.*

The Board granted Commonwealth Edison, and then Midwest Generation, an adjusted standard from the General Use hourly standards applicable at the I-55 bridge. *See In the Matter of: Petition of Commonwealth Edison Company for an Adjusted Standard from 35 Ill. Adm. Code 302.211(d) and (e)*, AS96-10 (March 16, 2000) (hereafter, "AS96-10"). The criteria for each time period established in AS96-10 are shown on the attached Exhibit A. For 12 of 17 time periods, the AS96-10 criteria is less than or equal to the General Use criteria, in two periods by more than 10°F. For the other five periods, the AS96-10 criteria is higher than the corresponding General Use criteria, but for three summer-time periods the increase is only 1°F. Consistent with the Board's statutory mandate, it found that the AS96-10 numeric criteria did not result in environmental or health effects substantially or significantly more adverse than those considered in adopting the General Use temperature criteria. *See In the Matter of: Petition of Commonwealth Edison Company for Adjusted Standard from 35 Ill. Adm. Code 302.211(d) and (e)*, AS96-10, 3 and 7 (October 3, 1996).

In contrast, the Agency proposals in 2008 and November 2013 would work a dramatic lowering of numeric criteria in the UDIP. The Agency proposed a single daily maximum temperature of 88.7°F, an absolute maximum of 92.3°F and 17 different period averages. The period averages generally apply to an entire month, but April, May, June, September and October have separate period averages for the early and late portions of those months. *Agency*

SOR, 85-87; Comments of the Illinois EPA on the Illinois Pollution Control Board's Subdocket C Second Notice Opinion and Order, 16-17 (Nov. 4, 2013) ("*IEPA Comments on Second Notice*"). These proposed standards are summarized on Exhibit A. All 17 of the period averages proposed by the Agency in November 2013 are not only lower than the corresponding Secondary Contact criteria, they are also lower than the corresponding General Use criteria. Nine of the 17 period averages are more than 10°F lower than the corresponding General Use criteria.

The changes to the daily maximum and absolute maximum values are less significant, but somewhat illusory. The Agency's proposed daily maximum and absolute maximum values are 4.3°F and 7.7°F less, respectively, than the existing Secondary Contact criteria and only 1.3°F and 0.7°F less, respectively, than the corresponding General Use criteria for most of the year. But, outside the late June, July, August and early September time periods, it will be difficult or impossible for a discharger to achieve the period averages if it is near the daily maximum on more than one or two days. For example, if a source discharges at 85°F (still below the daily maximum) for 3 days during the early May time period while the discharge is 65°F for the other 12 days, it will violate the period average of 68.1°F proposed by the Agency. Likewise, if a source discharges at 85°F for 3 days in February and discharges at 50.5°F for the remaining 25 days, it will violate the period average of 53.6°F proposed by the Agency. Indeed, the illusory nature of the daily maximum temperature limit in the non-summer months was essentially admitted by the Agency. HT, 7/29/13, 27 (Twait).

Moreover, the Agency provided little scientific justification for the non-summer (late September through early June) period averages. Initially, the Agency said that the numeric temperature criteria for these periods were "derived to maintain seasonal norms and cycles of increasing and decreasing temperatures." *Agency SOR*, 83; Exhibit 2, 13 (Prefiled Testimony of Scott Twait). Some testimony about the need to maintain seasonal cycles to protect essential

aquatic life functions was offered, Exhibit 13, 11 (Prefiled Testimony of Chris Yoder), but Mr. Yoder admitted that no biological data assessments suggested that maintenance of normal seasonal cycles requires achieving background temperatures with no human influence. HT, 1/31/08, 126. Moreover, it does not appear that the Agency referred to any scientific studies or tests of thermal effects on aquatic species in setting the period averages. HT, 7/29/13, 219, 222-224. The non-summer period averages were merely an attempt to reflect background.

With these comparisons in mind, the Agency's position on what temperature criteria to apply to the UDIP is hopelessly confused and illogical. As described above and shown on Exhibit A, the Agency's 2008 proposal included daily and absolute maximum limits and period average limits that were dramatically lower than even the existing General Use criteria generally applicable at the I-55 bridge. When the Board then proposed designating the UDIP as General Use, the Agency switched positions and suggested applying the General Use temperature criteria to the UDIP. *See Illinois Environmental Protection Agency's Motion to Amend Regulatory Proposal Filed in 2007, Amendments to Part 302 Proposal (proposing deletion of previously proposed Section 302.408(d)) (hereafter "IEPA Motion to Amend Regulatory Proposal") and Prefiled Testimony of Scott Twait, 2 (May 24, 2013).* When the Board then proposed a separate ALU for the UDIP in the *Second Notice Opinion*, the Agency switched back to its original proposal with certain modifications based on changing the background station chosen to fix 8 of the 17 period averages. *See IEPA Comments on Second Notice, 16-17.*

The lack of logical cohesion in the Agency's shifting positions and final proposal of temperature criteria is apparent in several ways. First, it is inconsistent with the Agency's approach to setting other numeric criteria. The Agency proposed the same dissolved oxygen standards for the waters of the UDIP that currently apply to General Use waters (which by definition should attain the CWA aquatic life goal) because the Agency believed the UDIP

minimally attained the CWA aquatic life goal. This logical connection was made clear in the testimony of Roy Smogor. In response to a question about the basis for the dissolved oxygen numeric criteria for the UDIP, Smogor stated:

"[W]e determined and proposed an aquatic life use for Upper Dresden Island Pool that, at a minimum level, if that's attained, that is equal to minimum attainment of the Clean Water Act Aquatic Life Goal. And, therefore, the standards that we developed in a previous rulemaking for general use waters for dissolved oxygen we thought were directly applicable, and we felt justified proposing those standards, those same dissolved oxygen standards for Upper Dresden Island Pool."

HT, 4/23/08, 33-34; *see also* HT, 4/24/08, 102. Mr. Smogor continued to say that because minimal attainment of the aquatic life component of a General Use designation was "the same level of biological condition as minimal attainment of the" ALU proposed for the UDIP, "therefore, the dissolved oxygen standards are the same for either set of waters . . ." *Id.* at 34. And, the Agency followed the same basic logic in proposing a numeric criteria for chlorides for the UDIP that is the same as the basic General Use numeric criteria. *Id.* at 45-46 (Twait). Along the same lines, Scott Twait acknowledged that "it would seem logical that if you were protecting for a lower use[,] water quality standards would be less stringent than [if] you would protect for higher use." HT, 4/24/08, 136.

What Mr. Smogor, Mr. Twait and the other Agency witness never explained, is why this logic does not equally apply to temperature. Mr. Smogor, backed by Robert Sulski and eventually the questions/testimony of Albert Ettinger, attempted to muddle together an argument about the breadth of the General Use category and the apparent allegation that it covers waters of widely varying actual quality. HT, 4/23/08. 36-39. This argument makes no sense. If the General Use designation covers waters of varying actual quality, it might be an argument for subdividing the General Use category and applying more stringent criteria to the higher use waters and less stringent criteria to the lower use waters. It might also indicate that the lower-in-

fact quality waters should be the subject to other regulatory mechanisms for improving water quality. But, the Smogor/Sulski/Ettinger argument does not undercut the common sense notion that waters of lesser aquatic life attainment and/or potential should be subject to less stringent numeric criteria.

If the Agency really believes the UDIP waters attain the CWA aquatic life goal just as the General Use waters attain that goal, then its logic should apply the same numeric temperature criteria to both. In fact, when the Board at first suggested the UDIP waters should be classified as General Use for ALU purposes, the Agency followed precisely this logic in the *IEPA Motion to Amend Regulatory Proposal* that was intended to subject the UDIP waters to General Use numeric criteria based on aquatic life uses, as opposed to human health or recreational uses. Without any coherent explanation, the Agency again abandoned that logical position in the *IEPA Comments on Second Notice* with its revised November 2013 temperature proposal for the UDIP.

Even beyond ignoring the common sense that it applied with regard to other criteria, the Agency actually proposed more stringent temperature criteria for the UDIP than currently apply to General Use waters. As noted above, the daily maximum and absolute maximum temperatures proposed by the Agency in November 2013 are 1.3°F and 0.7°F lower, respectively, than the corresponding criteria for General Use waters. More significantly, all 17 period averages in the Agency's November 2013 are lower than the corresponding hourly standards that apply for General Use waters. The proposed period averages for the early and late April periods are roughly 30°F lower than the corresponding General Use standards, which is a decrease of about 30%. Overall, the average decrease across all 17 periods is about 15.4% when compared to General Use temperature criteria. There is no logic to proposing numeric temperature standards for waters that the Board has found do not currently attain the CWA

aquatic life goal that are drastically lower than the numeric criteria currently applicable to General Use waters that are supposed to attain the CWA aquatic life goal.

In addition, the Agency's flip-flopping on the appropriate numeric temperature criteria for the UDIP proves that it has no scientific basis for its 17 period averages, particularly in the non-summer months. When the Agency proposed to subject the UDIP to General Use standards in May 2013, we can presume that it believed that the seasonal variability in the General Use standards (60°F for December to March and 90°F for April to November) was adequate to protect the essential aquatic life functions that the seasonal fluctuations were intended to protect. Obviously, the Agency believes that level of fluctuation is adequate protection for General Use waters, and why would it propose that level of seasonal fluctuation for the UDIP if it did not provide adequate protection of those aquatic life functions? Nothing changed in the science of aquatic life responses to temperature between May and November 2013 . . . at least the Agency offered no evidence of it when they flopped back to their 17 period averages proposal. *See IEPA Comments on Second Notice*, 16-17.

Adopting Mr. Twait's logic that lower use should equate to less stringent criteria, HT, 4/24/08, 136, and without waiving Stepan's arguments as to the proper ALU designation for the UDIP, it only makes sense that the temperature criteria for the UDIP should be no more stringent than the General Use criteria. Given that the Board has found that the UDIP is not currently fully attaining the CWA aquatic use goal, *Second Notice Opinion*, at 55, and that Mr. Smogor acknowledged that the UDIP has "lower biological potential than general use waters," HT, 4/23/08, 37, there is good justification for adopting standards less stringent than the General Use numeric temperature criteria. While the AS96-10 numeric criteria are marginally more stringent than the General Use numeric temperature criteria, the Board has previously found them to be

protective of the environment and even they would represent a better alternative to the criteria proposed by the Agency.

There are two other aspects of the Agency's November 2013 proposed numeric temperature criteria that deserve specific comment. First is the nature of the period averages. As noted above, a relatively few days of high excursion temperatures can make achievement of the period averages in the Winter, Spring and Fall time periods very difficult. Not only does this make the daily maximum temperatures in those periods a sham, it also threatens dischargers with daily penalties for the entire period (15 days or a month) when the non-compliance issue was really limited to a few days. In this way, the period averages are simply a trap for the unwary and threaten to subject dischargers to daily penalties for days when no violation actually occurred.

Second is the Agency's adoption, at the behest of the United States Environmental Protection Agency ("USEPA"), of a different background station for setting several of the period averages. Initially, the Agency used temperature data from the Route 83-Chicago Sanitary and Ship Canal ("CSSC") monitoring station to set the non-summer period averages. In that proposal, the Agency adopted that monitoring station as background for the LDPR "because it was not directly influenced by thermal sources such as cooling water or Lake Michigan and was believed to be representative of 'background' temperatures." *Agency SOR*, 83; *see also* Exhibit 2, 13 (Prefiled Testimony of Scott Twait). That determination also made sense because flow from the CSSC makes up about 72% of the Lower Des Plaines River flow, HT, 9/23/13, 98-99 (Twait), and "the [MWRDGC] effluent is the true background of this system. At times they are 100 percent of the flow." HT, 7/29/13, 208 (Twait). In its November 2013 proposal, the Agency flip-flopped on this issue too, changing the monitoring station to the Cal-Sag Channel-Route 83 station, *IEPA Comments on Second Notice*, 16-17, which only makes up 18% of the flow in the

Lower Des Plaines River. HT, 9/23/13, 98-99. The Agency's justification was that it had received a comment from USEPA that it believed the CSSC-Route 83 station did not represent the background temperature "of the system." Exhibit 480, 8 (Prefiled Testimony of Scott Twait). Mr. Twait elaborated at hearing that the Cal-Sag Channel-Route 83 station is [now] believed to be "less impacted from thermal sources," i.e., Midwest Generation's former Fisk and Crawford stations. HT, 9/23/13, 98. Yet, the Agency presented no evidence that discharges from Crawford and Fisk had any noticeable impact on the temperatures at the CSSC-Route 83 monitoring station, which is 10 to 15 miles downstream from those stations, HT, 7/29/13, 201-02 (Twait), and did not apparently re-consider the impact of Lake Michigan water.

This switch in the background station resulted in changes to 8 period averages with 6 of them decreasing. The Agency's flip-flop has no logical basis and frankly seems entirely result-oriented. USEPA's argument about background "for the system" makes no sense. What system were they talking about? The issue is what station best represents background for the Lower Des Plaines River, including the UDIP. That answer is clear: the CSSC-Route 83 monitoring that represents 72% of the flow into the Lower Des Plaines River.

IV. The Likely Costs of Complying with the Agency's Aquatic Life Use Designations Are Economically Unreasonable.

Under the current Secondary Contact and Indigenous Aquatic Life Use standards, the temperature and dissolved oxygen standards are constant throughout the year¹ and are generally met in the UDIP. HT, 3/11/08, 76. Thus, no corresponding limits have been inserted into Stepan's permit. *See above*, 2. That is unlikely to be the case if the Agency's proposed use is adopted.

¹ Dissolved oxygen is not to be less than 4 mg/l at any time, and temperature is not to exceed 93° F more than 5% of the time or 100° F at any time. 35 Ill. Adm. Code § 302.405 and 302.408.

The Agency has proposed different dissolved oxygen standards for the periods March through July and August through February, and its proposed period average temperature numeric criteria change every month, or in some cases every 15 days. *See e.g. Agency SOR*, 60 and 84-85; *IEPA Comments on Second Notice*, 16-17; summarized in Exhibit A. Moreover, in general those proposed standards require significantly higher levels of dissolved oxygen and lower temperatures. As Dr. Carl Adams and Robin Garibay of ENVIRON testified, dissolved oxygen levels would need to be increased from 4 mg/l to between 5 and 6 mg/l during March through July and 5.5 mg/l as a 30-day mean of daily means during August to February. Exhibit 318, 11. They also testified that temperature standards would generally be lowered from the current standards to a daily maximum temperature of 88.7° F and monthly or 15-day averages ranging from 85.1° F for most summer periods to well below 60° F from December through March (including a low of 53.6° F during February). *Id.*, 3; *Agency SOR*, 85; *IEPA Comments on Second Notice*, 16-17.

Based on available temperature data at the I-55 bridge, it appears unlikely that the Agency's proposed standards will be met in the UDIP. HT, 8/13/09, AM, 16-17; *see also* HT, 3/11/08, 45 (Scott Twait testifying that temperatures in UDIP do not meet General Use temperature standards, which are generally less stringent than those proposed by the Agency for the UDIP). Also, the Agency's proposed dissolved oxygen standards are not always being met at the I-55 bridge. The Agency's proposed standards include a requirement that dissolved oxygen meet or exceed 5 mg/l at all times during the months of March-July. Studies in 2004-2006 measured dissolved oxygen levels in the LDPR at the I-55 bridge lower than 5 mg/l on several occasions. *See* Hearing Ex. 323, Executive Summary for 2004, p. 8 (9 hours on one day below 5 mg/l), Executive Summary for 2005, p. 9 (123 hours on 16 dates below 5 mg/l), Executive Summary for 2006, p. 9 (56 hours on 14 dates below 5 mg/l). Given that circumstance, both

Agency and Stepan's witnesses agreed that dischargers into the UDIP are unlikely to be allowed a mixing zone to meet the proposed standards. HT, 3/12/08, 42, 170, 208 (Twait)²; HT, 8/13/09, AM, 24, 65-67 (Garibay). Moreover, for Stepan, this will not just be a seasonal issue. Based on an analysis of the temperature of its discharge, Stepan will likely have difficulty meeting both the summer and non-summer proposed temperature standards if they are imposed as a discharge standard with no mixing zone. HT, 8/13/09, AM, 45; Hearing Ex. 318, Fig. 3.

Warm water temperatures in Stepan's wastewater is initially a matter of the heat of process waste water and other sources. Hearing Ex. 318, 4. This is actually a benefit for a wastewater treatment system that depends to a large degree on warm water temperatures to maintain a healthy biomass (activated sludge) for the reduction of biological oxygen demand ("BOD") in the effluent. Hearing Ex. 318, 4. Those temperatures need to be in a range from about 65 to 95° F and preferably at the upper end of that range. HT, 8/13/09, AM, 54. Further, that target range must be maintained year round for the effective reduction of BOD. *Id.*, 56. The need for warm wastewater temperatures for effective treatment creates particular difficulty meeting the Agency's November 2013 proposed winter temperature standards which are below 60°F from December 1 to April 15. *See IEPA Comments on Second Notice*, 16-17.

Thus, the need to maintain a consistent temperature regime within the wastewater treatment system to achieve appropriate reduction of BOD is inconsistent with the Agency's desire to have water quality standards for temperature that fluctuate every month or 15 days and

² Mr. Twait attempted to qualify his conclusion that no mixing zone would apply if background temperatures exceeded the proposed water quality temperature standards by stating that he believed it was "reasonable to expect that at some point the upstream facilities will be meeting the water quality standard." HT, 3/12/08, 42. But, if those upstream facilities obtain relief under CWA 316(a), *see e.g. Ameren Energy Generating Co. v. Illinois Environmental Protection Agency*, PCB 09-38, Opinion and Order of the Board (March 18, 2010), or via a site-specific rule, *see* 35 Ill. Adm. Code § 304.205, that might not be the case. Moreover, if the upstream facilities "eventually" meet the standards, that suggests that there will be some prior period of time where the standards will not be met, which leaves facilities such as Stepan's at risk to the imposition of the water quality standards as end-of-pipe permit requirements.

require much lower temperatures during winter months.³ Moreover, use of cooling towers after activated sludge treatment for BOD reduction is beyond the best degree of treatment for OCPSF facilities, and neither Dr. Adams nor Ms. Garibay were aware of any OCPSF facilities using cooling towers in that way. HT, 8/13/09, AM, 93-94; HT, 8/13/09, PM, 14; *see also* HT, 4/23/08, 23-24 (Agency witnesses not aware of any facilities in Illinois that have installed cooling towers following industrial wastewater treatment).

As presented by Adams and Garibay, the costs of complying with the dramatically lower temperature criteria proposed by the Agency are likely to be significant.⁴ After evaluating seven different alternatives for cooling the temperature of Stepan's discharge, they identified the use of closed-circuit cooling towers in combination with a heat exchanger/chiller as the technology that could consistently and completely achieve the cooling necessary to meet the Agency proposed standards. HT, 8/13/09, AM, 62-63; Hearing Ex. 318, 5-8. They also evaluated alternatives for meeting the Agency's proposed dissolved oxygen standards and determined that the best option for achieving consistent and complete compliance would be hydrogen peroxide addition. Hearing Ex. 318, 11-13.

The combined costs of the efforts to comply with these requirements, as proposed, would be capital costs of \$1,665,000 and annual operating costs of \$1,950,000. *Id.*, 8 and 13. While these cost estimates have a built-in safety factor to account for uncertainties in temperature modeling and inevitable fouling that reduces the effectiveness of heat dissipation efficiency of

³ As Dr. Adams explained, cooling could be achieved more efficiently earlier in the wastewater system when temperatures are higher, but that cannot be done due to the temperature requirements for effective biological treatment. HT, 8/13/09, AM, 56-57; Hearing Ex. 318, 4.

⁴ While the testimony of Adams and Garibay was based on the Agency's 2008 proposed temperature criteria, it would equally apply to the Agency's November 2013 proposal, which is slightly more stringent overall.

the heat exchanger/chiller, the design processes used by ENVIRON were their usual and customary processes. HT, 8/13/09, AM, 63-65 and 68.

These are only the costs estimated by Stepan for its plant. Midwest Generation has presented estimates of its costs to comply with the Agency's proposed standards, and those costs are significant for just the plants that discharge into the LDPR. In addition, there are other industrial discharges into the LDPR who are likely to face similar costs relative to the scale of their plants and wastewater discharges. These costs are economically unreasonable given the other evidence brought forth in this proceeding showing that the UDIP has degraded habitat, navigational impacts and other characteristics that prevent it from fully attaining CWA aquatic life goals.

V. Complying with the Agency's Proposed Thermal Criteria for the UDIP Will Likely Cause More Environmental Damage than the General Use or AS96-10 standards.

Compliance costs are not the only consequence of revising the designated aquatic life uses for the LDPR and the UDIP. The technologies that will be necessary for Stepan and other dischargers to implement to achieve compliance with possible new numeric standards will also have indirect environmental side-effects. The heat in wastewater that must be removed to achieve lower discharge temperatures is energy that cannot be destroyed. HT, 8/13/09, AM, 39; Hearing Ex. 318, 4. It can only be transferred to some other environmental media, most likely ambient air. *Id.* And, the mechanical processes needed to transfer that heat from water to air must themselves use energy thus creating even more heat. HT, 8/13/09, AM, 39 and 57-58; Hearing Ex. 318, 4.

Because Stepan's plant receives most of its electric power from the nearby Joliet Station 9, the need to use mechanical processes to reduce discharge temperatures will necessitate the generation of more electricity, most of which is likely to come from the burning of coal. HT,

8/13/09, AM, 46-47. As Adams and Garibay estimated, the electrical demands associated with the additional treatment systems necessary to achieve the Agency's proposed water quality standards will generate annual incremental emissions of the following air pollutants: carbon dioxide, 128,530 tons; sulfur oxides, 3,037 tons; nitrogen oxides, 234 tons; and mercury, 24 pounds. Hearing Ex. 318, 9. These estimates were based on the Agency's 2008 proposed numeric criteria, which are generally somewhat higher than its November 2013 proposal. Thus, the above estimates may slightly underestimate annual incremental air emissions from complying with the November 2013 proposal.

As with Stepan's estimates of compliance costs, these environmental side-effects are likely to be encountered by other industrial dischargers who have perhaps put off entering testimony on these topics until Subdocket D. In any event, these kind of environmental side-effects are exactly the sort of considerations that the Board usually takes into account under Section 27(a) of the Act. 415 ILCS 5/27(a). While the phrase "environmental damage"⁵ in 40 C.F.R. § 131.10(g)(3) is not defined, it would clearly seem to encompass emission of pollutants into other environmental media that are a consequence of the proposed water quality standard.

VI. The Board Should Consider Other Means of Regulatory Relief to Allow Dischargers Adequate Time to Adjust to Any Modified Numeric Criteria.

There has been ample testimony in these hearings that multiple dischargers will have difficulty complying with discharge limits in permits directly based on the water quality criteria proposed by the Agency, particularly as to temperature, dissolved oxygen and chlorides. One of the concerns repeatedly expressed during the hearings was that some dischargers would not be able to make mixing zone proposals due to waters not complying with the proposed water quality

⁵ Stepan would disagree that the projected incremental emissions calculated by Dr. Adams and Ms. Garibay actually harm or damage the environment in the sense that some specific damage to fauna or biota or human health or public welfare could be traced to these incremental emissions. But, as used in 40 C.F.R. § 131.10(g)(3), the phrase "environmental damage" seems to be a broader concept that allows for the consideration of any environmental side-effects arising from a particular use designation under the CWA.

criteria because of the effects of other dischargers or non-point source impacts. Suggestions were made for the Board to facilitate multi-discharger variances or adjusted standards and delayed effective dates or even an approach of requiring larger, upstream dischargers or non-point sources to take steps to achieve compliance first. HT, 9/23/13, 42-43 (Twait). The Board's regulations actually seem to allow for multi-discharger variances, *see* 35 Ill. Adm. Code 304.105 (when violation of water quality standard "is caused by the cumulative effect of more than one source, several sources may be joined in an enforcement or variance proceeding, and measures for necessary effluent reductions will be determined on the basis of technical feasibility, economic reasonableness and fairness to all dischargers."), but the Board, the Agency and dischargers seem to have limited experience as to how these would work in practice.

No entirely satisfactory answer has been provided to this concern. Based on recent experience, variances (multi-discharger or not) may not be viable if they require USEPA approval and it insists that the variance from a water quality standard must invoke a UAA factor in order to be approvable. A delayed effective date would provide some relief to all dischargers, but may not be approved by USEPA and does not create any incentive for the larger dischargers to undertake early action. A sequenced or coordinated approach to implementation makes sense, but the legal mechanism for implementing this remains unclear since amended water quality standards potentially apply to everyone. Stepan encourages the Board to consider all these possible means of regulatory relief, as it is obvious that some form of relief is likely to be needed.

Conclusion

Stepan appreciates the opportunity to provide these comments to the Board. The Agency's proposed numeric temperature criteria for the UDIP are not supported by the evidence presented at hearing. Given the Board's determination that the UDIP is not currently attaining

the CWA aquatic life goal, there is no rational reason to apply numeric temperature criteria that are any more stringent than those applicable to General Use waters, which are supposed to attain the aquatic life goal. In addition, its proposed temperature criteria are not economically reasonable. In addition, we encourage the Board to consider various options for regulatory relief from any modified water quality criteria.

Respectfully submitted,
STEPAN COMPANY

DATE: April 30, 2014

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Exhibit A
Alternative Proposed Numeric Thermal Water Quality Standards
Upper Dresden Island Pool

Period	Existing Numeric Thermal WQS											
	Alternative Proposals for Thermal WQSs for UDP											
	General Use											
	Secondary Contact (35 IAC 302.408)	Adjusted Standard 96- 10		(35 IAC 302.211) IEPA Proposal May 2013		IEPA Statement of Reasons Proposal (2008)			IEPA Proposal (11/4/2013)			
Absolute Max		Absolute Max		Absolute Hourly Max		Period Avg (3)	Daily Max (2)	Absolute Max	Period Avg (3)	Daily Max (2)	Absolute Max	
Jan	93	100	60	93	60	63	54.3	88.7	92.3	54.3	88.7	92.3
Feb	93	100	60	93	60	63	53.6	88.7	92.3	53.6	88.7	92.3
Mar	93	100	65	93	60	63	57.2	88.7	92.3	54.4	88.7	92.3
Apr 1-15	93	100	73	93	90	93	60.8	88.7	92.3	58.9	88.7	92.3
Apr 16-30	93	100	80	93	90	93	62.1	88.7	92.3	62.9	88.7	92.3
May 1-15	93	100	85	93	90	93	69.2	88.7	92.3	68.1	88.7	92.3
May 15-31	93	100	90	93	90	93	71.4	88.7	92.3	70.4	88.7	92.3
June 1-15	93	100	90	93	90	93	74.2	88.7	92.3	75.5	88.7	92.3
June 16-30	93	100	91	93	90	93	85.1	88.7	92.3	85.1	88.7	92.3
July	93	100	91	93	90	93	85.1	88.7	92.3	85.1	88.7	92.3
Aug	93	100	91	93	90	93	85.1	88.7	92.3	85.1	88.7	92.3
Sep 1-15	93	100	90	93	90	93	85.1	88.7	92.3	85.1	88.7	92.3
Sep 16-30	93	100	90	93	90	93	77.0	88.7	92.3	76.5	88.7	92.3
Oct 1-15	93	100	85	93	90	93	73.2	88.7	92.3	73.2	88.7	92.3
Oct 16-31	93	100	85	93	90	93	69.6	88.7	92.3	69.4	88.7	92.3
Nov	93	100	75	93	90	93	66.2	88.7	92.3	66.2	88.7	92.3
Dec	93	100	65	93	60	63	59.9	88.7	92.3	59.9	88.7	92.3

Current Compliance Point	Within UDP	AS from General Use at I-55 Bridge	I-55 Bridge and Downstream	N/A	N/A
Proposed Compliance Point	Within UDP	Within UDP	Within UDP	Within UDP	Within UDP
Excursion Hours	Shall not exceed > 5% of time None	See Note 4.	Shall not exceed > 1% of hrs in any 12 mos None	Shall not exceed > 2% of hrs in any 12 mos 12 mos	Shall not exceed > 2% of hrs in any 12 mos None

Notes:

- All numeric temperatures in degrees Fahrenheit.
- The Daily Max in the 2008 and November 2013 IEPA proposals was derived from Exhibit 15, p. 14, Table 3 Modified Use RAS 2 Survival (Short-Term).
- The Period Averages are color coded as to the exhibit and information source from which they were derived. Exhibit 15 is the document Temperature Criteria Options for the Lower Des Plaines River, Nov 23, 2005 (Yoder). Attachment W is a June 4, 2007 letter from the MWRD to IEPA with attached tables and data.
 - Derived from Exhibit 15, p. 14, Table 3, Modified Use RAS2, Survival (Long-Term) as modified Att. H (Yoder)
 - Derived from Exhibit 15, pps 86-87 in App. B. 75th Pctile of 1998-2004 Route 83 CSSC ambient temperatures.
 - Derived from IEPA Statement of Reasons, Att. W, Table 1. 75th Pctile of 2001-2006 MWRD Stickney Plant effluent temperatures.
 - Derived from Exhibit 15, pps 84-85 in App. B. 90th Pctile of 1998-2004 Cal-Sag Channel-Route 83 station ambient temperatures.
- The AS96-10 numeric criteria are not to be exceeded by more than 3 F during 2% of the hours in any calendar year.