**BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**

| | | |
|---|---|---|
| IN THE MATTER OF: | ) | |
| | ) | |
| WATER QUALITY STANDARDS AND | ) | R08-9 Subdocket C |
| 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:

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

Marie Tipsord, Hearing Officer
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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 POST-HEARING COMMENTS OF STEPAN COMPANY, a copy of which is herewith served upon you.

STEPAN COMPANY

DATE: March 5, 2012

/s/ Thomas W. Dimond
Thomas W. Dimond

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**CERTIFICATE OF SERVICE**

I, the undersigned, certify that on this 5th day of March 2012, I have served electronically the attached 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:

Marie Tipsord, Hearing Officer
Illinois Pollution Control Board
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100 West Randolph Street, Suite 11-500
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The participants listed on the attached
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## POST-HEARING COMMENTS OF STEPAN COMPANY

Stepan Company ("Stepan") appreciates the opportunity to provide post-hearing comments to the Illinois Pollution Control Board ("Board") on proposed water quality use designations for the Chicago Area Waterway System 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 ("UDP") 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. Federal Law Does Not Limit the Evidence or Considerations the Board May Take Into Account in Adopting Water Quality Standards and No Presumption of Attainability of the Clean Water Act Goals Applies to the Unique Circumstances of the Lower Des Plaines River.

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 must 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." 33 U.S.C. § 1313(c)(2)(A). 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. While Congress expressed an aspiration that water quality should "wherever attainable" provide for recreation and protect and support the propagation of fish, shellfish and wildlife, 33 U.S.C. § 1251(a)(2), in doing so, it created no presumption that goal could be achieved for all water bodies or that all other uses of waters were subservient to those aspirations. Thus, the CWA does not itself create any "rebuttable presumption" in favor of recreational or aquatic life goals. Rather, 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 mantel 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). 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.

Even if a "rebuttable presumption" could be found in the CWA, under the unique circumstances of the LDPR, it would be inappropriate to apply such a presumption. It would also be improper to limit the evidence that can be considered in showing CWA goals are not attainable to those outlined in 40 C.F.R. § 131.10(g). Congress assigned the primary responsibility for designating water uses to the States – not to U.S. EPA. While information and evidence that the General Assembly has directed the Board to consider under Section 27 of the Act may also address the U.S. EPA standards for designating uses other than those designated in 42 U.S.C. § 1251(a)(2), those standards go beyond U.S. EPA's authority under the CWA and are not binding on the States.

Apart from the propriety of U.S. EPA's regulations, the LDPR is not a water body without a 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 even though no use attainability analysis under 40 C.F.R. § 131.10 (g) and (j) had been performed. Agency SOR, Att. A, 1-22.

Even if some of the conditions of the LDPR have changed in the intervening years, because of these previous decisions, there is no logic to applying a rebuttable presumption that any portion of the LDPR can attain CWA goals. Rather, the Board should consider all information relevant under Illinois law for the adoption of water quality standards pursuant to Section 27 of the Act. 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. *See* Section III., below. In that regard, the Agency's attempt to effectively move the line between general use waters and those that cannot attain CWA aquatic life goals has little support. 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. The Character of the LDPR, and particularly the Upper Dresden Island Pool, Are Not Adequate to Support the Type of Aquatic Community Advocated by the Agency.

### A. Conditions Resulting From Human Intervention Prevent the LDPR, including the UDP, from Attaining CWA Aquatic Life Goals.

Certain attributes of the LDPR, including the UDP, are not disputed. As the Agency's own contractor found, the flow in these waterways is dominated by wastewater effluent. Agency SOR, Att. A, 1-8 and Table 1.1. Indeed, wastewater effluent from the MWRD and other wastewater treatment plants contributes 70% - 90% of the low flow in the LDPR. *Id.*; *see also* Hearing Ex. 369, 3. Also, it is undisputed that the LDPR and connected waterways are heavily used for navigation by barges and other industrial shipping concerns. HT, 8/13/09, PM, 18; Hearing Ex. 324, 3. Even the Agency's contractor acknowledged that navigation on the LDPR and connected waterways was a viable and economically important use that was protected under the CWA and could not be removed. Agency SOR, Att. A, 2-21.

The effluent dominated nature of the LDPR has led to degraded sediment conditions that are not improving. As Dr. Burton testified, sediments in the UDP are impacted by metals, nutrients, pesticides, polycyclic aromatic hydrocarbons ("PAHs") and other contaminants. Hearing Ex. 369, 4 and Att. 1, 7-15. Also, there is no indication the sediment contaminant levels are improving and much of the sediment contamination is continuing due to existing point and non-point sources. Several sediment locations were sampled in both a 1994-95 study and more

recently in a 2008 study. For those co-located samples, the majority of detected metals in the 2008 sampling event were either higher or within a factor of two or less of the levels measured in 1994-95. Hearing Ex. 369, Att. 1, 10. Concentrations of total PAHs and PCBs were elevated in both studies, too. *Id.* In the UDP, the areas of most significant contamination tend to be outside the main navigation channel, which is well-scoured, in depositional areas that would be key habitat for fish species. *Id.* The tailwater area beneath the Brandon Road lock and dam that the Agency has so focused on as a key habitat area for fish in the UDP has significant PAH contamination that may be particular toxic because of the shallow water depths and the potential for photo-induced toxicity effects. *Id.* The PAH levels in the sediments are due to non-point sources that will not decline because there are no management practices in place to reduce them. *Id.* The story is similar for nutrients. It is not until below Dresden Pool that levels of nitrogen, ammonia, phosphorous and fecal coliforms drop significantly. *Id.*

It is also undisputed that the federal and state agencies (including the Illinois Department of Natural Resources) addressing the threat of Asian Carp to Lake Michigan and the Great Lakes are not proposing any effort to protect the UDP from the bighead and silver carp (hereafter, "Asian Carp"). Hearing Ex. 428, 9. Those extraordinary efforts are located at the upstream end of the UDP and will not prevent Asian Carp from entering and establishing significant populations in the UDP. *Id.* Large reproducing populations of Asian Carp exist in the lower Illinois River, and nearly 5,000 Asian Carp were captured in 2010 from the Marseilles Pool, which is immediately downstream of the Dresden Island Pool. *Id.*, 4-5. In fact, fish sampling in 2010 also found adult Asian Carp in the UDP, including one egg-laden female and also one in the Brandon Road lock and dam tailwater area. *Id.*, 7. Nothing has stopped the Asian Carp migration to date, and while commercial netting of Asian Carp in the Marseilles Pool may slow the advance, it is not the kind of effort that will prevent the Asian Carp from ultimately invading

the UDP. *Id.*, 6-7, 15-16. While the UDP has a heavily-used navigation channel, it also has substantial off-channel areas with slow-moving waters that could support plankton populations and be excellent habitat for Asian Carp. *Id.*, 3, 8.

As Greg Seegert testified, it is only a matter of time until the carp impact the aquatic life community in the UDP. *Id.*, 9. The inevitable presence of the Asian Carp in the UDP will adversely affect the fish community in a number of ways, including reduction of food resources for native fish, negative changes in fish recruitment and fish community structure. *Id.*, 10-14.

All of these human-caused conditions demonstrate that the UDP cannot presently attain the CWA aquatic life goal.

B. Dams and Other Hydrologic Modifications Prevent the LDPR and the UDP from Attaining CWA Aquatic Life Goals.

The Agency also admits that the LDPR and UDP are impacted by the existing locks and dams associated with the need to convey effluent and storm water flows to avoid flooding and with the protected navigational use of the river system. Agency SOR, 17 and 32. The Agency also acknowledges that those features are not feasible to be removed. Agency SOR, 32. Thus, the LDPR and UDP are not free-flowing rivers but part of an essentially lentic or lake-like system. Hearing Ex. 366, 6. Flows in this system are heavily managed to promote navigation and reduce water levels in advance of storm events to reduce flooding. *Id.*, attached Ex. 2, p. 5. Moreover, for some fish species, the managed flow regime is inconsistent with their seasonal migration patterns, can cause nest abandonment or displacement of recently hatched fry or lead to fish being stranded in shallow areas during low flow conditions. *Id.*, attached Ex. 2, pp. 5-6. The dams result in the UDP being described as 93% impounded, which makes it a less attractive habitat for several groups or classes of fish that prefer fast-moving waters. *Id.* Those are precisely the groups and classes that are necessary for the UDP to have a more diverse fish

community. This characteristic eliminates or reduces riffles and stream velocity, increases sedimentation, interrupts fish migration, and has a number of other adverse impacts on fish habitats. *Id.*

The dams and associated unnatural flow regime will not be removed any time soon. These constitute factors that prevent the LDPR, including the UDP, from attaining the CWA aquatic life goal.

C. The UDP Does Not Have Enough Proper Substrate, Cover, Flow or Other Physical Features to Attain CWA Aquatic Life Goals.

Several studies of the habitat qualities of the LDPR were presented for the Board's consideration. The Agency's contractor summarized and reported habitat assessments performed by EA Engineering in the early 1990's, noting that "[n]o changes in physical stream habitat" had occurred since those studies. Agency SOR, Att. A, 4-16. That analysis showed qualitative habitat evaluation index ("QHEI") scores in the LDPR were generally well below 60, which is the score recommended for defining warm water habitats consistent with CWA goals. The Agency's contractor assigned these low scores to lack of riffle/run habitat, limited hard substrates, channelization, poor riparian habitat, lack of in-stream cover and impounded waters. *Id.*, 4-33 to 4-34. The Agency's contractor went on to conclude that the major cause of the degraded habitat, commercial barge traffic and the related lock and dam system, were considered irreversible. *Id.*

The Agency presented QHEI score data for the Illinois and Des Plaines River as an attachment to its Statement of Reasons. Agency SOR, Att. S. As the Board will recall, these QHEI values only included 3 scores within the UDP and were riddled with errors. *See* Hearing Ex. 366, 12-13

The most recent and most extensive study of LDPR habitat was prepared by EA Engineering and presented as testimony by Greg Seegert. The survey conducted in July 2008 was particularly robust and methodical. It evaluated the entire linear distance of the UDP by establishing 500 meter zones for each shore of the river. From this delineation, 50 zones[1] were identified and scored using the QHEI index under two scoring procedures. Hearing Ex. 366, 8. Depending on the scoring approach, 90% or 98% of the zones scored below 60, which is the usual threshold for CWA aquatic life goal attainability. *Id.*, 9. Moreover, over half the scores were less than 45, and the mean score was 47.4 or 42.0 depending on the scoring approach. These scores are near or even below the cutoff (45) under which the State of Ohio concludes that the CWA aquatic life goal is not attainable. *Id.*, 10.

Consistent with previous studies, the only area that scored high enough to possibly attain CWA goals was the area immediately downstream of the Brandon Road lock and dam. *Id.*, 10-11. But, this area only comprises about 7% of the UDP, and Mr. Seegert explained why that limited area did not justify concluding that the UDP could achieve CWA aquatic life goals. The dams on the LDPR prevent it from functioning as a normal river system with predictable seasonal flows that flush sediments and allow for migratory movements by certain fish species. *Id.*, 11. Rather, these waters are impounded, have poorer macroinvertebrate population and lack the fish species diversity and richness of unimpounded rivers. *Id.* While the UDP can support the presence of some fish species that are more tolerant and have no special habitat needs, it cannot support significant populations of the more diverse groups of fish that typically characterize Illinois streams that can attain CWA aquatic life goals. *Id.* Taken as a whole, the

[1] Consistent with protocols, the areas scored did not include the navigational channel of the UDP, which makes up about 50% of the UDP. Hearing Ex. 366 10.

habitat studies do not support a conclusion that the LDPR and the UDP can attain the CWA aquatic life goal.

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

The manner in which the Board has segmented this proceeding makes the task of assessing economic reasonableness difficult. The Board chose Subdocket C to address the designation of narrative water quality uses for the waters included within this proceeding. Those uses do not specify particular numeric standards, and an understanding of the numeric standards that must be achieved is necessary for experts to evaluate possible technical compliance alternatives and the associated costs. This does not mean that the decision on the water quality uses is a decision that has no cost implications. Under the current Secondary Contact and Indigenous Aquatic Life Use standards, the temperature and dissolved oxygen standards are constant throughout the year[2] and are generally met in the UDP. 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.

The Agency has proposed different dissolved oxygen standards for the periods March through July and August through February, and its proposed period average temperature standards change every month, or in some cases every 15 days. *See e.g.* Agency SOR, 60 and 84-85. Moreover, in general those 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

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[2] 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 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 below 60° F from December through March (including a low of 53.6° F during February). *Id.*, 3; Agency SOR, 85.

Based on available temperature data at the I-55 bridge, it appears unlikely that the Agency's proposed standards will be met in the UDP. HT, 8/13/09, AM, 16-17; *see also* HT, 3/11/08, 45 (Scott Twait testifying that temperatures in UDP do not meet General Use temperature standards, which are generally less stringent than those proposed by the Agency for the UDP). 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 UDP are unlikely to be allowed a mixing zone to meet the proposed standards. HT, 3/12/08, 42, 170, 208 (Twait)[3]; 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 winter 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.

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[3] 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.

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 further complicates 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, *id.*, 56, which creates particular difficulty meeting the Agency's proposed winter temperature standards which are below 60° F from December 1 to March 31. *See* Agency SOR, 85.

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 require much lower temperatures during winter months.[4] 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).

Whether the Agency's proposed numeric standards are eventually adopted is uncertain, but any change to the designated aquatic life use could have some impact on the numeric criteria. Thus, without conceding that the Agency's proposed numeric criteria are appropriate for its designated use or any other new designated use for the UDP, Stepan believes that the Board

[4] 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.

should consider the costs of complying with new proposed criteria in considering whether the designated use should be revised.

As presented by Adams and Garibay, those costs are likely to be significant. 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 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. Due to the manner in which this proceeding has been segmented, other dischargers may have thought it prudent to wait until Subdocket D to present testimony on the costs they will face, but that does not make those costs any less real. These costs are economically unreasonable given the other evidence brought forth in this proceeding

showing that the UDP has degraded habitat, navigational impacts and other characteristics that prevent it from fully attaining CWA aquatic life goals.

## V. Complying with the Agency's Aquatic Life Use Designations Will Likely Cause More Environmental Damage than Designation of a Less Restrictive Use Designation.

Compliance costs are not the only consequence of revising the designated aquatic life uses for the LDPR and the UDP. 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.

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. Conclusion

The Agency's proposed aquatic life use designations for the LDPR, and particularly the UDP, are not supported by the evidence presented at hearing. In previous proceedings, the Board has determined that the industrial character of the LDPR above the I-55 bridge distinguished it from the areas below the bridge. Nothing has changed that alters that conclusion. The LDPR is still an effluent-dominated waterway that is heavily impacted by sediment impacts from its effluent-dominated nature and navigational barge traffic. While some improvements to the system may have occurred, the balance of the evidence in the record does not justify the Agency's attempt to effectively move the CWA aquatic life attainment line from the I-55 bridge to Brandon Road lock and dam.

Respectfully submitted,
STEPAN COMPANY

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[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.