

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

MIDWEST GENERATION, LLC)
Petitioner,)
v.) PCB 16-19 (Time-Limited Water Quality
ILLINOIS ENVIRONMENTAL) Standard Variance)
PROTECTION AGENCY)
Respondent.)

NOTICE OF FILING

To:

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PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Pollution Control Board Midwest Generation, LLC's Amended Petition for Time-Limited Water Quality Variance with Exhibits (Exhibits messengered to IPCB on CD and Federal Expressed to Service List due to volume), a copy of which is herewith served upon you.

Dated: June 27, 2018

MIDWEST GENERATION, LLC

By: /s/ Susan M. Franzetti

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CERTIFICATE OF SERVICE

I, the undersigned, certify that I have served the attached Midwest Generation, LLC's Amended Petition for Time-Limited Water Quality Variance (Exhibits messengered to IPCB on CD and Federal Expressed to Service List due to volume), via electronic mailing to the following:

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TABLE OF CONTENTS

List of Acronyms and Abbreviations.....vi

I. Introduction.....1

II. Procedural History3

 A. The Designated Uses of the CSSC and UDIP3

 B. The Board Establishes Water Quality Standards for the CSSC,
 Brandon Pool, and UDIP7

 C. MWGen’s Petition for Variance 8

 D. MWGen’s Petition for an Alternative Effluent Limit for Will
 County Station9

 E. MWGen’s Ongoing Thermal Demonstration Studies for the
 Joliet Stations10

 F. Tentative Conclusions Regarding the UDIP and Five-Mile Stretch13

III. Legal Standards Applicable to Relief14

 A. Time-Limited Water Quality Standard Variances15

 B. Illinois TLWQS Requirements16

 C. TLWQS Case Studies17

 1. Case Study: Colorado17

 2. Case Study: Texas22

 D. Alternative Effluent Limits Under §316(a) of the Clean Water Act22

IV. Required Contents of Petition25

 A. Statement Indicating Type of TLWQS Sought (Section 104.530(a)(1))...25

 B. Map of the Proposed Waterbody and Written Descriptions
 (Section 104.530(a)(4))25

 1. CCS Control and Brandon Pool26

 2. UDIP26

 3. “Five Mile Stretch” of the Lower Des Plaines River26

 C. Location of the Petitioners’ Activity and the Location of the Points
 of Its Discharge (Section 104.530(a)(3))26

 1. Will County Generating Station26

 2. The Joliet Stations27

 3. Additional Members of Class of Thermal Dischargers29

- D. Identification of the Designated Uses of the Waterbody and the Currently Applicable Water Quality Standards for the Pollutant or Parameter for Which a TLWQS is Sought (Section 104.503(a)(2), and (a)(5))29
 - 1. Aquatic Life Use B, UDIP Aquatic Life Use, and General Use29
 - 2. Previously Applicable Thermal Water Quality Standards31
 - 3. Thermal Water Quality Standards for ALU B and UDIP use32
 - 4. Adjusted Thermal Water Quality Standards for the Five-Mile Stretch33

- E. Identification, Including the Board’s Docket Number, of Any Prior Water Quality Standards Variances/Time-Limited Water Quality Standards Issued to the Petitioner, Watershed, Waterbody, Waterbody Segment, and, if Known, the Petitioners’ Predecessors Concerning Similar Relief (Section 104.530(a)(8))35
 - 1. AS 96-1035
 - 2. Provisional Variances35

- F. Data Describing the Nature and Extent of the Anticipated Failure to Meet the Water Quality Standard and Facts Supporting Petitioners’ Argument that Compliance with the Water Quality Standards Regulation Cannot be Achieved by Any Required Compliance Date (Section 104.530(a)(6))36
 - 1. CSSC36
 - 2. UDIP38
 - 3. Five-Mile Stretch40

- G. Demonstration that Attainment of the Designated Use or Uses and Criterion or Criteria is Not Feasible Throughout the Term of the TLWQS Because of One or More of the Factors Listed in Section 104560 (Section 104.530(a)(9))41
 - 1. UAA Factor 341
 - a. CSSC and Brandon Pool41
 - 2. UAA Factors Four and Five43
 - a. CSSC and Brandon Pool43
 - b. UDIP44
 - 3. UAA Factor Six48

| | | |
|------|---|----|
| a. | Demonstrate the designated use is a potential use and not an existing use | 49 |
| b. | Demonstrate that entity will incur substantial economic impacts | 49 |
| c. | “Evaluate entity’s financial health” | 53 |
| d. | “Determine whether impacts are widespread” | 53 |
| i. | Impacts on the local economy | 53 |
| ii. | Impacts on the local government | 54 |
| iii. | Power price impact | 58 |
| iv. | Capacity price impact | 61 |
| v. | Harm to NRG/MWG | 63 |
| e. | “Evaluate the economics benefits of cleaner water” | 64 |
| f. | “Public comment and debate period” | 65 |
| g. | “If substantial and widespread economic and social impacts are demonstrated, determine which pollution option should be implemented” | 65 |
| H. | Demonstration to Assure That the Proposed Highest Attainable Condition Does Not Conflict with the Attainment of Downstream Water Quality Standards | 65 |
| I. | Identification, By Name of the Permit Holder and Permit Number, of the Permits Held by Dischargers That Might be Affected by the Adoption of the TLWQS. (Section 104.530(a)(9)) | 65 |
| J. | The proposed Highest Attainable Condition of the Watershed, Waterbody, or Waterbody Segment Identified in Subsection (a)(4) Expressed as Set Forth in Section 104.565(d)(4), Including Projected Changes in the Highest Attainable Condition Throughout the Proposed Term of the TLWQS (Section 104.530(a)(12)) | 66 |
| 1. | Will County Receiving Waters | 67 |
| 2. | UDIP Receiving Waters | 68 |
| 3. | Five-Mile Stretch | 70 |
| K. | The Proposed Term of the TLWQS and Justification That it is Only as Long as Necessary to Achieve the Highest Attainable Condition, Which Includes a Description of the Relationship Between the Proposed Pollution Control Activities and the Proposed Term; (Section 104.530(a)(14)) | 71 |
| 1. | Will County Receiving Waters | 71 |
| 2. | UDIP and Five-Mile Stretch | 71 |

| | | |
|----|---|----|
| 3. | Proposed Reevaluation Schedule to Reevaluate the Highest Attainable Condition During the Term of the TLWQS, if the Proposed Term of the TLWQS is Longer Than Five Years (Section 104.530(a)(15)) | 72 |
| L. | An Identification and Description of Any Process, Activity or Source That Contributes to a Violation of a Water Quality Standard, Including the Material Used in That Process or Activity. (Section 104.530(a)(10)) | 72 |
| M. | A Description and Copies of All Pollutant Minimization Plans That are Relevant to the Relief Requested And Are Currently Being Implemented or Were Implemented in The Past (Section 104.530(a)(11)) | 73 |
| N. | A Demonstration of Pollutant Control Activities Proposed to Achieve the Highest Attainable Condition, Including Those Activities Identified Through a Pollutant Minimization Program. (Section 104.530(a)(13)) | 73 |
| V. | Conclusion | 74 |

LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-------------------|--|
| Act | Illinois Environmental Protection Act |
| ALU B | Chicago Area Waterway System Aquatic Life Use B |
| Aquanova/Hey | Aquanova International, Ltd. and Hey and Associates, Inc. |
| Barrier | Aquatic Nuisance Species Barrier |
| Board | Illinois Pollution Control Board |
| C | Celsius |
| CAWS | Chicago Area Waterway System |
| CDM | Camp, Dresser, McKee |
| cfs | cubic feet per second |
| ComEd | Commonwealth Edison |
| CPW | Colorado Department of Parks and Wildlife |
| CSO | combined sanitary overflow |
| CSSC | Chicago Sanitary & Ship Canal |
| CWA | Clean Water Act |
| DO | Dissolved Oxygen |
| DSP | Detailed Study Plan |
| EA | EA Engineering Science, and Technology, Inc. |
| F | Fahrenheit |
| FHR | Flint Hills Resources Joliet LLC |
| Five-Mile Stretch | LDPR from the I-55 Bridge (River Mile 277.9) to Illinois River (River Mile 273.0). |
| GW | Gigawatt (one billion watts) |
| GWh | Gigawatt hour |
| IDNR | Illinois Department of Natural Resources |
| IEPA | Illinois Environmental Protection Agency |
| ISO | Independent Service Operator |
| JCAR | Illinois Joint Committee on Administrative Rules |

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|----------|---|
| LDA | Local Deliverability Area |
| LDPR | Lower Des Plaines River |
| M | million |
| MGD | million gallons per day |
| mg/L | milligrams per liter |
| MMBtu | one million British Thermal Units |
| MW | megawatt |
| MWe | megawatts of electricity |
| MW-d | megawatt per day |
| MWh | megawatt hour |
| MWGEN | Midwest Generation, LLC |
| NPDES | National Pollution Discharge Elimination System |
| O&M | operation and maintenance |
| QHEI | Qualitative Habitat Evaluation Index |
| S&L | Sargent & Lundy LLC |
| Stepan | Stepan Company |
| TARP | Tunnel and Reservoir Plan |
| TW | terawatt (one trillion watts) |
| TWh | terawatt hour |
| TLWQS | time-limited water quality variance |
| UAA | use attainability analysis |
| UDIP | Upper Dresden Island Pool |
| USACE | U.S. Army Corps of Engineers |
| U.S. EPA | United States Environmental Protection Agency |
| WQBEL | water quality-based effluent limitation |
| WQS | water quality standard |
| 7Q10 | seven-day low flow in a 10-year period |

EXHIBIT LIST

EXHIBIT A: Will County Detailed Study Plan (DSP)

EXHIBIT B: Joliet 9 Detailed Study Plan (DSP)

EXHIBIT C: Joliet 29 Detailed Study Plan (DSP)

EXHIBIT D: EA, Status of MWGen Joliet Station 316(a) & Subpart K DSP Work

EXHIBIT E: U.S. EPA, *Discharger-Specific Variances on a Broader Scale* (Mar. 2013)

EXHIBIT F: Fact Sheet: Colorado Temporary Modifications

EXHIBIT G: *Written Testimony of Tri-State Generation and Transmission Association, Inc., In Re Water Quality Classifications and Standards and Designations for the Gunnison and Lower Dolores River Basin*, June 12, 2016

EXHIBIT H: U.S. EPA, *Watershed-Based NPDES Permitting: Rethinking Permitting as Usual* (May 2003)

EXHIBIT I: U.S. EPA, *Watershed-Based Permitting Case Study: Sand Creek Watershed, Colorado* (July 2007)

EXHIBIT J: *Water Quality Control Division's Comments on and Discussion of the Proposed Changes to Regulation 35, Segment 4 of the San Miguel River, for Classification and Numeric Standards, as Related to Temperature and Aquatic Life* (April 4, 2006)

EXHIBIT K: U.S. EPA, *Revisions to Regulations 34, 35 and 38* (Oct. 30, 2006)

EXHIBIT L: *CPW Prehearing Statement, December 2016 Rule-Making Hearing* (Oct. 4, 2016)

EXHIBIT M: U.S. EPA, *Re: EPA Action on Three Sets of Revisions to Water Quality Standards* (Oct. 12, 2017)

EXHIBIT N: *Pre-Hearing Submission of Public Service Company, Temporary Modifications of RMH* (Oct. 4, 2016)

EXHIBIT O: *Technical Report: Temperature Monitoring on the St. Charles River for Public Service Company of Colorado Comanche Plant* (Oct. 3, 2016)

EXHIBIT P: Map of Chicago Area Waterway System

EXHIBIT Q: Maps Showing CSSC with Will County Station

EXHIBIT R: Maps Showing UDIP Including Location of Each Member of the Class of Thermal Dischargers

EXHIBIT S: Maps of Five-Mile Stretch Portion of Water Body Immediately Downstream of UDIP

EXHIBIT T: Intake Data – Joliet 9

EXHIBIT U: USACE, *Summary of the Great Lakes Mississippi River Interbasin Study-Brandon Road* (Sept. 2017)

EXHIBIT V: Mr. Henry's March 9, 2011 Written Testimony

EXHIBIT W: 2011 Sargent & Lundy Report

EXHIBIT X: Affidavit from Radhika deSilva, PHD, P.E.

EXHIBIT Y: Alec MacGillis, *Forced to Choose Between a Job –and a Community* (May 23, 2018)

EXHIBIT Z: Joliet 9 Permit

EXHIBIT AA: Joliet 29 Permit

EXHIBIT BB: Joliet Air Permit

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| Petitioner, |) | | |
| v. |) | PCB 16-19 | (Time-Limited Water Quality |
| |) | | Standard Variance) |
| ILLINOIS ENVIRONMENTAL |) | | |
| PROTECTION AGENCY |) | | |
| Respondent. |) | | |

MIDWEST GENERATION, LLC’S AMENDED PETITION FOR TIME-LIMITED WATER QUALITY VARIANCE

Pursuant to Section 38.5 of the Illinois Environmental Protection Act; 35 Ill. Adm. Code Part 104, Subpart E; and 40 C.F.R. § 131.14, Midwest Generation, LLC (“MWGen”) hereby amends its prior request that the Illinois Pollution Control Board (“Board”) grant a time-limited water quality variance (“TLWQS”) for a class of thermal dischargers in contiguous portions of the Chicago Area Waterway System (“CAWS”) known as the Chicago Sanitary & Ship Canal (CSSC), Brandon Pool, Upper Dresden Island Pool (UDIP), and the “Five-Mile Stretch.” The class of thermal discharger includes the MWGen electric generating stations known as Will County Generating Station (“Will County Station”), Joliet Generating Station 9 and Joliet Generating Station 29 (the “Joliet Stations”), collectively referred to as the “MWGen Stations.” The MWGen Stations need relief from the new thermal water quality standards for the UDIP that will become applicable to the CSSC, Brandon Pool, and UDIP on July 1, 2018. Pending resolution of this amended TLWQS Petition, the MWGen Stations’ thermal discharges are covered by the automatic stay of the new thermal water quality standards which became applicable upon the original petition’s timely filing on July 21, 2015.

The discharger class includes certain facilities located downstream from the MWGen Stations, including Flint Hills Resources Joliet, LLC (“FHR”), Stepan Company (“Stepan”), and possibly also ExxonMobil.

I. INTRODUCTION

In 2015, the Board adopted the most stringent thermal standards for the CSSC, Brandon Pool, and UDIP that have ever been applied to those waterbodies. Recognizing that those standards might be excessively stringent, and that thermal dischargers have options for regulatory relief that

other dischargers do not, the Board delayed the “applicability” of those standards for three years. Shortly after the Board reached this conclusion, MWGen began pursuing the steps necessary to obtain discharger-specific effluent limits. For the Will County Station, MWGen has already completed the studies necessary to obtain such limits and its petition for Subpart K alternative effluent limitations is pending before the Board. (See Docket No. PCB 18-58)

The studies for the Joliet Stations have taken longer. Although the study plans for those stations were developed at the same time as the plan for the Will County Station, operational changes at the Joliet Stations in 2016 produced a new thermal regime in the waterway. The units switched fuel source from coal to natural gas, and are now run much less frequently, because gas is more expensive than coal. So, studies of the changed thermal conditions could not begin immediately after the Board adopted the new thermal standards.

Thus, MWGen seeks this TLWQS variance to provide an extension of the period of regulatory relief from the new thermal standards while the Board reviews the filed thermal demonstration for Will County Station and while the thermal studies for the Joliet Stations are completed, and then reviewed by the Board and the United States Environmental Protection Agency (“U.S. EPA”). MWGen anticipates that the Will County Station’s portion of the TLWQS will not need to run past 2020, and the Joliet Stations’ portion will not need to run past 2022. Granting this TLWQS will not result in any worsened conditions in the waterway, and the proposed variance includes conditions that significantly tighten the water quality standards for thermal effluent applicable to the waterbodies from what was previously required.

There are no other feasible ways that these waterbodies could achieve the Board’s new designated uses over the next several years. For one, requiring the MWGen Stations to derate during periods of elevated ambient temperatures and low flow conditions will produce substantial and widespread economic harm to the millions of consumers served by those Stations, both in the prices they pay for electricity and in the risks they face if the grid becomes less resilient in the Stations’ absence. And although there is pollution control technology available for thermal effluent, it would cost tens of millions of dollars to install at the MWGen Stations and may not be feasible to install at Will County Station due to the interference of high voltage power lines in the only available space. It would be wildly inefficient to suffer those costs, only to have the technology become irrelevant once the Board approves thermal alternative effluent limits for these stations.

Also, as the Board has recognized previously, the waterbodies provide especially poor habitat for aquatic species that are thermally sensitive. They are artificially constructed, and the repeated dredging and unnatural flow patterns maintained in the waterway to accommodate barge traffic and for flood control purposes are highly disruptive to aquatic life. And even though when it selected the UDIP use a few years ago, the Board thought that future habitat improvement projects could allow the UDIP to attain that designation, there are no prospects for that work to be completed during the period of TLWQS relief requested here. Thus, because the UDIP is not currently attaining its use designation based on one or more of the factors set forth in the use attainability analysis regulation and this petition proposes the required “highest attainable condition” for thermal standards that can be achieved during the requested TLWQS period, as well as satisfying all other requirements for a TLWQS variance under the new Board rules, MWGen requests that the Board grant the relief requested for the MWGen Stations.

II. PROCEDURAL HISTORY

A. The Designated Uses of the CSSC and UDIP

The CSSC, which is the receiving stream for the Will County Station’s thermal discharge, was formerly designated as a Secondary Contact and Indigenous Aquatic Life Water (“Secondary Contact Waters”) under the Illinois use designation system in Part 303 of 35 Ill. Adm. Code.¹ It shared this designation with the Brandon Pool and the UDIP portion of the Lower Des Plaines River (“LDPR”), the receiving stream for the Joliet Stations.² Due to their inherent limitations, these and other waterbodies designed as Secondary Contact waters were regulated by a set of water quality standards that were less stringent than the General Use water quality standards that applied to most waters of the state. Both waterways are heavily influenced by hydromodification, channelization, alterations in flow, and wastewater discharges. These and other factors dramatically limit the kinds of aquatic life that can be maintained there.

Since the adoption of the Secondary Contact Waters standards in the 1970s, water quality improved over the years as the result of point source discharge controls, including wastewater control technology improvements by publicly owned treatment works (“POTWs”) and the

¹ See Map below at Section IV.C.1.

² See Map below at Section IV.C.2.

initiation of large-scale engineering projects to limit the frequency with which raw sewage enters the waterway during storm events. These changes led to a rulemaking proceeding before the Board to revise the applicable designated uses and standards. On October 26, 2007, the Illinois Environmental Protection Agency (“IEPA”) filed two use attainability analyses (UAAs) with the Board, and submitted that the UAAs indicated that the CSSC, Brandon Pool, UDIP, and other portions of the CAWS had attained, or had the potential to attain, higher designated recreational and aquatic life uses under the Clean Water Act (the “CWA”) than that provided by the Secondary Contact Waters designation (the “UAA Rulemaking”). *See 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, PCB R08-9* (filed Dec. 26, 2007).³

The ensuing UAA Rulemaking lasted several years and consisted of several subdockets to address the respective recreational and aquatic life use designations and associated water quality standards for the CAWS. Ultimately, the Board redesignated the CSSC from a “Secondary Contact and Indigenous Aquatic Life” water to a “Chicago Area Waterway System Aquatic Life Use B” or “ALU B” water. 35 Ill. Adm. Code 303.240.

For the CSSC, the Board concluded that, “while water quality has improved in the CSSC and as a result, a greater number of fish species have been documented as occurring, problems persist” Subdocket C, *First Notice*, at 196. Indeed, when the waters were assessed using two common biological indices—the IBI score (which measures fish populations) and the MBI, or macroinvertebrate biotic index—the waterway still produced “poor to very poor” quality. *Id.*

In justifying its decision not to designate the CSSC as a General Use water, the Board applied the “UAA Factors” found at 40 C.F.R. § 131.10(g)(1)-(6), which lists conditions that may prevent a waterway from attaining the General Use designation. In the case of the CSSC, three of these factors were met – Factors Three through Five. Factor Three, which looks to human-caused sources of pollution, was met because the waterway had abnormally low dissolved oxygen (“DO”), plus elevated levels of total nitrogen, oil and grease, total phosphorous, iron, and heat. *See*

³ For simplicity, all other citations to the UAA Rulemaking will refer to the subdocket, a condensed title of the filing, and the page number.

Subdocket C, *First Notice*, at 196.⁴ Factor Four, which looks to whether “[d]ams, diversions or other types of hydrologic modifications” prevent the waterway from attaining a designated use (*see* 40 C.F.R. § 131.10(g)(4)), was met because the system of locks and dams in the waterway produced irregular flow patterns as a necessary part of the waterway’s use for barge traffic. Subdocket C, *First Notice*, at 194-96. These irregular flows would strand fish on a shoreline during surges in flow and also produced indirect disruptions to aquatic life by aggravating some forms of pollution, like contaminated sediments. *Id.* Very low or no flow conditions caused water to be unnaturally heated by ambient temperatures.

The Board found that Factor Five was also met, based on the waters being “artificially constructed or channelized, straight, deep-draft, steep walled shipping channels with little or no fixed aquatic or overhanging riparian vegetation.” *Id.* at 194. These qualities significantly compromised the habitability of the waterway, producing very low Qualitative Habitat Evaluation Index (QHEI) scores in the range of 27 to 40.5.⁵ *Id.* at 195.

The ALU B use was also applied to a portion of the LDPR, specifically the part of that waterbody “from its confluence with the [CSSC] to the Brandon Road Lock and Dam (Brandon Pool).” 35 Ill. Adm. Code 303.235(b)(3)(B). The Board found impairments in the Brandon Pool substantially similar to those in the CSSC.

The Board found a different designated aquatic life use appropriate for the UDIP, which stretches from the Brandon Road Lock and Dam to the I-55 Bridge. The Board noted that the UDIP was not meeting General Use aquatic life goals. Despite having more favorable conditions than the CSSC, the UDIP’s IBI score for fish populations came to an average score of 20.5, right on the boundary between “poor” and “very poor.” *Id.* at 217. Nonetheless, the Board determined that none of the UAA Factors indicated that this impairment was irreversible.

⁴ The Board observed that the DO levels might be produced by thermal effluent in the waterway, but it ultimately concluded that “wet weather impacts due to discharges from the Racine Avenue Pumping Station and many CSOs are the primary factors contributing to lower DO levels.” *Id.*

⁵ QHEI scores can range from 0 to 100. A score above 60 is generally consistent with the goals of the Clean Water. Scores between 45 and 60 show that the waterway is impaired, and that down grading of the waterway’s designated uses might be appropriate if the stream segment is “irretrievably modified.” A score below 45 indicates a waterway that cannot attain warm water habitat biocriteria and has modifications that are generally severe and widespread. *See* UAA Rulemaking, *IEPA 2007 Rulemaking Petition*, Appendix A, at p. “4-24.”

The Board found that, despite being immediately downstream from ALU B waters, the UDIP waters generally had better conditions, although the conditions were somewhat limited. For instance, the predominance of manmade pollutants, such as copper, mercury, fecal coliform, and zinc, were not as severe as that found further upstream. *Id.* at 219-20. Dissolved oxygen also seemed to be less of an issue in the UDIP, which managed to comply with the General Use standard 99.8% of the time. *Id.* at 219.

The Board also declined to find that the UDIP had a significantly compromised habitat that would prevent attainment of the CWA's fishable goals. The UDIP has a "fair amount" of natural shoreline and side channels, plus the mouths of several tributaries. *Id.* at 218. That said, the Board found that, like some of the ALU B waters, the UDIP "is impounded, which reduces stream velocity and creates a deep-water habitat that is not optimum for a diverse benthic macroinvertebrate community." *Id.* Thus, for most of the main channel, the main channel border, and the border, QHEI scores averaged below 50, which is at the lower end of impaired habitats. *Id.* at 219. Only in smaller tailwater sections of the waterway, comprising about 7% of the UDIP, did the QHEI scores rise above 60.

The Board concluded that the UDIP had the potential to attain the CWA's fishable goals in the future because IEPA's studies held out hope that "improvements in in-stream cover and riparian buffers could potentially improve QHEI scores to above the recommended . . . value of 60." *Id.* at 219. And, although the main channel of the UDIP did indeed present poor habitat, the Board appeared to agree with IEPA testimony that "in a large river a relatively small, localized amount of critical habitat can provide a large influence in sustaining overall fish community." *Id.* Or, in other words, the UDIP's habitat should be judged by the best pockets of habitat, rather than the UDIP as a whole.

Finding that none of the UAA Factors applied, the Board considered designating the UDIP as a General Use water, but it ultimately decided against this approach, because it would have caused General Use water criteria to go into immediate effect in the waterway, and the Board did not want this "unintended consequence." Subdocket C, *Proposed Second Notice*, at 50. The Board specially noted that it understood that the UDIP might be regulated under an alternate set of thermal criteria. *Id.* at 41. Indeed, even though IEPA thought that the UDIP "minimally" met the CWA aquatic goals, it did not argue that the General Use thermal standards should apply—indeed, it proposed an alternate set of limits for the UDIP.

So instead of designating the UDIP as a “General Use” water, the Board created a unique designation—“Upper Dresden Island Pool Aquatic Life Use Waters”—associated with the following uses:

These waters are capable of maintaining, and shall have quality sufficient to protect, aquatic-life populations consisting of individuals of tolerant, intermediately tolerant, and intolerant types that are adaptive to the unique flow conditions necessary to maintain navigational use and upstream flood control functions of the waterway system. Such aquatic life may include, but is not limited to, largemouth bass, bluntnose minnow, channel catfish, orangespotted sunfish, smallmouth bass, shorthead redhorse, and spottail shiner.

Id. at 303.230(a).

B. The Board Establishes Water Quality Standards for the CSSC, Brandon Pool and UDIP

In Subdocket D of the CAWS UAA Rulemaking, the Board turned to the question of what thermal standards would apply in ALU B waters and UDIP waters. The IEPA, certain citizens groups and MWGen each proposed different thermal water quality standards for these waters. MWGen proposed three alternative standards for thermal conditions in the waterway and supported them with reports from its environmental consultant EA Engineering Science, and Technology, Inc. (EA). The Board, however, declined to adopt the MWGen proposed standards or those proposed by the Agency and other stakeholders. Although MWGen’s reports indicated that the existing thermal discharges did not pose a threat to fish found in the CSSC and UDIP, the Board found the reports had not adequately accounted for “intolerant” species of fish that might populate the waterway in greater numbers if the thermal regime changed. Subdocket D, *Second Notice*, at 72. Also, the Board was concerned that IEPA and other interested parties had not been given an adequate opportunity to rebut the MWGen report.

MWGen also argued that the studies underlying the adjusted thermal standard for the waters downstream from the I-55 Bridge (which are General Use waters), showed that the adjusted thermal standard would be appropriate if applied to the UDIP and CSSC. The Board, however, declined to rely on those studies, noting that they had been conducted when there were two additional generating stations utilizing the CAWS, Fisk and Crawford. The Board concluded that “further evaluation based on the current conditions of the waterways” was needed. Subdocket D, *First Notice*, at 209.

The Board ultimately concluded that the General Use thermal standards should nominally apply in both UDIP and ALU B waters. These standards were significantly more stringent than the previous Secondary Contact standards. However, the Board set a three-year delayed applicability date on these thermal standards.⁶ The Board again noted the need to “allow resolution of variance issues at the federal level and provide clarity to affected dischargers.” Subdocket D, *Second Notice*, at 77. A three-year delay, noted the Board, would allow dischargers like MWGen “time to determine their compliance options, including operational changes, treatment options, CWA Section 316(a) thermal demonstrations, or site-specific thermal standards.” *Id.*

C. MWGen’s Petition for Variance

On July 21, 2015, MWGen filed a Petition for Variance for the Will County and Joliet Stations. The Petition was based on Section 35 of the Act and the variance regulations at 35 Ill. Adm. Code Part 104, Subpart B. The requested variance would run for two years, between July 1, 2018 and June 30, 2020. (July 1, 2018, being the date on which the new thermal standards would become “applicable” to the CSSC, Brandon Pool and UDIP.) In this filing, MWGen noted that in addition to seeking a temporary variance for thermal discharges for those stations, it would also begin collecting physicochemical, biological and plant operating data to support a petition for an alternative thermal effluent limit pursuant to Section 316(a) of the CWA and 35 Ill. Adm. Code Part 106, Subpart K.

On February 24, 2017, Illinois Governor Bruce Rauner signed Public Act 99-937 into law, and it went into effect immediately. (It has since been codified at 415 ILCS 5/38.5.) This legislation authorized the Board to issue TLWQSs and empowered the Board to promulgate regulations detailing the substantive requirements that need to be satisfied before a TLWQS can be adopted. On its date of enactment, the new law automatically converted all pending petitions for variances from water quality standards (including MWGen’s 2015 petition) into TLWQS petitions. 415 ILCS 5/38.5(c).

On March 16, 2017, the IEPA filed a response to MWGen’s petition and advised the Board that, should it become necessary for MWGen to amend its petition, the Board should set a deadline of 90 days after the Board promulgated regulations governing TLWQS relief.

⁶ As a formal matter, the new thermal standards went into “effect” in July 2015. But the Board’s regulations state that those standards do not become “applicable” to the CSSC, Brandon Pool, and UDIP until July 2018.

On April 12, 2017, the Board ruled that MWGen's "converted" variance petition did not substantially comply with Section 38.5(e) of the Act. (The Board issued noncompliance rulings in all of the "converted" petitions, which was expected, as they were written based on Section 35 standards that were no longer applicable.) Agreeing with the IEPA's suggestion, the Board allowed MWGen to amend its petition within 90 days of the Board's adoption of TLWQS regulations. Finally, because other companies discharge thermal effluent into the waterbodies covered by MWGen's petition, the Board established a class of thermal dischargers that may be covered under the TLWQS petition:

heated effluent dischargers into Chicago Sanitary and Ship Canal, and Upper Dresden Island Pool, including Flint Hills, Midwest Generation (Will County Station, Joliet 9 Station, and Joliet 29 Station), and Stepan Chemical as the class of dischargers that may be covered by a time-limited water quality standard for temperature under Section 38.5(f) of the Act; Exxon Mobil as a potentially-affected discharger, subject to the [IEPA]'s further evaluation

PCB 16-19, at 2 (Apr. 12, 2017).

On August 9, 2017, the IEPA proposed regulations governing TLWQS petitions to the Board, and a rulemaking proceeding commenced under Docket R18-18. The Board accepted the proposal and issued a First Notice on August 17, 2017. A public hearing was held on October 10, 2017. The Board made further revisions to the proposal after the hearing, issued the revised regulations as Second Notice and transmitted them to the Illinois Joint Committee on Administrative Rules (JCAR) on February 8, 2018. The Board made additional changes based on recommendations from JCAR and issued a Final Order and Opinion on April 26, 2018. The regulations became effective on April 27, 2018.

D. MWGen's Petition for an Alternative Effluent Limit for Will County Station

In addition to filing the 2015 variance petition, MWGen acted quickly on the Board's UAA Subdocket D suggestion to obtain alternative thermal limits for the MWGen Stations affected by the new thermal standards. On October 7, 2015, pursuant to the early screening requirements of 35 Ill. Admin. Code 106, Subpart K, MWGen submitted a Conceptual Study Plan to the IEPA. Subsequently, MWGen and its consultant, EA, met with IEPA on November 4, 2015, to discuss the plan. Based on comments received from the IEPA on its Conceptual Study Plan, MWGen filed a Detailed Study Plan for the Will County Station on December 3, 2015. ("Will County DSP"). IEPA approved the Will County DSP by letter dated March 3, 2016. After IDNR's questions

regarding certain aspects of the DSP were satisfactorily addressed, the IDNR also approved it by email dated June 9, 2016.

The implementation of the Will County DSP began immediately. Because it typically takes at least two years to conduct the studies described in the DSP, and new thermal standards for the CSSC would become applicable on July 1, 2018, MWGen obtained the approval of IEPA, in consultation with U.S. EPA Region 5, for two changes to the DSP that expedited its completion. One change allowed use of the two years of recently collected fisheries data (2015 and 2016) instead of using data collected during 2016 and 2017, as outlined in the original DSP. The other change allowed the use of both new 2016 habitat data and previously collected habitat data, replacing the requirement to collect additional habitat data from these same locations in 2017.⁷ A copy of the modified Will County DSP is attached as Exhibit A. Upon the completion of the Will County Station 316(a) Demonstration Report, it was submitted to the IEPA for review and comment prior to filing MWGen's Subpart K Petition with the Board on January 26, 2018. Will County Station's Subpart K Petition is pending a decision by the Board.⁸

E. MWGen's Ongoing Thermal Demonstration Studies for the Joliet Stations

MWGen began pursuing an alternative effluent limit for the Joliet Stations alongside its efforts on behalf of Will County Station. On October 7, 2015, pursuant to the early screening requirements of 35 Ill. Admin. Code 106, Subpart K, MWGen submitted a Conceptual Study Plan to the IEPA for the Joliet Stations. Then, MWGen and EA, met with IEPA on November 4, 2015, to discuss the Plan. Based on input received from IEPA, MWGen filed separate Detailed Study Plans for Joliet 9 and Joliet 29 on December 4, 2015. Copies are attached as Exhibits B and C.

⁷ On March 1, 2018, IDNR advised the IEPA that it had reviewed the demonstration and agreed that the alternative thermal effluent limits would not affect any threatened or endangered species. On May 15, 2018, IDNR advised the Board that (1) it concurred with IEPA's conclusion that the alternative thermal effluent limit would not injure the balanced, indigenous, community in the CSSC, (2) that modifications to the Will County DSP made in December 2016 with the IEPA's consent were justified, and (3) that information concerning this modification was present in MWGen's petition for an alternative thermal effluent limit.

⁸ The revised version of the Demonstration Report submitted with the Petition addresses all comments received from the IEPA. MWGen also submitted a copy of the Demonstration Report to the U.S. EPA on January 10, 2018. As of this filing, it has not received any comments or questions regarding the report from the U.S. EPA.

(For simplicity, the two plans will be referred to as the “Joliet DSP.”) IEPA approved both plans on March 3, 2016.

IDNR provided comments via email on March 7, 2016. A conference call to discuss IDNR’s comments occurred on April 19, 2016 and MWGen responded on May 15, 2016. IDNR responded to MWG’s comments on June 8, 2016, stating it had “no further concerns and look[ed] forward to the study results and opportunity for further comment in the 316(a) process.”

The Joliet DSP called for sampling to be conducted in the UDIP and Five-Mile Stretch during the calendar years of 2016, 2017, and 2018. The DSP cautioned that the sampling period might need to be extended if unusual meteorological conditions and/or atypical station operations interfered with the collection of useful data. It further cautioned that the 2016 data, some of it collected prior to the start of the Joliet Stations’ new mode of peaker operations, would not be representative of the UDIP’s thermal regime once the stations were operating. Exhibit B, Joliet 9 DSP, at 25.

Joliet Station operations are the primary reason why the Joliet DSP has extended out over a longer period than the Will County DSP. The Joliet Stations were out of operation for several months in 2016, as they converted their fuel source from coal to natural gas. This project was not completed until June 1, 2016. After conversion to natural gas, the Stations would begin operating as “peakers,” generating only during periods of peak system electrical demand. The collection of the needed two-years of study data under the Joliet DSP needed to await operations in the new “peaker” mode. Given that the foreseeability of peaker plant operations is uncertain because periods of peak electrical demand are not predictable, the new peaker mode of operation of the Joliet Stations also made difficult scheduling the collection of useful DSP data. And, even when the Joliet Stations were running, efforts were made to time the DSP such that Will County Station also was operating in order to collect data when all three stations were operating simultaneously. When EA attempted to collect data in December 2016, it was soon discovered that the data would not be practically useful, primarily because the Joliet Stations did not run for a long enough period of time to create “mature” thermal data. (Typically, a run of three days is needed.) MWGen notified IEPA of the problem, and the IEPA supported MWGen’s proposal to delay the winter work until January/February 2017.

But, because of the relatively mild 2017 winter, electrical demand remained low through much of the winter, and the Joliet Stations were not run at all during January 2017. Eventually, to

avoid further postponement of the winter DSP work, MWGen planned to put the Joliet Stations into operation so that representative instream conditions could be created to allow two rounds of sampling in February (15th to 17th and 22nd-23rd). These operations were conducted at a significant loss (\$810,882.27) to MWGen, due to the low compensation that PJM Interconnection (the regional transmission organization for Illinois and several other states) was offering to generators on those particular days. And unfortunately, only the second run produced useful sampling data—the first run was compromised when one of the generating units at the Joliet Stations was shut down due to a steam leak. (By contrast, Will County Station was able to conduct all of its needed winter thermal studies in winter 2016-2017.)

The second, and final, thermal plume survey and the second winter fish survey were completed at the Joliet Stations on December 14, 2017, which was the first time that the Stations went into operation that month. Although the Joliet Stations operated in late December 2017 and early-to-mid January 2018, EA was unable to access the waterway during that time, because the boat ramps along the UDIP were inundated by ice. By the time the ice had cleared, the Joliet Stations were no longer in operation.

The Joliet DSP originally proposed conducting at least four winter fish surveys. At present, EA has been able to complete only two such surveys. The Joliet DSP approved schedule calls for an additional round of winter fish sampling in December 2018. If this sampling occurs and produces sufficient data, EA believes that the three rounds of winter fish sampling should be sufficient to form the basis of a thermal demonstration. EA has advised the IEPA of this conclusion, and the IEPA advised it does not object.

Ongoing work on the Joliet Stations DSP will continue in 2019. The prospective analysis, which EA has already begun, should be complete by April 2019. EA estimates it will complete the development of proposed alternative effluent limits by June 2019. MWGen estimates that the proposed alternative effluent limits will be submitted to the IEPA in August 2019. If the IEPA is able to complete its review of the proposed limits in approximately ninety days, MWGen projects that Subpart K thermal alternative effluent limits petitions for the Joliet Stations will be filed with the Board not later than January 2020.

EA has completed a full summary of its work to date, the necessity of the additional data to form robust conclusions on the effects of the Stations' thermal discharge, and the impossibility of collecting that data in the three years following the completion of the UAA Rulemaking. This

summary, which includes specific plans for how this data will be collected and analyzed, is attached as Exhibit D.

F. Tentative Conclusions Regarding the UDIP and Five-Mile Stretch

Although studies are still underway, EA has collected enough data that it can reach tentative conclusions. Perhaps the most important conclusion is that sustained periods of cooler temperatures in the waterway (driven by extended shutdowns of the Will County and Joliet Stations for maintenance and/or modifications) have not resulted in the appearance of the thermally intolerant species anticipated by the UDIP Use designation. In particular the populations of white sucker and the *Moxostoma* (redhorse) species in the UDIP have remained at historical levels.

| Taxa | UDIP Catch Rates | | Five-Mile Stretch Catch Rates | |
|-----------------------|------------------|-----------|-------------------------------|-----------|
| | 1994-2015 | 2015-2016 | 1994-2015 | 2015-2016 |
| White Sucker | 0-1.4 | 0.4-0.6 | 0-0.4 | 0-0.3 |
| <i>Moxostoma</i> spp. | 0.1-2.0 | 1.0-1.7 | 0.3-7.2 | 0.5-1.0 |

Table 1 - Catch Rates of Thermally Sensitive Aquatic Life in UDIP

Also, elevated temperatures in water can indirectly harm aquatic life by decreasing the DO levels in the water below chronic or acute levels. But EA’s work has reached the tentative conclusion that MWGen’s thermal discharges to the UDIP do not produce this effect. Water quality monitoring in the UDIP has found only 4 sampling events (of 1,119 samples collected from 1994 to 2016) where DO levels went below the UDIP chronic standard. Sampling in the Five-Mile Stretch has also only found about one to five measurements per year that go below standard, and most of these occurred in backwater areas, where the thermal plume has minimal influence. Accordingly, neither the UDIP nor the Five-Mile Stretch has been designated as impaired for DO in any 305(b)/303(d) list from 2004 to the most recent 2018 draft list.

Thus, it is not the case that MWGen’s thermal demonstration study is just a shot-in-the-dark intended only to try to prolong the regulatory stay under Section 38.5. There is a strong likelihood that once fully collected, the fish sampling and thermal data will demonstrate that the current operating conditions of the Will County and Joliet Stations results in thermal effluent that assures the protection of a balanced, indigenous community of aquatic life in the UDIP and Five-Mile Stretch.

A complete discussion of EA’s tentative conclusions is available in Exhibit D.

III. LEGAL STANDARDS APPLICABLE TO RELIEF

Section 303 of the CWA requires Illinois to adopt water quality standards⁹ for navigable waterways within its jurisdiction. 33 U.S.C. § 1313. Generally, those water quality standards must allow for a broad set of aquatic and recreational uses, but if one or more those uses have been shown to be unattainable the states are authorized to adopt standards that reflect that reality. 40 C.F.R. §§ 131.5(a)(7), 131.5(a), 131.10(j), and 131.20(a).

To permanently remove an unattainable designated use, states must conduct a “Use Attainability Analysis” using the six factors outlined in 40 C.F.R. § 131.10(g) (the “UAA Factors”). The UAA Factors provide the allowed reasons for a finding of unattainability, any one of which is sufficient to support such a finding:

- (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 substantial and widespread economic and social impact.

⁹ When used in federal law and regulations, the phrase “water quality standards” typically includes both the establishment of designated uses for intrastate waters as well as the promulgation of criteria necessary to protect these uses. But in Illinois law, the term “water quality standards” is used *solely* to refer to the specific numeric or narrative criteria that have been adopted to protect the existing designated uses. This petition uses the narrowed meaning.

*Id.*¹⁰

A. Time-Limited Water Quality Standard Variances

While a UAA may remove a use, there are federal and Illinois processes for temporarily removing a use. 40 C.F.R. § 131.14; 35 Ill. Admin. Code Part 104, Subpart E. This is done through the creation of a TLWQS variance.¹¹ A TLWQS may be set for a specific period of time or may run indefinitely.¹² 40 C.F.R. § 131.14(b)(1)(iii)-(v).

The purpose of a TLWQS is to encourage regulators to pursue higher designated uses for compromised waterways even where it is uncertain that one or more impairments can ever be improved to the point where that higher use is actually attained:

The purpose of a [TLWQS] variance is to allow states and authorized tribes to make incremental progress toward attaining designated uses that are not currently attainable but *may be* attainable in the future. When used appropriately, [TLWQS] variances can provide a regulatory mechanism to improve water quality when a designated use cannot be attained in the near term, but a state . . . wants to maintain the designated use as a long term goal.

U.S. EPA, *Water Quality Standard Regulatory Revisions: Response to Public Comments*, Docket #: EPA-HQ-OW-2010-0606, Essay 8, at p. “3-298” (Aug. 2015) (emphasis added) (hereinafter “U.S. EPA Essay 8”).¹³

A TLWQS must satisfy one of the same UAA Factors as a permanent use change. *Id.* at § 131.14(b)(2)(i)(A)(1). But a TLWQS petition can be based on a narrower technical demonstration than one would see in support of a permanent use change in a UAA matter, because

¹⁰ Alternatively, a discharger can seek to demonstrate that the TLWQS is needed to cover a period of lake, wetland, or stream restoration through dam removal or other significant reconfiguration activities, where those attainment of the designated use and criterion would be precluded while the activity is ongoing. 40 C.F.R. § 131.14(b)(2)(i)(A)(2); *see also* 35 Ill. Admin. Code 104.560(a)(7).

¹¹ The federal regulations do not use the term “time-limited water quality standard.” Instead they use the term “Water Quality Standard Variance” or “WQS Variance.” *See* 40 C.F.R. § 131.14. Although the two kinds of variances are not identical in every respect, the differences are minor, and so they are both referred to here as “TLWQS variances.”

¹² But a TLWQS that is projected to last longer than five years must be subject to a schedule for reevaluation. 40 C.F.R. § 131.14(b)(1)(iv)-(v).

¹³ Available at <https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OW-2010-0606-0344&attachmentNumber=23&contentType=pdf>

generally “the data and analyses often needed to support adoption of a TLWQS could be less complex and require less time and resources compared to removing a designated use because many TLWQS’s evaluate only one parameter for a single permittee for a limited period of time.” *Water Quality Standards Regulatory Revisions*, 80 Fed. Reg. 51020, 51024 (Aug. 21, 2015) (preamble to final rule).

TLWQS variances are thought to be especially appropriate in two situations. The first is when it is known that a waterbody’s designated use and criterion are unattainable today (or for a limited period of time) but feasible progress could be made toward attaining the designated use and criterion. *Water Quality Standards Regulatory Clarifications*, 78 Fed. Reg. 54518, 54532 (Sept. 4, 2013) (preamble to proposed rule). So, for instance, a waterbody might be impaired by excess nutrient loading from municipal treatment plants that cannot be reduced without causing a substantial and widespread economic impact. But if there is evidence suggesting that a higher designated use might be achievable in the future, perhaps due to the development of more cost-effective control technology or a change in local economic conditions, a TLWQS variance may be more appropriate. *See U.S. EPA, Discharger-Specific Variances on a Broader Scale*, EPA-820-F-13-012, at 3 (Mar. 2013) (attached as Exhibit E).

The second situation is when there is uncertainty regarding whether the designated use is attainable at all, especially when it is unclear whether increased restrictions on dischargers can overcome ongoing waterbody impairments from natural and/or irreversible anthropogenic causes. In those cases, a TLWQS variance could allow time to answer this question, and the studies might ultimately support a permanent change in the designated uses of the waterway. U.S. EPA, Essay 8, p. “3-306.”¹⁴ Alternatively, if it is discovered that the waterbody has unique characteristics that could allow for exceedances of a particular criterion without compromising a current or future designated use, then the studies might be used to develop a site-specific criterion. *Id.*

B. Illinois TLWQS Requirements

Both Section 38.5 of the Act and the Board’s new regulations at 35 Ill. Admin. Code, Part 104, Subpart E, generally track the substantive requirements from the federal CWA regulations.

¹⁴ *See also* U.S. EPA, *Guidance: Coordinating CSO Long-Term Planning with Water Quality Standards Review*, EPA-833-R-01-002, at 34 (July 2001), (“[TLWQS Variances] provide a ‘bridge’ if additional data or analyses are needed before the state can make a determination that a designated use is not attainable and adopts an alternative use.”), *available at* https://www3.epa.gov/npdes/pubs/wqs_guide_final.pdf.

The state regulations do have minor differences in wording. For instance, the Illinois rules authorize TLWQSs in instances where the discharger or dischargers demonstrate “a substantial and widespread negative economic and social impact on the public,” which is different phrasing from the federal regulations. *Id.* at 104.560(a)(6). *Compare* 40 C.F.R. § 131.10(g)(6) (“... would result in widespread economic and social impact.”). The Board has clarified, however, that the two phrasings carry the same meaning. *Order and Opinion*, R:18-18, pp. 3-4 (Apr. 26, 2018).

The procedural requirements for Illinois TLWQS relief are dramatically different from the federal procedural standards. Subpart E creates a role—filled here by the IEPA—that does not exist in the federal regulations. *Id.* at 104.550. The Illinois regulations also have a screening provision, the “substantial compliance review,” that is not present in the federal regulations. *Id.* at 104.545. Illinois has also generated specific content requirements for TLWQS petitions that are consistent with, but go into much more detail than, the federal regulations. *Compare* 35 Ill. Admin. Code 104.530, *with* 40 C.F.R. § 131.14(b)(2).

C. TLWQS Case Studies

Prior to the enactment of Section 38.5 of the Act, Illinois dischargers facing unreasonable hardship if forced to comply with particular effluent limits could seek a variance under Section 35 of the Act. But Section 35 relief was based on different standards than those found in the new TLWQS standards in Section 38.5, and so there are no direct Board precedents applying the TLWQS criteria. Still, Section 38.5 is based on the same federal TLWQS regulations that other states mirror, and so there is some value in looking at experience from those jurisdictions. MWGen has identified cases from other jurisdictions that granted relief under circumstances that were similar to what MWGen seeks here. The cases are relevant both because the jurisdictions, at the time, had regulations that were closer in form to the federal regulations than Illinois had, and the variances were approved by the U.S. EPA.

1. Case Study: Colorado

Colorado refers to its TLWQS regulations as “Temporary Modifications.” Although these regulations are phrased differently from the federal or Illinois regulations, they are consistent with them. A “Temporary Modification” may be granted if:

- (i) an existing permitted discharge has a demonstrated or predicted water quality based effluent limit compliance problem, and
- (ii) one of the following is shown to exist:

- A. there is significant uncertainty regarding the water quality standard necessary to protect current and/or future uses
- B. there is significant uncertainty regarding the extent to which existing quality is the result of natural or irreversible human-induced conditions.

Colo. Water Reg. No. 31.7(3)(a).¹⁵

Typically, Colorado's section 31.7(3)(a)(ii)(A), or "Type A," is met when significant uncertainty exists regarding whether the adopted water quality standard goes beyond what is required to protect the existing or future use designation for a particular waterbody.¹⁶ By contrast, section (ii)(B), or "Type B," covers situations where there is uncertainty about the underlying cause, or causes, of the existing water quality and additional studies are needed to derive a defensible standard. The TLWQS allows the discharger time to conduct a site-specific criteria study or, in some cases, a UAA. *Id.*

Colorado's "Temporary Modification" regulations predate U.S. EPA's promulgation of formal TLWQS regulations in 2015. But that rulemaking was a codification of past Agency practice, relying on Office of General Counsel memos going back as far as 1977. *See also* 40 C.F.R. § 131.13 (1983) (allowing States to grant "variances"). Nor are Colorado's regulations a departure from U.S. EPA practice: They are simply an elaboration on how TLWQS variances can be appropriate when existing uncertainty about present or future conditions in a regulated waterbody could be resolved by further study. This is consistent with the U.S. EPA's own guidance that TLWQS variances are appropriate where "[t]he state . . . does not know whether the designated use and criterion may ultimately be attainable . . ." *See* Exhibit E, U.S. EPA, *Discharger-Specific Variances on a Broader Scale*, at 3. And, as discussed below, U.S. EPA has repeatedly approved Colorado's Temporary Modifications, even as recently as October 2017.¹⁷

¹⁵ Available at https://www.colorado.gov/pacific/sites/default/files/31_2018%2801%29.pdf.

¹⁶ Colorado provides as an example the following "Type A" situation: When a standard would be more relevant to a particular waterbody if it used a water-effect ratio to take site-specific conditions into account. *See* Fact Sheet: Colorado Temporary Modifications (attached as Exhibit F).

¹⁷ Although it is not included as a case study here, the U.S. EPA has held out a temporary modification granted to Sand Creek, in central Colorado, as a success story. *See* U.S. EPA, *Watershed-Based NPDES Permitting: Rethinking Permitting as Usual*, EPA-833-F-03-004 (May 2003) (brochure) (attached as Exhibit H). This temporary modification was intended to allow for time to "develop and implement a study during the temporary modification period to collect more information to better understand the sources of selenium in the Sand Creek watershed and to

The Colorado Water Quality Control Commission applied the “Type B” standards in reviewing a TLWQS petition it received from the “Nucla Station,” a coal-fired power plant that discharges into the San Miguel River in western Colorado. Like the CSSC and UDIP waters here, the Nucla Station discharged to a receiving water that had erratic flow conditions, making it difficult for the plant to use a mixing zone to achieve compliance with the local thermal criteria. Also, Colorado distinguishes between “cold water” aquatic life use waters and “warm water” aquatic life use waters and had classified this portion of the river as “cold water” even though portions of it had relatively high ambient temperatures, especially in the winter. Nucla’s owners, Tri-State Generation and Transmission Association, Inc., initially asked that the whole segment be redesignated as a “warm water” aquatic life use. *Written Testimony of Tri-State Generation and Transmission Association, Inc., In Re Water Quality Classifications and Standards and Designations for the Gunnison and Lower Dolores River Basin*, June 12, 2006 (Exhibit G). The Colorado Water Quality Control Division opposed this, arguing that the upstream portions of the segment were properly designated as “cold water,” and that even though the downstream portions could become warm during low-flow conditions, that was not a sufficient basis to redesignate them as “warm water” aquatic life use. *Water Quality Control Division’s Comments on and Discussion of the Proposed Changes to Regulation 35, Segment 4 of the San Miguel River, for Classification and Numeric Standards, as Related to Temperature and Aquatic Life* (Apr. 4, 2006) (Exhibit J).

The Commission ultimately adopted a compromise position. The river segment was split into two segments, with the upstream segment receiving no changes in thermal standards. The downstream segment was redesignated as “Cold Water – Class 2” which is a classification that recognizes limits in species diversity caused by physical habitats and erratic water flows. See Colo. Water Reg. 35.21, *Statement of Basis*, at 70-71.¹⁸

At the time, the Colorado water standards “cold water” segments had identical thermal criteria, regardless of whether they were Class 1 or 2—as is the situation here for the Use B, UDIP Use and General Use waters. To address the lower level of protection appropriate for the downstream, newly designated “Cold Water – Class 2” use, the Nucla Station received a temporary

determine appropriate site-specific selenium standards.” U.S. EPA, *Watershed-Based Permitting Case Study: Sand Creek Watershed, Colorado*, at 3 (July 2007) (attached as Exhibit I).

¹⁸ Available at https://www.colorado.gov/pacific/sites/default/files/35_2017%2812%29.pdf.

modification that provided less stringent thermal standards for its thermal discharges to the downstream portion of the river segment. But this relief was based on the existing “uncertainty as to the appropriate underlying standard” and it was conditioned on Nucla Station’s owner conducting “studies designed to address whether [the Station’s] discharge has an adverse impact on the aquatic community.” *Id.* at 71. On October 30, 2006, U.S. EPA approved the Nucla temporary modification, agreeing that “[t]his type of temporary modification was adopted . . . to allow time for collection of additional data necessary to complete a review of the numeric temperature standard for that segment.” U.S. EPA, *Revisions to Regulations 34, 35 and 38*, “Enclosure 1,” at p. 7 (Oct. 30, 2006) (Exhibit K.)

Nucla Station completed its thermal studies in 2010 and returned to the Commission to request permanent revisions to the classification of the downstream segment as well as site-specific thermal standards. The Commission agreed that, unlike the earlier data, the new studies showed that the “cold water” use classification was indeed inappropriate to the downstream segment. Furthermore, the collected data showed that the existing thermal conditions in the downstream segment were “not causing harm to the aquatic community based on fish and macroinvertebrate data collected” See Colo. Water Reg. 35.33, *Statement of Basis*, at p. 76.

The Colorado Department of Parks and Wildlife (CPW) recently obtained similar relief for a portion of the Arkansas River in southeastern Colorado. The river segment is immediately downstream from the Pueblo Reservoir and can feature abnormally high temperatures depending on the timing of releases from the Pueblo Reservoir. See *CPW Prehearing Statement, December 2016 Rule-Making Hearing* (Oct. 4, 2016) (Exhibit L). Despite this, the segment was designated as a habitat for cold-water aquatic life, as cold-water fish like rainbow trout and brown trout were found in the waterway despite routine exceedances of chronic summer and winter temperature standards.

CPW sought a temporary modification to clarify the situation. For instance, it was not well-understood whether the cold-water trout were successfully reproducing in the waterway despite the temperature regime, or whether their populations were produced entirely by restocking efforts. In 2017, the Colorado Water Quality Control Commission approved a 4.5-year temporary modification to complete these studies, noting that the studies might ultimately be used to develop

a “site-specific standard.” See Colo. Water Reg. 32.58, *Statement of Basis*, at p. 145.¹⁹ U.S. EPA Region 8 approved the temporary modification on October 12, 2017. U.S. EPA, *Re: EPA Action on Three Sets of Revisions to Water Quality Standards*, “Enclosure 3,” at p. 14 (Oct. 12, 2017) (Exhibit M).

The Colorado regulations also anticipate that the studies justifying the temporary modification can take longer than anticipated, and Regulation 31.7 allows for the Colorado Water Quality Commission to extend the expiration date of the TLWQS where appropriate. See Colo. Water Reg. 31.7(3)(f)(iii). One of the most recent examples of this provision being utilized came in 2017, when the Commission reviewed an already-existing temporary modification of the statewide temperature standard as applied to a segment of the Arkansas River (called “Middle Arkansas Segment 6b”). This temporary modification had been requested by the Colorado Public Service Company in 2013 to resolve the uncertainty around the appropriate temperature standard and possibly provide support for a site-specific standard.

In 2015, the company notified the Commission that it had begun suffering “data losses” that had delayed the project. See *Pre-Hearing Submission of Public Service Company*, Temporary Modifications of RMH, at 5 (Oct. 4, 2016) (attached as Exhibit N). Specifically, large data gaps had been created during storm events when excessively large flows prevented the flow measurement instrumentation from logging data or when the data loggers became buried in sediment and produced inaccurate data. But, the company emphasized that it had made significant progress and detailed the steps that it planned to take to complete its study. The Commission approved the extension of the temporary modification on January 9, 2017. See Colo. Water Reg. 32.58, *Statement of Basis*, at p. 145. U.S. EPA Region 8 approved the extension of the temporary modification on October 12, 2017. U.S. EPA, Exhibit M, “Enclosure 3,” at p. 14.

Customarily, dischargers will file study plans with the Commission detailing the information already collected, and outlining the additional studies needed, and the estimated time to complete those studies. See, e.g., *Technical Memo: Temperature Monitoring on the St. Charles River for Public Service Company of Colorado, Comanche Plant* (Oct. 3, 2016) (Exhibit O). This is why, although there is no corresponding requirement in Illinois regulations, MWGen has included with this petition a letter from its environmental consultant, EA, which provides an

¹⁹ Available at https://www.colorado.gov/pacific/sites/default/files/32_2018%2801%29.pdf.

overview of the studies conducted to date and the additional studies that still need to be completed as part of the approved Joliet DSP. (Exhibit D.)

2. Case Study: Texas

Extensions of water quality variances can be found in other states as well. In 1998, a plywood mill in Texas was found to have aluminum in its effluent in excess of the statewide numerical limits.²⁰ The mill had no realistic way to limit this: The aluminum originated in local soils, not the manufacturing process. The mill conducted preliminary studies that confirmed that the aluminum originated in the soil, and that if a less-sensitive method for assessing aluminum content (a partitioning coefficient) was used to establish the mill's effluent limits, there would be no harm to aquatic life. But, more extensive studies, particularly a "Water Effects Ratio" study, would be needed to confirm that a site-specific criterion for aluminum was appropriate, and the study would take years to conduct.

EPA Region 6 granted a TLWQS variance for the mill to conduct these studies, and incorporated these requirements into the facility's permit, with the expectation that the Water Effects Ratio study would be complete by August 2001.

But due to operational changes at the plant, the study could not be completed in time. So, Texas requested a three-year extension of the variance. The U.S. EPA granted the extension, subject to additional conditions, such as monitoring and reporting requirements for aluminum. Ultimately, in 2005 the mill was able to present its completed studies and obtained a site-specific criterion for aluminum.

D. Alternative Effluent Limits under § 316(a) of the Clean Water Act

MWGen believes that the Will County and Joliet Stations can achieve long-term compliance with the new use designations for the CSSC and UDIP through thermal demonstration studies. This approach is consistent with federal law and, as the Colorado and Texas case studies show, it is consistent with past practice by state regulators and approvals by U.S. EPA. The CWA

²⁰ Many of the primary documents related to this variance are not available online. MWGen's knowledge is based on a narrative summary prepared by a U.S. EPA contractor using information obtained from primary documents and informal interviews with EPA regions. The U.S. EPA placed this document into the administrative docket of the 2015 Clarification Rule. *See* U.S. EPA 2011b *Variance Compendium*, at 15-17 (Jan. 24, 2011), available at <https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OW-2010-0606-0110&contentType=pdf>.

recognizes the importance of electricity generation and has sought to balance the dissipative needs of generating stations with the needs of aquatic life.²¹ This culminated in Section 316(a) of the CWA, which grants special relief to thermal dischargers.

With respect to any point source . . . whenever the owner or operator of any such source, after opportunity for public hearing, can demonstrate to the satisfaction of the Administrator (or, if appropriate, the State) that any effluent limitation proposed for the control of the thermal component of any discharge from such source will require effluent limitations more stringent than necessary to assure the projection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made, the Administrator (or, if appropriate, the State) may impose an effluent limitation under such sections for such plant, with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water.

CWA Section 316(a), *codified at* 33 U.S. Code § 1326(a).

The context behind Section 316(a) is important: Prior to 1972, dischargers would face enforcement actions for harm caused by their discharges only if a direct causal link could be established between the defendant's effluent and a decrease in the water quality in their receiving waters. Establishing this correlation in waterways with large numbers of dischargers proved impractical, and so Congress passed amendments shifting the focus of the federal water pollution laws to effluent limitations, rather than the ultimate effect of the effluent on the waterway. *See EPA v. California ex rel. State Water Res. Control Bd.*, 426 U.S. 200, 202-03 (1976).

But, this shift occurred at a time when federal water pollution laws did not define heat as a pollutant, and while the laws were being revised, a significant debate began over whether thermal discharges should be regulated, and if so, whether these regulations would produce significant disruption in American industry, particularly at generating stations.²²

²¹ Although the CWA was known at the time as the Federal Water Pollution Control Act, this detail is set aside for clarity.

²² Senator Daniel Patrick Moynihan, speaking during debate on the 1977 Amendments to the CWA noted the continued need for special treatment for thermal effluent:

My primary concern, for the moment, is the thermal effluent from steam electric powerplants The treatment of thermal discharges

Ultimately, lawmakers worked out a compromise: Heat would be treated as a pollutant, but would receive unique treatment, in that dischargers could press for lower effluent limits by making a demonstration that elevated thermal discharges would not have a significant effect on the waterway. In essence, heat would be regulated under the pre-1972 standard, except with the burden of proof shifted to the discharger. So while it was no longer tenable to presume that thermal effluent had no ecological effects, Congress chose to adopt an approach that “avoid[s] unnecessary capital expenditure, and thus needless higher costs to the consumer while assuring adequate protection of the aquatic environment.” Statement of House Conferees to H.R. 3199, *reprinted in* 3 Congressional Research Service, *Legislative History of the Water Pollution Control Act Amendments of 1977*, at 365-66 (1978).

At least one legislator also made the point that generating stations, the primary generators of thermal effluent, were different from many other industries in that there were relatively few point sources nationally. As a result, while regulators lacked the resources to take special consideration of discharger-specific conditions for every NPDES permit, they would not be overtaxed if generating stations could request that their thermal effluent limitations take these issues into account. October 4, 1972 House Debate on H. Res. 1146, Comments of Rep. Clausen, Member of Conference Committee, *reprinted in* 1 Congressional Research Service, *Legislative History of the Water Pollution Control Act Amendments*, at 263-64 (1973).²³ Furthermore, power

presents a special problem because of important economic and energy considerations. It costs \$60 to \$100 million to retrofit a cooling tower on a single powerplant. In addition, it can take 24 or more months to complete the construction, at time during which the plant must be removed from operation for 6 months. This has implications for the reliability of the impacted electrical system.

Senate Debate: August 4, 1977, *reprinted in* 4 Congressional Research Service, *Legislative History of the Clean Water Act of 1977*, at 1044 (1978).

23

[Rep. Clausen:] Two basic arguments for the technological standards which do not apply to the same level in the case of heat as they do for other pollutants are national uniformity and ease of enforcement. With regard to national uniformity, a basic technological standard requires that all sources of the discharge of pollutants would be required to meet the same effluent limits. This requirement . . . would preclude owners and operators of industrial facilities from moving their facilities to a location with less stringent

plants are highly immobile due to their need to limit transmission distances, and so there was no need to worry that less stringent thermal standards in one waterway would result in power generators relocating there to take advantage of the relief. *Id.*

IV. REQUIRED CONTENTS OF PETITION

In substantial compliance with the petition content requirements of 35 Ill. Adm. Code 104.530, MWGen provides the following information:

A. Statement Indicating Type of TLWQS Sought (Section 104.530(a)(1))

The Board's TLWQS regulations allow for three types of TLWQS: single discharger, multiple discharger, and watershed/waterbody segment. Consistent with the Board's prior order, MWGen is requesting a multiple discharger variance for the class of thermal dischargers including itself, Flint Hills Resources ("FHR"), Stepan Chemical ("Stepan") and possibly ExxonMobil.

B. Map of the Proposed Waterbody and Written Description (Section 104.530(a)(4))

This petition covers a single, contiguous water body in Will and Grundy Counties. The Illinois Section 303(d) list subdivides this waterway into three portions, GI-02 (a portion of the CSSC), G-12 (the LDPR), and G-24 (Des Plaines River). However, as explained below, the petition does not pertain to the entirety of GI-02 or G-24.

A map showing the CSSC and the UIDP within the larger context of the Chicago Area Waterway (taken from the Board's UAA proceeding) is provided in Exhibit P. Two maps showing the portion of the CSSC involved here (with the location of the Will County Station denoted) is

water quality control requirements. Because steam-electric generating plants are the major source of the discharges of heat, this argument has reduced validity. Such plants are intended to supply the power requirements for specific areas which are closely regulated by the Federal Power Commission and they cannot be moved too far from their consumers because of the high cost of transporting base load requirements.

Id. at 263; *see also* October 4, 1972 House Debate on H. Res. 1146, Comments of Rep. Johnson, member of Conference Committee, *reprinted in* 1 Congressional Research Service, *Legislative History of the Water Pollution Control Act Amendments of 1972*, at 267 ("This agreement recognizes that heat is different from solid or suspended pollutants because of its temporary and localized nature, and permits consideration of the dissipating capacities of the receiving waters, on a case-by-case basis.").

provided in Exhibit Q. Two maps of the UDIP, including the location of each member of the class of thermal dischargers, is provided in Exhibit R. And finally, two maps of the Five-Mile Stretch portion of the water body immediately downstream of the UDIP are provided in Exhibit S.

1. CSSC and Brandon Pool

Will County Station's thermal discharges do not affect the majority of the CSSC which runs from Damen Street Bridge to the Lockport Dam. However, under low flow conditions, it is possible for the effect of the thermal discharge to extend immediately upstream of the Station's outfall location. Accordingly, in the CSSC, the TLWQS proposed water body extends from the U.S. Army Corps of Engineers' (USACE) Electric Dispersal Barrier complex at River Mile 296.25, downstream through the Brandon Pool to the Brandon Lock & Dam at River Mile 285.5. These waters are entirely within Will County, Illinois.

2. UDIP

The TLWQS requested in this petition continues downstream to cover the entirety of the UDIP, as it is defined in 35 Ill. Admin Code 303.230(a). This spans the LDPR from the Brandon Road Lock and Dam (River Mile 285.5) to the I-55 Bridge. These waters are entirely within Will County, Illinois.

3. "Five-Mile Stretch" of the Lower Des Plaines River

The Board has adopted an adjusted standard applicable to the MWGen Stations thermal discharges at the I-55 Bridge, which is the beginning of the portion of the LDPR called the "Five-Mile Stretch." This stretch of the LDPR runs from the I-55 Bridge (River Mile 277.9) to the head of the Illinois River (formed by the confluence of the Des Plaines River and the Kankakee River, at River Mile 273.0). The Five-Mile Stretch straddles the border between Grundy County and Will County.

C. Location of the Petitioners' Activity and the Location of the Points of Its Discharge. (Section 104.530(a)(3))

1. Will County Generating Station

Will County Station is a coal-fired generating station located in Romeoville, Illinois, near the intersection of the CSSC and 135th Street. For most of its operating history, the Station consisted of 4 generating units, known as Units 1 through 4, with an 1,154-megawatt capacity and a design circulating water flow rate of approximately 1,292 million gallons per day ("MGD"). Units 1 and 2 were permanently retired in August 2012. In April 2015, Unit 3 was taken offline

and will remain offline until energy market conditions make its resumed operation economically reasonable.

Unit 3 has a rated production capacity of 268 megawatts of electricity (“MWe”). Unit 4, which was added to the station in 1963, has a rated production capacity of 542 MWe. Units 3 and 4 have a combined design circulating water flow rate of approximately 864 MGD, but the average discharge volume is approximately 750 MGD. The design temperature rise in the circulating cooling water across the station is approximately 11.1°F.

The Will County Station’s discharge canal enters the CSSC at River Mile 295.4.

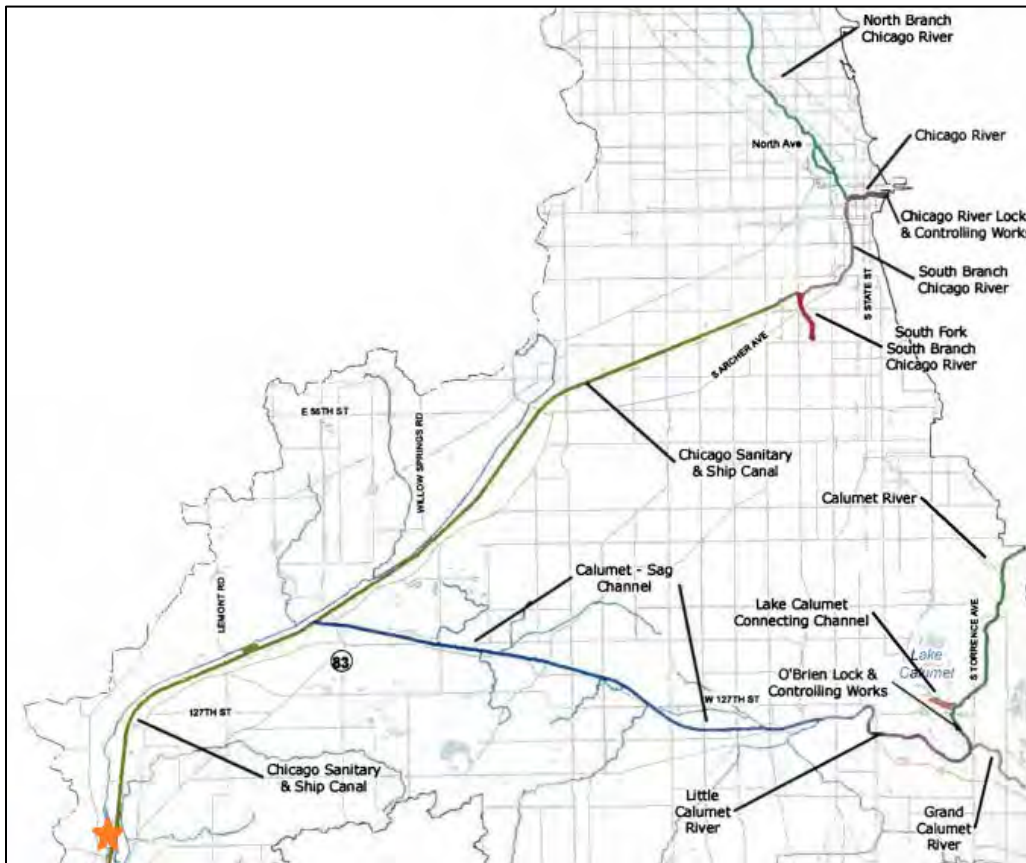


Figure 1 - Map of CAWS - The Location of Will County Generating Station is Marked with a Star

2. The Joliet Stations

Joliet Station 9 (initially constructed in 1920, with Unit 6 added in 1959) and Joliet Station 29 (constructed in 1964) are in Will County, Illinois, approximately one mile southwest of the City of Joliet, adjacent to the LDPR in the UDIP.

Joliet Station 9 has a single generating unit, Unit 6, capable of producing 341 MWe and with a design circulating water flow rate of approximately 376 MGD. The design maximum

temperature rise in the circulating cooling water is approximately 10.45° F. Joliet Station 29 has two generation units, Units 7 and 8. Units 7 and 8 can produce 566 MWe and 561 MWe, respectively, for a total of approximately 1100 MWe for both units. Its design circulating water flow rate is approximately 1,325 MGD. The design maximum temperature rise in the circulating cooling water is approximately 12.4° F.

The Joliet Stations' wastewater outfalls, including condenser cooling wastewater, are located approximately seven miles north of the I-55 Bridge on opposite sides of the LDPR. Joliet Station 9 is on the east bank of the river and Joliet Station 29 is on the west bank. Both of their thermal discharges flow into the LDPR approximately one-half mile downstream of the Brandon Road Lock and Dam. The discharge canal for Joliet 9 enters at River Mile 284.9, and the discharge canal for Joliet 29 enters at River Mile 284.6.

Prior to 2016, the Joliet Stations used coal as their fuel source and operated year-round. In 2016, each was converted to using natural gas, and thus operate as “peakers”—active only during times of high energy demand. This conversion did not affect their design flow rate, design temperature rise, or design power output.²⁴

²⁴ Based on the terms of the gas conversion construction and operating permit issued for the Joliet Stations, the stations are no longer limited to a maximum gross megawatt output as in prior permits but are subject to air emission limits. However, the removal of the maximum gross megawatt output has not resulted in any significant increase in the power output levels of the Joliet Stations.



Figure 2 - Map of Affected Waterway from Lockport Dam & Lock to I-55 Bridge

3. Additional Members of Class of Thermal Dischargers

The additional parties who wish to be covered by this multi-discharger petition will be providing information on their operations in separate pleadings, per 35 Ill. Admin. Code 104.530(d).

D. Identification of the Designated Uses of the Waterbody and the Currently Applicable Water Quality Standards for the Pollutant or Parameter for which a TLWQS is Sought. (Sections 104.530(a)(2), and (a)(5))

1. Aquatic Life Use B, UDIP Aquatic Life Use, and General Use

The current aquatic life use designations and water quality standards for the CSSC and UDIP arose from the multi-year UAA rulemaking for the CAWS and the Lower Des Plaines River. As explained in Sections II.A & II.B above, in February 2014, the Board adopted new aquatic life use designations for the CAWS and the UDIP portion of the LDPR. *See* Subdocket C, *Final Order*. For all but the water segment known as Bubbly Creek,²⁵ the Board replaced the Indigenous Aquatic

²⁵ 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. *Id.* Although the Board did subsequently

Life use designation and created three new aquatic life use designations in its place: ALU A for certain segments of the CAWS; ALU B for the CSSC and the Brandon Pool; and the “UDIP” use for the upstream portion of the Dresden Pool. In adopting these new aquatic life use designations (and the previously updated recreational use designations for these waters), the Board noted that they reflect the advancement of the stream quality but that many sections of CAWS and also the UDIP still need to be improved to achieve the goals of the CWA. Subdocket D, *Second Notice*, at 69.

ALU B is a lower aquatic life use designation than the UDIP Use. ALU B waters “are not capable of attaining an aquatic life use consistent with the section 101(a)(2) of the Clean Water Act goal” because the waterway is an unsuitable habitat for many intolerant species. 35 Ill. Adm. Code § 303.235(b)(2). This designation is defined in the regulations as follows:

Waters designated [ALU 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.

35 Ill. Adm. Code 303.240.

The UDIP aquatic life use is the highest of the three new aquatic life use designations.²⁶ The Board acknowledged that the “UDIP may not fully attain the CWA aquatic use goal but that in comparison to ALU A or ALU B waters, it “has more diverse habitat conditions and is subject to a lesser degree of recurring impacts from navigation use and upstream flood control functions.”²⁷ The Board also recognized that whatever UDIP thermal standards were ultimately adopted might need to be adapted for certain dischargers. Subdocket C, *First Notice*, at 43.

promulgate thermal standards for Bubbly Creek (*see* 35 Ill. Adm. Code § 302.408), they are not part of the 2018 Thermal Standards referenced in this petition.

²⁶ The UDIP use designation regulations provides that UDIP waters “are capable of maintaining, and shall have quality sufficient to protect, aquatic-life populations consisting of individuals of tolerant, intermediately tolerant, and intolerant types that are adaptive to the unique flow conditions necessary to maintain navigational use and upstream flood control functions of the waterway system.” See 35 Ill. Adm. Code § 303.230(a).

²⁷ See Subdocket D, *Final Order*, at 22, citing Subdocket C, *Second Notice*, at 55.

The “Five-Mile Stretch” downstream from the I-55 Bridge was not affected by the UAA proceeding. It was a General Use water both before and after the proceeding.

2. Previously Applicable Thermal Water Quality Standards

Prior to the new 2014 aquatic life use designations, the Illinois aquatic life use classification system, was composed of essentially two classifications: General Use and Indigenous Aquatic Life. *See* 35 Ill. Adm. Code Part 303. General Use waters can attain the Clean Water Act aquatic life goals. The broad General Use category protects water bodies capable of supporting all aquatic life and all recreational uses. There is no differentiation among aquatic communities or the physical characteristics of a water body within the General Use thermal standards. *See id.* at § 303.201. In contrast, waters designated as Indigenous Aquatic Life were specifically recognized as not being capable of attaining the Clean Water Act’s fishable/swimmable goals.²⁸ The Indigenous Aquatic Life use designation recognized that only highly tolerant aquatic life, suited to the “physical configuration” and elevated contaminant levels could habitate in the CSSC and LDPR at the time the designation was created. And because these species were generally tolerant of elevated temperatures, the water quality standards associated with the “Indigenous Aquatic Life” use were significantly different from those applicable to General Use waters. The Indigenous Aquatic Life standards allow for temperature maximums of 93° Fahrenheit (F) year-round, while General Use standards adopted 90°F maximums, with 60°F maximums during the winter (December through March) months.²⁹ The Indigenous Aquatic Life standards also allowed for a greater excursion range (seven degrees F versus three) and a higher percentage of excursion hours (five percent versus one) over a twelve-month period. The General Use thermal standards also include narrative temperature restrictions not included in the Indigenous Aquatic Life standards. The narrative standards prohibit “abnormal temperature changes that may adversely harm aquatic

²⁸ “Secondary contact and indigenous aquatic life standards are intended for those waters not suited for general use activities but which will be appropriate for all secondary contact uses and which will be capable of supporting an indigenous aquatic life limited only by the physical configuration of the body of water, characteristics and origin of the water and the presence of contaminants in amounts that do not exceed the water quality standards listed in Subpart D.” 35 Ill. Adm. Code § 302.402 (2014).

²⁹ The Indigenous Aquatic Life thermal water quality standards are set forth in 35 Ill. Adm. Code § 302.408. The General Use thermal water quality standards are set forth in 35 Ill. Adm. Code § 302.211.

life,” disruption of “normal daily and seasonal temperature fluctuations,” and any temperature rise more than 5° F above naturally occurring temperatures. 35 Ill. Adm. Code § 302.211(b)-(d).

3. Thermal Water Quality Standards for ALU B and UDIP Use

In Subdocket D of the UAA Rulemaking, the Board evaluated what thermal standards to apply to the new aquatic life use designations. The Board concluded that none of the thermal standards proposals by the IEPA or other participants were appropriate for various reasons. *See* Subdocket D, *Final Order*, at 6. The Board found the proposed standards were overly stringent, based on outdated data sets, did not adequately account for all potential “intolerant” species, and/or that other participants in the proceeding had not had an adequate opportunity to rebut them. In the absence of an appropriate thermal standards proposal, the Board decided that the existing, already federally-approved General Use thermal standards should instead be applied. However, the Board extended the applicability date of the new thermal standards to July 1, 2018, in recognition of the compliance challenges raised for thermal dischargers by the Board’s decision to apply the more stringent General Use thermal standards:

The Board appreciated 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. The Board found that delaying the effective date of the thermal standards would allow time for dischargers to achieve compliance or seek relief.

Id.

Therefore, the Board adopted a three-year delayed applicability date for thermal standards for all three of the new use designations and decided that the existing Indigenous Aquatic Life thermal standard will continue to apply to these waters during the delayed applicability date period.³⁰ *See* 35 Ill. Adm. Code § 302.408(b). These new thermal standards will be referred to as the “2018 Thermal Standards.”

³⁰ *Id.* at 24.

| Month | Prior Secondary Contact Standards & Interim 35 IAC § 302.408(b) Standards (effective 1 July 2015-30 June 2018) | 2018 Thermal Standards (Applicable July 1, 2018) |
|------------------------|---|--|
| | Daily Maximum | Daily Maximum |
| | (°F) | (°F) |
| January | 93 | 60 |
| February | 93 | 60 |
| March | 93 | 60 |
| April | 93 | 90 |
| May | 93 | 90 |
| June | 93 | 90 |
| July | 93 | 90 |
| August | 93 | 90 |
| September | 93 | 90 |
| October | 93 | 90 |
| November | 93 | 90 |
| December | 93 | 60 |
| Excursion Hours | Shall not exceed 93°F more than 5% of the time, or 100°F at any time | Shall not exceed maximum limits during more than 1% of the hours in the 12-month period ending with any month; At no time shall water temperature exceed the maximum limits by more than 3.0°F |

Table 2 - Comparison of Secondary Contact Thermal Standards and New Thermal Standards

4. Adjusted Thermal Water Quality Standards for the Five-Mile Stretch

In 1996, Commonwealth Edison (“ComEd”), the previous owner of the MWGen Stations, sought an adjusted thermal standard pursuant to 35 Ill. Adm. Code 304.141(c) and CWA Section 316(a). The requested relief was granted by the Board in 1996 pursuant to Section 28.1(c) of the Act. *See* AS 96-10, dated October 3, 1996 (amended March 16, 2000). The Board granted the adjusted thermal standards after ComEd “presented adequate proof” that the impact of its facilities on water temperatures past the I-55 Bridge did not cause nor could be reasonably expected to cause significant ecological damage to the waters of the Five-Mile Stretch. *See* Opinion and Order of the Board in AS 96-10, at 7 (Oct. 3, 1996); *see also*, Response of the Illinois EPA to the Amended Petition of Commonwealth Edison Company Adjusted Standard from 35 Ill. Adm. Code 302.211 (d) and (e) filed in AS 96-10.

The AS 96-10 Standards are in-stream temperature limits applicable at the I-55 Bridge location and consist of a numeric monthly/semi-monthly temperature limits which vary on a seasonal basis. The adjusted standards are not more lenient than the 2018 Thermal Standards across-the-board. The adjusted standards are identical to the numeric 2018 Thermal Standards during the months of January and February, late May, early June and September. They are more lenient in March and December, within 1°F of the numeric 2018 Thermal Standards during late June, July and August and more stringent than the General Use standards for the remaining periods of the year (*i.e.*, April, early May, October and November).³¹

| Month | AS 96-10 Standards | 2018 Thermal Standards |
|------------------------|---|--|
| | Daily Maximum (°F) | Daily Maximum (°F) |
| January | 60 | 60 |
| February | 60 | 60 |
| March | 65 | 60 |
| April 1-15 | 73 | 90 |
| April 16-30 | 80 | 90 |
| May 1-15 | 85 | 90 |
| May 16-31 | 90 | 90 |
| June 1-15 | 90 | 90 |
| June 16-30 | 91 | 90 |
| July | 91 | 90 |
| August | 91 | 90 |
| September | 90 | 90 |
| October | 85 | 90 |
| November | 75 | 90 |
| December | 65 | 60 |
| Excursion Hours | Shall not be exceed more than 3°F during 2% of the hours in the 12-month period ending December 31, or 93°F at any time | Shall not exceed maximum limits during more than 1% of the hours in the 12-month period ending with any month; At no time shall water temperature exceed the maximum limits by more than 3.0°F |

Table 3 - Comparison of AS 96-10 Thermal Standards and General Use Thermal Standards

³¹ The AS 96-10 Standards are not, however, subject to the General Use numerical limits and the narrative standards in 35 Ill. Adm. Code 302.211(d) and (e), which limit monthly temperatures and the maximum temperature rise above natural temperatures up to 5°F or less.

The AS 96-10 Standards have been incorporated into the MWGen Stations' NPDES permits since the Board granted them.

Applicability of the AS96-10 Standards was transferred to MWGen by the Board on March 16, 2000. AS 96-10, Opinion and Order of the Board, dated March 16, 2000. Since that time, MWGen has performed annual physicochemical and biological studies of the waterway in order to determine whether there are any adverse impacts from the thermal discharges on the resident aquatic community. The monitoring data collected during these annual studies is submitted to IEPA each year and continues to serve as the basis for the continuation of the AS96-10 Standards.

E. Identification, Including the Board's Docket Number, of any Prior Water Quality Standards Variances / Time-Limited Water Quality Standards Issued to the Petitioner, Watershed, Waterbody, Waterbody Segment, and, if Known, the Petitioner's Predecessors Concerning Similar Relief. (Section 104.530(a)(8))

1. AS 96-10

As discussed above, in Section IV.D.4, the Five-Mile Stretch has been subject to an adjusted standard since 1996.

2. Provisional Variances

Limited provisional thermal variances have been granted to MWGen, but only from the AS 96-10 Standard. In July 2011, pursuant to Illinois EPA Order 12-03, during a time of very hot weather and high energy demand, a provisional variance was granted that lasted for fewer than 4 days and there were no exceedances of the maximum limit of 96° F allowed under the provisional variance. In July 2012, pursuant to Illinois EPA Order 12-20/rev. Order No. 13-10,³² MWGen was granted a 10-day provisional variance from temperature standards due to the widespread heat and drought conditions in the Midwest causing high energy demand and elevated temperatures in the receiving waters. This provisional variance was subsequently extended an additional 10 days by Illinois EPA when this exceptionally hot and dry period continued, along with high energy

³² A review of the Board's "E Library" records on its website indicates that the Board renumbered certain of the docket numbers shown on the Illinois EPA's proposed provisional variance orders as filed with the Board. Accordingly, both the original docket numbers assigned by the Agency and, where applicable, the Board's revised docket numbers are provided.

demand.³³ An additional provisional variance was obtained to cover a very hot portion of August 2012. IEPA Order 12-26/rev. Order No. 13-14.

MWGen’s predecessor, ComEd petitioned the Board for a variance for similar relief on four occasions, the last of which occurred in the 1990s. Based on a search of available historical records, MWGen has determined that the Board granted ComEd at least the following provisional variances from the thermal water quality standards:

| Date | Description of ComEd Provisional Variance | PCB Order No. |
|------------|--|---------------|
| 10/17/1996 | 45-day provisional variance to Commonwealth Edison for its facilities located in Will and Cook counties from the temperature standards and interim temperature limitations in Special Condition #5 of NPDES Permit No. IL0064254 for the Joliet Station #29, and from the temperature limitations as set forth in 35 Ill. Adm. Code 302.211(d) and (e), 304.141(a) and from the interim temperature limitations in PCB 91-29, subject to conditions. | PCB 97-072 |
| 9/7/1995 | 18-day provisional variance extending PCB 96-26 | PCB 96-51 |
| 8/3/1995 | 32-day provisional variance extending PCB 95-183 | PCB 96-26 |
| 6/29/1995 | 25-day provisional variance from thermal limits contained in Special Condition 9 NPDES Permit IL0002216; Joliet Station 29 NPDES Permit No. IL0064254; Will County Station NPDES Permit No. IL0002208 | PCB 95-183 |

Table 4 - ComEd Provisional Variances

F. Data Describing the Nature and Extent of the Anticipated Failure to Meet the Water Quality Standard and Facts Supporting Petitioner’s Argument that Compliance with the Water Quality Standards Regulation Cannot be Achieved by Any Required Compliance Date. (Section 104.530(a)(6))

1. CSSC

On MWGen’s behalf, EA conducted quantitative hydrothermal modeling to predict thermal conditions in the Will County Station’s receiving waters under various operating and ambient flow conditions. EA’s demonstration study includes a three-dimensional hydrodynamic mathematical model (MIKE 3) that was developed, calibrated and validated using actual measured data from prior and current thermal plume studies performed at Will County Station which increases the reliability of the modeling results. It was used to estimate ambient temperatures under

³³ The only other provisional variance granted to MWGen did not involve thermal relief. In September 2001, the Board granted MWGen a 45-day provisional variance from the total suspended solid effluent standards at 35 Ill. Adm. Code § 304.124(a) to allow MWGen to retire three existing intra-plant sluice water transport lines and to replace them with two new larger lines and associated valves at Joliet 29 Station.

various weather, canal flow, and Station thermal plume conditions (including six representative flow and temperature scenarios). The hydrothermal modeling effort provided predictive information regarding worst-case scenarios, as well as more typical thermal compliance scenarios, under the expected range of conditions under which the Station operates during the summer and winter.

This modeling is being used to support Will County Station's pending Subpart K petition for an alternative thermal effluent limit. *See* PCB 2018-058 (filed Jan. 26, 2018). On March 12, 2018, the IEPA recommended approval of the petition, based in part on EA's hydrothermic modeling. On May 15, 2018, IDNR advised the Board that it concurred with the IEPA's conclusion that the alternative thermal effluent limit would not injure the balanced, indigenous, community in the CSSC.

These studies indicate that compliance with the 2018 Thermal Standards' summer limits would not be consistently assured. During typical summer conditions, and with favorable canal flows, the Will County Station is not expected to exceed the 90°F thermal standard outside its 26-acre mixing zone. But, under "worst case" summer conditions (historically high intake temperatures combined with chronically low waterway flows), there might not be enough flow available in the CSSC to dissipate discharge temperatures, and the Station would be unable to consistently meet an edge-of-mixing-zone limit of 90°F.

The 2018 Thermal Standards do allow for excursion hours (1% of the hours in any 12-month period, equivalent to approximately 87 hours per year), but this does not meaningfully increase Will County Station's ability to comply. The small number of allowable excursion hours provided by the 2018 Thermal Standards would be entirely insufficient to support Station operations during both the summer and winter months, especially if unseasonal weather patterns and/or low flow conditions persisted during a given year, as they last did in 2012.

With respect to the zone-of-passage requirements in 35 Ill. Adm. Code 302.102(b)(8), the Will County Station thermal plume studies conducted in the waterway in 2011 and 2016/early 2017 all showed that a zone of passage of greater than a 50% was maintained, despite erratic flow conditions in the CSSC. However, the conservative thermal plume modeling conducted as part of the Will County demonstration study indicates that the Station's thermal discharge will not be able to comply with the 75% zone-of-passage requirement at all times in every portion of its 26-acre mixing zone when high ambient temperatures coincide with relatively

lower flow conditions in the CSSC. In fact, because the dilution ratio swings above and below 3:1 effectively at random, assessing compliance with the existing zone-of-passage standards is often difficult. For this reason, the Will County Station is requesting as part of its pending Subpart K petition that the minimum zone-of-passage requirement under Section 302.102(b)(8)—as reflected in the Station’s NPDES permit—be modified to allow a 50% ZOP or greater, at all times.

2. UDIP

Based on the data currently available from the Joliet DSP work by EA, it is reasonably expected that, like Will County Station, the Joliet Stations will not be able to comply with the 2018 Thermal Standards under low flow and elevated ambient temperatures, even though they now operate at a dramatically lower capacity factor than they did before their conversion to natural gas and “peaker” operation. Shown in Exhibit T, there have been intermittent periods in the 2012 and 2013 where the hourly ambient water conditions at the Joliet Stations, as measured at the intake for Joliet 9, exceeded the General Use thermal standards even before the water passed through the Stations. Also, by their nature, summer peaker operations tend to occur at times when ambient temperatures are highest (and energy demand is highest), so the effects of the new peaker operating mode on the Joliet Stations’ ability to meet General Use thermal standards remain uncertain until the completion and evaluation of the data that is being gathered as part of the Joliet DSP.

EA reviewed operating data for the FHR, Stepan, and Exxon Mobil facilities, including temperature and flow discharge data, covering the last several years of operations. EA’s preliminary conclusions are that each of these dischargers require minimal assimilative capacity in the UDIP receiving waters to maintain compliance with the applicable thermal standards during typical conditions. The three dischargers have design flow rates that are very small when compared with the flow rate of the waterway:

| Discharger | Flow Rate |
|-------------------------|--------------------|
| FHR | 3.6 cfs (design) |
| Stepan | 1.36 cfs (design) |
| Exxon Mobil | 16.24 cfs (design) |
| LDPR 7Q10 ³⁴ | 1,453 cfs |

Table 5 - Comparison of Downstream Dischargers

³⁴ Seven-Day low flow in a 10-year period.

EA also has compared the discharge monitoring reports (DMRs) for FHR, Stepan, and ExxonMobil, to the temperatures recorded at the I-55 Bridge. It found that in the summer, when the Will County and Joliet Stations are likely to use more of the waterway's assimilative capacity, Stepan and FHR tend to produce thermal effluent that is nearly the same temperature as the water at the I-55 Bridge.

This was also true for ExxonMobil in 2012-2014, but over the last three summers it has had measured outfall temperatures that are higher than the temperatures measured at I-55. But, from 2012 to the present, the summer temperatures at I-55 have held steady or decreased, which would support the conclusion that Exxon's discharge is too small to have a meaningful effect on downstream temperatures—and thus, has either no or a very small need for assimilative capacity in the water to maintain compliance with the 2018 Thermal Standards.

The Stepan thermal discharge is always a higher temperature during the winter months than the corresponding main river temperature, as measured at the I-55 Bridge which is approximately 2 River Miles downstream of the Stepan discharge. During the summer months, the Stepan discharge is similar to the temperature of the main river. Because Stepan's Design Average Flow (DAF) for its Outfall 001 is only 0.88 MGD (1.36 cfs), and the lower Des Plaines River 7Q10 is 1,453 cfs, EA has preliminarily concluded that there should be sufficient assimilative capacity for the facility to meet both summer and winter UDIP numeric limitations. However, Stepan's existing NPDES permit contains a special condition that does not allow a mixing zone, and so it is not currently adversely affected by the use of assimilative capacity by upstream dischargers.³⁵ But EA's preliminary evaluation of the Stepan discharge data indicates that Stepan may need an allowed mixing zone to maintain consistent compliance with the 2018 Thermal Standards.

As described in Section II.E, MWGen and EA have been working diligently to gather the information needed to perform necessary modeling work to evaluate the ability of the MWGen Stations and the three downstream thermal dischargers to comply with the 2018 Thermal Standards in the UDIP under both facility "worst case" operating conditions and receiving water "worst case" conditions. But more time is needed to complete this effort. The demonstration study being conducted in accordance with the Joliet DSP will also complete the evaluation of the above-presented preliminary conclusions regarding the available assimilative capacity of the receiving

³⁵ Plus, Stepan does not draw process water from the UDIP (it uses well water), and so ambient water temperatures do not affect its end-of-pipe temperatures.

waters to allow for consistent compliance at the edge of an allowed mixing zone for the respective downstream thermal discharges from FHR, Stepan, and ExxonMobil. It will also evaluate whether the General Use narrative thermal criteria, 35 Ill. Admin. Code 302.408(c)-(f), are being met under “worst case” conditions in the waterbody, and whether those criteria are more stringent than necessary to protect a balanced, indigenous, population of aquatic life throughout the waterway.

3. Five-Mile Stretch

As described above, MWGen sought provisional variances during “worst case” conditions in 2012, when abnormally high ambient temperatures coincided with low flow conditions in the waterway. Had the provisional variances not been obtained, the thermal standards created by AS 96-10 would have been exceeded.

There generally are lower heat loadings to the CSSC and UDIP now than in 2012. The Fisk and Crawford Generating Stations were retired on August 28, 2012, and August 30, 2012, respectively.³⁶ In 2012, the Will County Station had two generating units in operation and has since “mothballed” Unit 3.

Until the Joliet DSP work is completed, MWGen is unable to determine with a reasonable degree of certainty whether the MWGen Stations’ thermal discharges will or will not consistently attain compliance with the General Use Thermal Standards applicable at the I-55 Bridge. There were no exceedances of either the AS 96-10 or General Use standards in 2016 or 2017, but neither of these years presented particularly challenging compliance conditions in terms of ambient temperatures, low flow and station operating conditions. Consequently, MWGen will not know whether it can maintain compliance with the 2018 Thermal Standards under “worst case” conditions until EA completes the studies outlined in the Joliet Stations’ DSP.

³⁶ While the coal-fired boilers at Fisk have been retired, there are still eight oil-fired combustion turbines located at the site. These units are limited to a collective 20,000 MWh/year of generation and operate less than 200 hours per year as a group. They do not generate wastewater.

G. Demonstration that attainment of the designated use or uses and criterion or criteria is not feasible throughout the term of the TLWQS because of one or more of the factors listed in Section 104.560 (Section 104.530(a)(9))

1. UAA Factor 3

a. CSSC and Brandon Pool

During the Subdocket C proceedings of the CAWS UAA rulemaking, the Board closely evaluated available information on the CSSC. It ultimately concluded that the available evidence demonstrated that water quality problems related to “Factor Three” prevented the attainment of CWA Goals in the CSSC. The Board noted that under the 2004 Illinois 305(b) Report, the CSSC was already regarded as impaired by PCBs in fish tissue, ammonia (unionized), low DO levels, oil and grease, total phosphorous, and iron. Subdocket C, *First Notice*, at 196.³⁷

Extensive evidence of low DO in the waterway were provided during the UAA proceeding. The Board noted the DO monitoring results provided by the Agency’s UAA environmental consulting firm, Camp, Dresser, McKee (CDM), showing depressed DO levels in the CSSC. (*Id.*, citing IEPA Rulemaking Petition, Attachment B, hereinafter the “CDM Report”.) Indeed, CDM’s sampling near the Will County Station found that the waters in that part of the CSSC only managed to stay above the minimum 5 mg/L General Use standard for DO 57% of the time. And, it failed to comply with the daily mean average limit of 6 mg/L over the course of an 8-hour period 63% of the time. CDM Report, at 4-71.

³⁷The waterway is still designated as impaired by PCBs, mercury, DO, phosphorous, and pH in the draft 2018 Integrated Water Quality Report and 303(d) list. Available at: <http://www.epa.illinois.gov/topics/water-quality/watershed-management/tmdls/303d-list/index>.

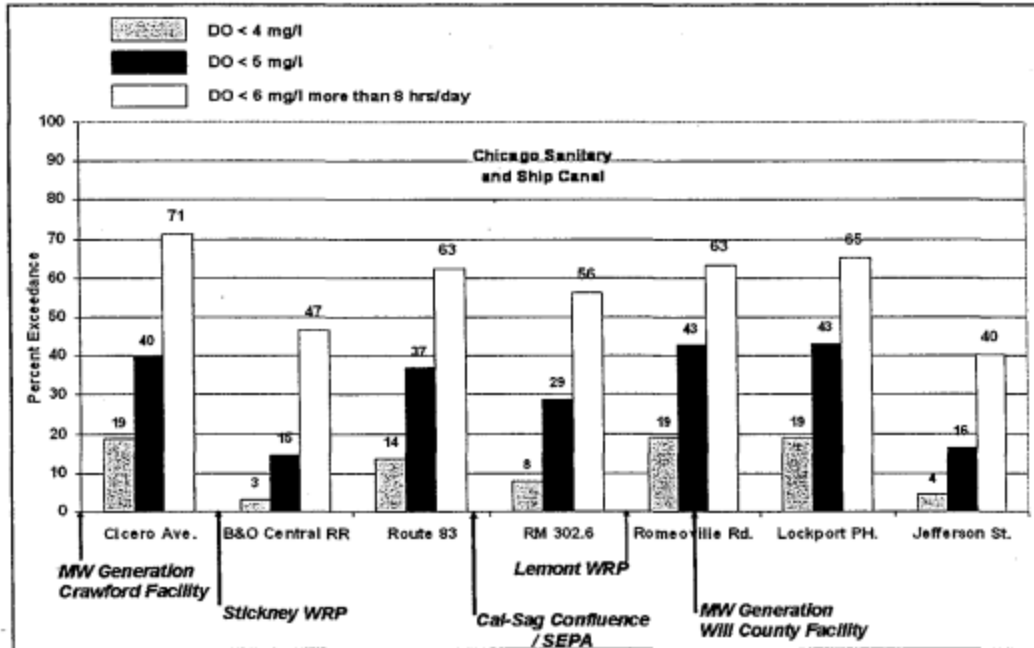


Figure 3 - Excerpt from CDM Report, at p. "4-71"

The Board noted that the DO problems were driven by wet-weather impacts, including discharges from the Racine Avenue Pumping Station and numerous upstream combined sewer overflows ("CSOs," that could result in overflows during rainstorms.³⁸ *Id.* at 196.

In the Board's analysis, the CSSC aquatic community also struggled from the presence of the Aquatic Nuisance Species Barrier, an electric field barrier that the USACE installed to prevent the upstream migration of aquatic nuisance species, particularly Asian carp. *Id.* at 195. The Barrier, located immediately upstream from the Will County Station, prevents most fish species from moving between the CSSC and Lake Michigan, significantly limiting its habitability. *Id.* at 195-96.

The Board found similar problems in the Brandon Pool. Water quality monitoring found five chemical constituents that failed to meet the General Use standards: copper, mercury, fecal coliform, DO, and zinc. *Id.* at 214. DO, which the Board evaluated as the "primary constituent of concern," failed to meet the "any time" general use standard of 5 mg/L 20%-25% of the time. *Id.* at 214-15. Because these conditions were irreversible (setting aside the abstract possibility of installing aeration at the Lockport Dam), the Board concluded that Factor Three was met.

³⁸ There are 307 permitted CSOs that discharge into the CAWS. CDM Report at p. "3-13." Chicago, including the Stickney plant, are the "dominant contributions" to the waterway.

While the U.S. EPA questioned whether the development of the Tunnel and Reservoir Plan (“TARP”) held the potential to significantly reduce the impacts of CSOs on the waterway, *see* Subdocket C, *U.S. EPA Comment*, PC #1372 (filed June 26, 2013), the Board did not regard the TARP system’s potential to cause long-term improvements in water quality as a valid reason to reverse its finding that the CSSC and Brandon Pool conditions satisfied Factor Three. Subdocket C, *Second Notice*, at 48-49. The TARP program was not scheduled to be completed until 2029, and the receiving waters would continue to be impacted by storm events until the work finished. *Id.* In fact, hearing testimony had indicated that even after completion, the TARP system would not completely capture all CSO events. *Id.* at 48.

2. UAA Factors Four and Five

As discussed below, in the CSSC and LDPR, the limiting effects of hydrologic modifications (Factor Four) and poor-quality habitat (Factor Five) pose interrelated questions. Thus, to avoid unnecessary repetition, both UAA Factors are discussed together.

a. CSSC and Brandon Pool

During the Subdocket C proceeding, the Board concluded that the CSSC and Brandon Pool both were incapable of attaining the full range of CWA uses due to impairments related to Factors Four and Five. Both waterways produced “QHEI” scores for habitability ranging from poor to very poor. Indeed, as shown in Figure 4 below, a QHEI survey location in the vicinity of the Will County Station produced a QHEI score of 27.0 on a scale of 100, which was the worst score in the entire CSSC.

| Site | QHEI | Undercut Banks | Over-Hanging Veget. | Shallows | Deep Pools | Rootwads | Rootmats | Boulders | Oxbows Side-channels | Aq. Plants | Logs | Cover Amount | | | | Cover Score |
|--|------|----------------|---------------------|----------|------------|----------|----------|----------|----------------------|------------|------|--------------|---|---|---|-------------|
| | | | | | | | | | | | | E | M | S | N | |
| Chicago Sanitary and Ship Canal | | | | | | | | | | | | | | | | |
| Lockport | 40.5 | | 1 | 1 | 2 | | | 2 | | | 1 | | | X | | 9.0 |
| Romeoville | 27.0 | 1 | | | 1 | | | | | | | | | | X | 4.0 |
| Willow Springs Road | 40.5 | | 1 | | 2 | | | 2 | | | | | X | | | 11.0 |
| Harlem Avenue | 38.5 | | 1 | 1 | 1 | | | 2 | | | | | X | X | | 10.0 |
| Upstream Cicero Avenue | 33.5 | | | 1 | 1 | | | 1 | | | | | | X | | 7.0 |
| Damen Road | 32.0 | 1 | | 1 | 1 | 1 | 1 | 1 | | | | | | X | | 10.0 |

Figure 4 - IEPA UAA Rulemaking Petition, Attachment R, Analysis of Edward T. Rankin, Center for Applied Bioassessment and Biocriteria. The “Romeoville” sampling site is the one closest to Will County Station.

These low QHEI scores documented major habitat problems reflecting a wide set of impairments, including silty substrates, little instream cover, channelization, and no sinuosity. Subdocket C, *First Notice*, at 195. The Board did not sort these impairments between those that might fall under Factor Four, and those that might fall under Factor Five, presumably because it is

difficult to do so due to the interrelated causes of the impairments. Factor Five, for instance, asks whether there is a lack of proper substrate, but the silty substrates described by the Board are to some degree the product of the unnatural flow conditions in the waterway, which are generated by the Factor Four hydrologic modifications.

The Board found similar problems that satisfied Factors Four and Five in the Brandon Pool. Like the CSSC, the Brandon Pool is a man-made channel (dredged periodically to maintain navigability) with concrete or sheet-pile embankments. Because of these and other factors, the Brandon pool had low QHEI scores: Ranging from 27 to 37 in the middle of the Pool, and 35.5 to 55.5 along its borders. *Id.* at 213. The operation of the lock-and-dam system considerably aggravated these issues—the waterway was routinely dredged, for instance, which prevented any long-term improvement of the substrates in the waterway or alterations to its depth that might improve habitability. *Id.* at 214. In its response to the U.S. EPA’s request for a “better demonstration that the hydromodifications present” in the Brandon Pool prevent attainment of aquatic life uses beyond those envisioned in ALU B,³⁹ the Board again noted the history of the pool, including the fact that it had been deepened and widened for commercial navigational purposes. These modifications, among other factors, had produced QHEI scores that were not consistent with the waterway accommodating CWA aquatic life uses, and were generally in line with the scores found in the CSSC. Subdocket C, *Second Notice*, at 52. Furthermore, a UAA evaluation performed by the IEPA’s UAA contractors, Aquanova International, Ltd. and Hey and Associates, Inc., had suggested that the habitat impairments were basically irreversible—improvements in instream cover and riparian vegetation were difficult to accomplish in the Brandon Pool due to concrete and sheet-pile retaining walls, plus the fact that the Brandon Pool runs through an unvegetated urban area (Joliet). Subdocket C, *Second Notice*, at 214, citing IEPA 2007 Rulemaking Petition, Attachment A, hereinafter the “Aquanova/Hey Report.”

b. UDIP

The Board’s First Notice Opinion states that UAA Factors Four and Five were not met in the UDIP, because the UDIP has the potential in the future to achieve the CWA’s aquatic life goal. The Board noted that the UDIP has natural embankments and at least some portions of it are of high enough quality to allow aquatic life to habitate the waterway as a whole. Subdocket C, *First*

³⁹ Subdocket C, *U.S. EPA Comment*, PC #1372, June 26, 2013.

Notice, at 218-20. The Board also favorably cited a portion of the Aquanova/Hey Report, indicating that “improvements in in-stream cover and riparian buffers could potentially improve QHEI scores” to the point where the waterway might meet CWA aquatic life goals. *Id.* at 219, citing Aquanova/Hey Report. But the Board did not specify how, when or at what cost these improvements, necessary to allow the UDIP to attain the CWA’s goal could be accomplished.⁴⁰

Thus, the Board recognized that the UDIP currently has habitat limitations that would not be found in a natural waterway. The water is impounded to accommodate barge traffic, and the reduced stream velocity and deep-water habitat is “not optimum for a diverse benthic macroinvertebrate community.” *Id.* at 218. And, ultimately, the Board chose not to designate the UDIP as a General Use waterway. Instead the Board created a UDIP Use designation that concedes that the waterway will not be suitable to aquatic life that cannot adapt “to the unique flow conditions necessary to maintain navigational use and upstream flood control functions of the waterway system.” 35 Ill. Admin. Code 303.230.

Still, the Board concluded that, flow conditions aside, the waterway can be inhabited in the future even by “intolerant” species that cannot manage adverse conditions or unfavorable habitats when the needed improvements to the waterway are made. MWGen’s research did not identify any current plans to implement these necessary improvements. Indeed, it is not clear if the improvements are possible. The Aquanova/Hey Report that the Board relied on gives no specifics on how or where this work could be done. It generally notes that improving vegetative conditions along the banks of the waterway might improve the scores.⁴¹ But it also notes that the existing

⁴⁰ The CDM Report’s strategic plan for the CAWS includes developing “a stakeholder group to study habitat issues and form a technical team to evaluate aquatic habitat restoration technologies applicable in a highly urbanized environment that does not adversely impede drainage or navigation.” CDM Report, at p. “6-9”. To MWGen’s knowledge no such stakeholder group or technical team has been formed. Nor do local environmental groups, like the Lower Des Plaines Ecosystem Partnership, show any indication that they regard habitat improvement in the UDIP as a priority. See <http://www.lowerdesplaines.org/restoration.htm>. Indeed, CDM’s description strongly suggests that the actual ability of a habitat restoration plan to be implemented and materially improve the attainable uses of the waterway is unproven and needs further evaluation by specialists.

⁴¹ The need to use the waterway for navigable purposes limits the kinds of habitat improvements that could be implemented. For instance, in non-navigable parts of the CAWS, the installation of “Christmas tree reefs” (*i.e.* dumping old Christmas trees in the middle of the waterway) has been noted as a potential method for improving habitat conditions. See CDM Report, at 6-9.

vegetation in the waterway is “indicative of a disturbed community,” which suggests that pollution in the waterway and random shifts in water levels, might prevent the vegetation from sustaining itself once installed.⁴²

What’s more, it is not clear how quickly the installation of such vegetation could occur. The Aquanova/Hey report lists cottonwoods, green ash, elm, and various shrubs as native vegetation along the UDIP, and implies that these larger plants are the primary sources of “cover” for aquatic life and for controlling bank erosion. Aquanova/Hey Report, at p. “4-12”. Yet cottonwoods, ash, and elm trees all take over a decade to grow to full size, and there is no indication that juvenile trees could be transplanted into the waterway.

Thus, today and for the foreseeable future, the UDIP has impaired habitat, presenting QHEI scores that are similar to those found in the Brandon Pool, which the Board has found meets the standard for Factor Five impairments. Even if this condition might be improved over time, it will not be improved over the time requested for this TLWQS variance. Accordingly, Factor Five is satisfied for purposes of this requested TLWQS.

Finally, improving habitat quality in the UDIP may be at odds with maintaining the aquatic community upstream, including in Lake Michigan. The Brandon Road Lock and Dam acts as a physical barrier in preventing the Asian carp from spreading upstream into the CAWS and possibly into the Great Lakes. Indeed, USACE is in the process of upgrading the control measures at the Brandon Road Lock and Dam to include various barriers and efforts against Asian carp, including a new electrical dispersal barrier, a noise barrier, flushing jets, contract fishermen, and in some instances the application of piscicide. *See* USACE, *Summary of the Great Lakes Mississippi River Interbasin Study-Brandon Road* (Sept. 2017) (attached as Exhibit U).⁴³

⁴² An additional problem is that, according to the Aquanova/Hay Report, “[i]ndustrial development exists along much of the [UDIP].” Aquanova/Hay Report, at p. “4-12”. This suggests that property owners along the waterway might refuse to allow restoration work to occur.

⁴³ It is clear that the construction of the new control measures will be disruptive on both a short-term and long-term basis to aquatic life in the UDIP. USACE summarized potential impacts, including controlled blasting of the waterway, replacement of natural shoreline with engineered structures, construction noise, and electrical shock. *USACE, GLMRIS-Brandon Road Draft Integrated Feasibility Study and Environmental Impact Statement*, at 305-09 (Aug. 2017), available at http://glmr.is.anl.gov/documents/docs/brandon-rd/GLMRIS-BR_Draft_Report.pdf. But because the USACE has not committed to a particular date when construction will start, MWGen is unable to say whether this will be a relevant problem during the term of this TLWQS variance.



Figure 5 - USACE's "Tentatively Selected Plan" for Upgrading Brandon Road Lock and Dam

But, as both IDNR and USACE have noted, Asian carp are not being found in large numbers in the UDIP, when compared with waters immediately downstream. As IDNR has observed:

Since the start of intensive monitoring efforts in 2010, fixed site and computer-generated random site sampling below Brandon Road Lock and Dam has resulted in the collection of over 60,000 fish to date. Of these fish, approximately 3,300 were Asian Carp and nearly all were collected over 5 miles downstream from Brandon Road Lock and Dam. The most recent fishing of the Dresden pool occurred just last month (October 2017) and confirms that a low number of Asian carp exist at the leading edge.

See IDNR-Office of Resource Conservation, *Comments to USACE, GLMRIS-Brandon Road Draft Integrated Feasibility Study and Environmental Impact Statement*, at 4 (Dec. 5, 2017).⁴⁴

Neither IDNR nor the USACE have pinned down the exact reasons for the spread of Asian carp stalling at the UDIP:

Theories for the stationary population front include lack of preferred food resources, navigation activity, environmental sound, limited habitat, and the presence of chemicals, pharmaceuticals and

⁴⁴ Available at

<https://www2.illinois.gov/ltg/Documents/2017%20USACE%20Brandon%20Rd%20TSP%20Comments%20-%20DNR%20ORC%20Final.pdf>

pollution. IDNR-[Office of Resource Conservation] notes that significant improvement in Des Plaines River water quality over the 26-year period has not altered the population front.

Id.; see also *GLMRIS-Brandon Road Draft Integrated Feasibility Study and Environmental Impact Statement*, at 105 (Aug. 2017) (“The factors driving this apparent stalled range expansion are not understood but may include food and habitat availability, water quality, channel morphology and hydrology, and lock-specific differences.”).

Thus, even if movement were to begin on habitat restoration, it would have to proceed with caution. The effectiveness of the new barriers is intertwined with the size of the Asian carp population in the immediate vicinity of the Brandon Road Lock and Dam. *GLMRIS-Brandon Road Draft Integrated Feasibility Study and Environmental Impact Statement*, at “C-18” (Aug. 2017).⁴⁵ Any habitat improvement measures that might increase the Asian carp population in the UDIP carry a risk not only of causing harm to the CSSC, but also Lake Michigan.

3. UAA Factor Six

In March 1995, the U.S. EPA published the *Interim Economic Guidance for Water Quality Standards Workbook*.⁴⁶ Although “interim” for over twenty years, it remains the most current information on how a party is to demonstrate that UAA Factor Six is satisfied. It must be emphasized, however, that this guidebook makes no reference to whether it is appropriate to use it in the context of a time-limited water quality standard variance, or whether some provisions must be modified to make sense in this context. Certainly, a time-limited variance confined to a single water-quality criterion should not require a greater showing of economic impact than a permanent use change.

In a multi-discharger variance petition, UAA Factor Six considerations are treated slightly differently from other factors. For other factors, the individual dischargers do not substantively strengthen their petition by acting collectively: “A permittee that could not qualify for an individual WQS variance should not qualify for a multiple discharger variance.” But, U.S. EPA guidance suggests that when assessing widespread and substantial harms, regulators should look to the

⁴⁵ Available at http://glmris.anl.gov/documents/docs/glmrisreport/01-Appendix_C-GLMRIS_Risk_Assessment_Methodology.pdf.

⁴⁶ Available at <https://www.epa.gov/sites/production/files/2016-03/documents/econworkbook-complete.pdf>.

collective harms faced by the dischargers named in the petition, rather than simply evaluating them piecemeal. *See* Exhibit E, U.S. EPA, *Discharger-Specific Variances on a Broader Scale*, at 4 (suggesting that variance is appropriate where “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.”).

The following sections are based on the relevant elements referenced in the U.S. EPA guidance for satisfying UAA Factor Six.

a. “Demonstrate that designated use is a potential use and not an existing use.”

The 2018 Thermal Standards were taken verbatim from the General Use thermal standards because the Board had no other proposal before it that it deemed acceptable. The CSSC’s designated use is ALU B – not General Use. MWGen submits that the CSSC does not meet the criteria for applying a General Use thermal standard and in this regard, the 2018 Thermal Standards are not an “existing use.” The Board recognized this in delaying the applicability of the 2018 Thermal Standards for three years as a means of providing affected dischargers with time to pursue relief from thermal standards that are ill-suited to an ALU B designation. Regrettably, the three-year delay authorized by the Board has not proven to be sufficient to allow thermal dischargers like MWGen sufficient time to seek and obtain such relief. Further, there was no showing in the Board’s UAA proceeding that the CSSC does currently meet the standards embodied by ALU B with regard to thermal conditions. Hence, for all of these reasons, with regard to thermal conditions, the ALU B is a potential use and not an existing use.

Nor does the UDIP meet the goals embodied in UDIP Aquatic Life Use. Instead, the Board has assumed that intolerant and moderately intolerant aquatic life will return to the waterway if the General Use thermal standards are adopted.

b. “Demonstrate that Entity will incur substantial economic impacts.”

The Guidance directs dischargers to take stock of their pollution reduction options, the costs of those options, and to highlight the lowest cost option that would allow the entity to meet water quality standards. During the Subdocket C UAA Rulemaking, MWGen presented an extensive report prepared in 2011 by the engineering firm of Sargent & Lundy LLC (“S&L”) and

the sworn testimony of Ray E. Henry, who was the lead author of the report.⁴⁷ A copy of Mr. Henry's March 9, 2011 written testimony and the 2011 S&L Report are attached as Exhibits V and W, respectively. MWGen has also attached Exhibit X, an affidavit from Radhika deSilva, PhD, PE, Principal Engineer/Vice President of ASA Analysis and Communication, Inc., confirming that the conclusions offered by Mr. Henry in 2011 remain accurate today and for the foreseeable future and updating the compliance cost information presented in the 2011 S&L Report. Mr. Henry's testimony explained the comprehensive study he and his colleagues had performed regarding the feasibility of installing new control technology. S&L evaluated the feasibility of both open-cycle cooling and closed-cycle cooling on all five of the then-existing Midwest Generation facilities, including the Will County and Joliet Stations. As stated in the 2011 S&L Report and as Mr. Henry testified, S&L concluded that the open-cycle cooling conducted by each of the MWGen Stations, including the operation of the Joliet 29 helper cooling towers, would not be able to achieve and maintain compliance with the IEPA's proposed thermal standards (which were pending before the Board at that time). Although the Board ultimately rejected the Illinois EPA's proposed thermal regulations and adopted the new 2018 Thermal Standards that are somewhat more lenient, the conclusions reached in the 2011 S&L study remain applicable. See Exhibit X, Affidavit of Dr. Radithka deSilva.

As stated in the Executive Summary of the 2011 S&L Report, S&L had previously performed a similar study for MWGen in 2005 using the existing General Use thermal standards as the design basis for evaluating the control options and associated costs for achieving compliance. The conclusions reached in the 2005 and 2011 S&L studies were essentially the same. In both studies, S&L concluded that the stations would have to be converted to closed-cycle cooling to achieve consistent compliance with either the General Use thermal standards or the Illinois EPA's then proposed Use B and UDIP thermal standards.

For the conversion to closed-cycle cooling, using the 2011 S&L cost estimates, the capital costs at the Joliet Stations would total approximately \$481 million. Will County Station would require an additional \$298 million. In the 2005 study, S&L estimated that the capital costs for Joliet 9 would be about \$170 million and Joliet 29 would be about \$257 million, for a total of approximately \$427 million for the Joliet Stations (which is fairly close to the 2011 cost estimate,

⁴⁷ Mr. Henry also testified during the UAA Hearings. His testimony is contained in the Subdocket C Hearing Transcript dated Feb. 1, 2011, at pp. 44 -134.

as adjusted for inflation to 2015 dollars). The estimated 2011 O&M costs for the three facilities, updated for inflation, would total over \$20 million per year. Further, even if the conversion of these stations to closed-cycle cooling were economically feasible, which it is not, a conversion project could not be completed by the July 1, 2018 applicability date of the new Use B and UDIP thermal standards. As the 2011 S&L Report notes, converting the Will County and Joliet stations to closed-cycle operations could take between 31 and 33 months. Moreover, S&L stressed that this was a “best case scenario” that assumes a depressed construction market where contractors have immediate availability. That “depressed construction market” is no longer the case today.

Due to the passage of approximately seven years since the 2011 S&L Report’s preparation, MWGen presented the 2011 S&L Report and related UAA sworn testimony concerning its contents to another expert, Dr. Radhika deSilva, to obtain a “second expert opinion” regarding its findings and to determine current cost estimates for the MWGen Stations, which no longer include the closed Fisk & Crawford Stations addressed in the 2011 S&L Report. Dr. Radhika deSilva is a principal Engineer/Vice President of ASA Analysis and Communications, Inc. with over 12 years of experience in water and wastewater issues for steam electric generating plants, including design and cost estimating work on retrofitting plants with closed-cycle cooling systems. She holds doctorate and Bachelor of Science degrees in environmental engineering from Harvard University as well as Masters of Science degrees from Massachusetts Institute of Technology (MIT) in Environmental Engineering and in Technology and Policy. See Exhibit X, Affidavit of Dr. Radithka deSilva, ¶¶ 1 and 2.

Based on her review, Dr. deSilva agreed with S&L’s conclusion that closed-cycle cooling technologies are not feasible or practical for the MWGen Stations and that other cooling technologies, such as man-made cooling lakes and cooling ponds with sprays, are also not feasible because of the site area limitations. *Id.* at ¶¶7, 10-12. Dr. deSilva found that these closed-cycle cooling technologies either “have not been proven on such large-scale installations, would result in unacceptable performance losses at the Stations, are incompatible with existing condenser design, or are considerably more expensive than the alternative of using mechanical draft cooling towers”, the only viable option identified by S&L. *Id.* at ¶ 10. Dr. deSilva also considered the use of the Joliet 29 “helper” cooling towers, including adding more of them, and found that they could not sufficiently cool the Joliet 29 Stations’ effluent to achieve consistent compliance with the 2018 Thermal Standards, particularly during the fall and spring seasons. *Id.* at ¶¶ 8-10. For Will County

Station, Dr. deSilva came to the same general conclusion that S&L did regarding the lack of adequate space for additional mechanical draft cooling towers because of the presence of ComEd high voltage lines in the only available space where they could be installed. *Id.* at ¶12.

Dr. deSilva also prepared updated cost estimates, including refining the design basis for those cost estimates based on additional space now available at the Joliet 29 Station due to the removal of its former coal pile area (now that the station is fueled by natural gas). She concluded that the capital cost of installing mechanical draft cooling towers at Will County Station is \$356 million and that annual O&M costs range from \$2.1 million to \$7.5 million depending upon the operating level of the station. *Id.* at ¶¶ 14-17.⁴⁸ For the Joliet Stations, Dr. deSilva used S&L's costing approach but adjusted S&L's cost estimates to 2018 costs. *Id.* at ¶15 For the Joliet 9 Station, the 2018 estimated capital cost of installing mechanical draft cooling towers is \$112 million and for the Joliet 29 Station, it is \$269 million. Thus, the total, 2018 estimated capital costs for the MWGen Stations are \$737 million, with additional total, annual estimated O&M costs ranging from \$16.2 million to \$21.6 million. *Id.* at ¶¶ 16 and 18.

The 1995 Interim Guidance also directs companies to look at "Change[s] in Process" as a type of pollution control project. But the only pollution control project applicable here is to not operate (*i.e.*, "derate") the MWGen Stations during those times when the 2018 Thermal Standards may be exceeded. The MWGen Stations do not have any other thermal reduction option besides derating the Stations. Derating is not a financially viable pollution control project for the MWGen Stations. Although it is projected that the MWGen Stations can comply with the 2018 Thermal Standards and the I-55 Bridge General Use numerical thermal criteria during most of the year, they cannot remain profitable if they avoid operating during the winter or summer months when their effluent might heat the water above the General Use numerical standards. This is particularly true of the Joliet Stations, which are now operated during times of high demand, which typically is when ambient conditions present the greatest compliance challenge.

The Joliet Stations justify their financial viability based on their capacity to generate on the days of greatest electrical demand. As shown in Figure 6, Joliet 9 only operated on 62 days in 2016, and 17 days in 2017. Unit 7 (one of the two generating units at Joliet 29) only operated

⁴⁸ Like the 2011 S&L Report, Dr. deSilva's 2018 cost estimates are accurate to within -30%/+50%.

146 days in 2016, and 38 days in 2017. Unit 8, the other unit, ran only 79 days in 2016, and 22 days in 2017.

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sep | Oct | Nov | Dec |
|-----------------|-----|-----|-----|-----|-----|------|------|-----|-----|-----|-----|-----|
| 2016-- Joliet 6 | 19 | 22 | 0 | 0 | 0 | 2 | 13 | 3 | 0 | 3 | 0 | 0 |
| 2017-- Joliet 6 | 0 | 6 | 0 | 0 | 0 | 0 | 7 | 0 | 1 | 0 | 0 | 3 |
| 2016-- Joliet 7 | 29 | 27 | 16 | 0 | 0 | 10 | 25 | 19 | 9 | 11 | 0 | 0 |
| 2017-- Joliet 7 | 0 | 6 | 0 | 0 | 4 | 7 | 7 | 0 | 8 | 0 | 0 | 6 |
| 2016-- Joliet 8 | 16 | 27 | 0 | 0 | 0 | 4 | 22 | 8 | 2 | 0 | 0 | 0 |
| 2017-- Joliet 8 | 0 | 3 | 0 | 0 | 0 | 2 | 5 | 0 | 8 | 0 | 0 | 4 |

Figure 6 - Joliet Station Generating Units - Days in Operation

Unfortunately, the days of greatest electrical demand tend to coincide with summer days where ambient water temperatures will be closest to the General Use thermal standards. They also coincide with abnormally warm non-summer months where the thermal standards have already changed to the 60° F standard from the summer months standard of 90° F. Thus, any derating by the Joliet Stations would occur on days where the stations would normally operate based on grid demand.

c. “Evaluate the entity’s financial health.”

MWGen would suffer financial hardship if the new thermal standards were in effect for months or years before it can obtain 316(a) relief for the Will County and Joliet Stations.

MWGen does not anticipate that these hardship, on their own, would be sufficient to force the plants to close. Thus, because MWGen cannot prove that the financial damage would be fatal, MWGen is not including detailed financial information in this petition—MWGen does not ordinarily disclose its financials, as this could give an economic advantage to its competitors.

That said, energy markets are extremely volatile, as shown by MWGen’s having recently gone through bankruptcy. The Board is well aware that coal-fired generating stations, like Will County, have been steadily retired due to market forces. So, even if MWGen is likely to survive the regulatory costs associated with the 2018 Thermal Standards, these costs will significantly weaken its ability to withstand unexpectedly adverse economic conditions.

d. “Determine whether impacts are widespread.”

i. Impacts on the local economy

Recently, Bloomberg Businessweek published an article on the economic ripple effects that followed the shutdown of the J.M. Stuart Station in Adams County, Ohio. *See Alec MacGillis, Forced to Choose Between a Job—and a Community* (May 23, 2018) (attached as Exhibit Y). The

closure caused major disruptions, not just to the station's employees, but also the community as a whole. The shutdown of the plant resulted in it being devalued by over \$56 million, and lead to a \$787,200 per-year loss to the county government. The local school district expects to lose \$4.5 million dollars due to decreased tax revenues, and children moving out of the area as their parents look for new work.

The article describes the scene at the jobs fair that the state's workforce development agency put on for the former employees:

About 100 plant workers showed up. There were free "Ohio Means Jobs" tote bags and a spread of sandwiches, pasta salad and banana pudding. There was also a door prize: a thumb drive. Officials from Shawnee State University, in nearby Scioto County, were promoting their video game design program. The Southern Hills Career & Technical Center advertised training for nursing assistants. A woman from the Kentucky Career Center had a list of available jobs that included Hampton Inn receptionist, Dollar General sales associate and Domino's Pizza driver.

Id.

The Will County and Joliet Stations employ 91 people (44 at Will County, and 47 at the Joliet Stations). Sixty-three of these positions are union jobs, and the median pay is around \$95,000 (total payroll for the two plants is \$9.4 million dollars.) The Stations collectively have 54 full-time contractors. An additional 130 contractors work on multi-month site projects annually, which works out to an additional 19 full-time employees.

MWGen cannot say that the economic impacts from laying off the 91 employees would reach the scale of the layoffs in Adams County, Ohio. Will County is larger, and has a higher per capita income than Adams County, which may be the poorest county in Ohio. Still, even if the Will County economy is strong enough to provide new jobs for some of station personnel, those jobs will almost certainly pay significantly less. The union positions are highly skilled technical jobs, and many of them involve specialized knowledge that provides little benefit outside of the power industry. Similarly, most of the non-union jobs require a college degree, and those employees will also have a difficult time transitioning to other industries—especially older workers. (The median age of the employees is around 54 years-old.)

ii. Impacts on the local government

MWGen does not have data on how much the employees at the Will County and Joliet Stations pay in state and county taxes. MWGen itself pays \$1.65 million dollars in property taxes

to Will County, per year. The state's valuation of the Stations, currently \$20.5 million dollars, would be reduced dramatically if the plants are not in use, just like the J.M. Stuart Station in Ohio.⁴⁹

The Guidance also directs that Factor Six can be employed when there is a "likelihood that the need to adopt pollution reductions in the affected community would discourage other businesses from locating in the area in the future." Indeed, there are elements of the regulations as drafted that operate quite arbitrarily here. The General Use thermal standards require that "The maximum temperature rise above natural temperatures shall not exceed 2.8°C (5°F)." 35 Ill. Admin. Code 302.408(e). Yet, the meaning of this regulation is unclear, when applied to an unnatural waterway that at times consists entirely of treated wastewater from the Stickney Wastewater Treatment Plant and even when the water "naturally" originates from Lake Michigan, its flow rate operates unnaturally, and repeated impoundments interrupt its flow and increase ambient temperatures. As the Board conceded during the UAA proceedings, temperature of the effluents determines the base temperature of the river, more so than it having a natural temperature."⁵⁰ If the Board does not take steps to reconcile the General Use narrative criteria with the unnatural reality of the CSSC and UDIP, this may discourage future businesses from locating in the area, for fear of unclear and/or unnecessarily strict thermal conditions in their NPDES permits.

Finally, if together with other market forces, the redesignation of the CSSC and UDIP is the proverbial "straw" that contributes to decisions to close the Will County and Joliet Stations, this could have a severe effect on over a dozen states in the Midwest and Mid-Atlantic. As noted above, PJM has put into place a scheme that would heavily penalize power generators that fail to maintain production during times of highest demand. Those potential penalties are in place to ensure that the 60 million customers within the PJM transmission network do not lose power to their homes during extreme summer and winter events. These concerns were based on reliability issues that became apparent during the polar vortex in the 2013-2014 winter season.

PJM's analyses of the reliability of the transmission network has concluded that coal is a critical part of maintaining system reliability, second only to natural gas. Even under normal conditions: "Natural gas and, to a lesser degree, coal, individually exhibit a broad range of the

⁴⁹ The shutdowns would affect state coffers as well. On average, the Stations generate ~\$850,000 in sales taxes, and ~\$300,000 in use tax.

⁵⁰ Subdocket C, *First Notice Order*, at 38.

generator reliability attributes. Therefore, portfolios with large shares of both natural gas and coal exhibited a majority of the generator reliability attributes.” PJM Interconnection, *PJM’s Evolving Resource Mix and System Reliability*, pp. 31-32 (Mar. 20, 2017).⁵¹ Thus, in the vast majority of modeled operating conditions, the PJM grid requires a mix of natural gas and coal to maintain desired levels of reliability.

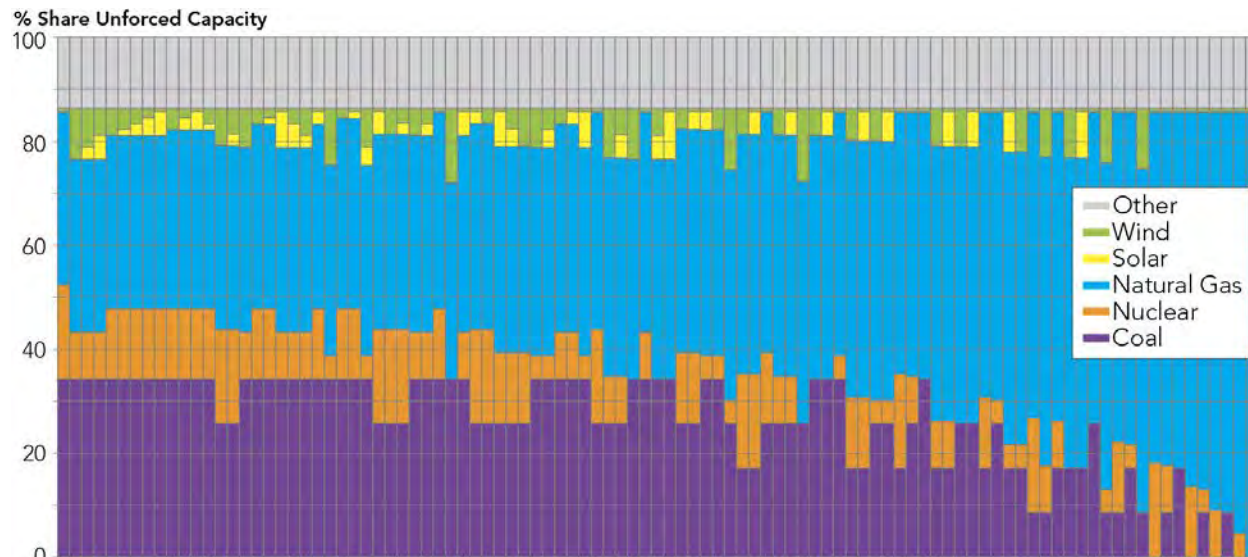


Figure 7 - Modeled "Desirable" Portfolios (From PJM’s Evolving Resource Mix and System Reliability Report)

And PJM regards coal and natural gas power as absolutely essential in responding to a polar vortex. Indeed the majority of the scenarios require a high share of both. PJM Interconnection, *PJM’s Evolving Resource Mix and System Reliability—Appendices*, at 41 (Mar. 30, 2017).⁵²

⁵¹ Available at <http://www.pjm.com/~media/library/reports-notice/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx>.

⁵² Available at <http://www.pjm.com/~media/library/reports-notice/special-reports/20170330-appendix-to-pjms-evolving-resource-mix-and-system-reliability.ashx>

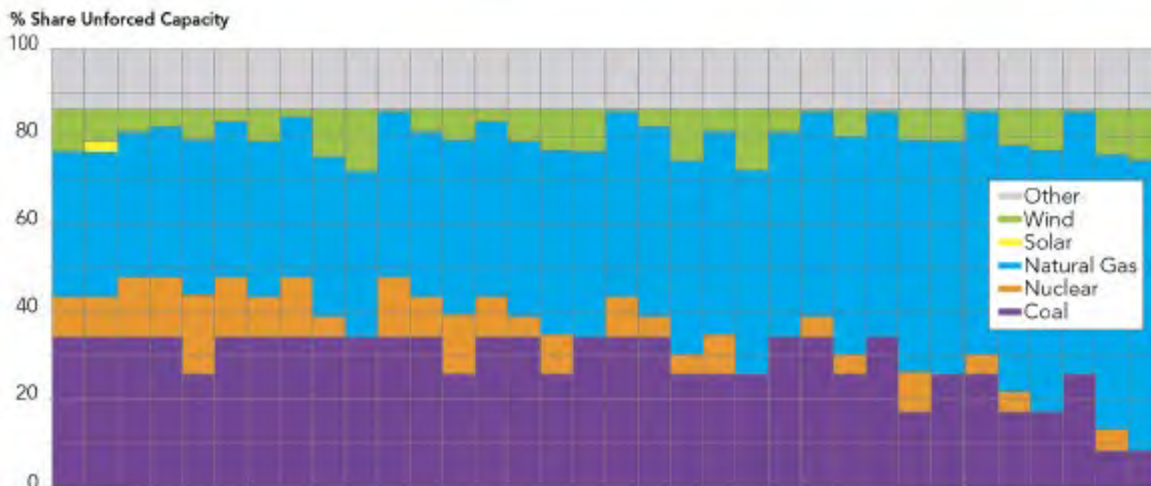


Figure 8 - Viable Energy Portfolios for Polar Vortex Event (From PJM Reliability Report Appendix)

Recent challenges posed by the “bomb cyclone” have placed further attention on the need for coal and gas-fired power plants. See 1 National Energy Technology Laboratory, *Reliability, Resilience and the Oncoming Wave of Retiring Baseload Units: The Critical Role of Thermal Units During Extreme Weather Events*, DOE/NETL-2018/1883 (Mar. 13, 2018).⁵³ From December 27, 2017, to January 8, 2018, a cold weather event known as the “Bomb Cyclone” stressed the reliability of the PJM network (and several other eastern networks) to provide electricity to northeastern states. A review of production data in the wake of the storm shows that nuclear generating stations, while being important to maintaining baseload, cannot meaningfully increase their output to improve reliability during extreme weather events. Similarly, renewable power (accounting for only 4% of power supplied by regional transmission networks during the Bomb Cyclone) could not play a role in closing the gap. *Id.* at 12. Instead, coal-fired plants like the Will County Station accounted for 74% of the total increased production in the PJM network. The National Energy Technology Laboratory estimates the value of the added resilience provided to the network by scalable power generators like Will County Station at \$3.5 billion dollars. *Id.* at 16.

⁵³ https://www.netl.doe.gov/energy-analyses/temp/ReliabilityandtheOncomingWaveofRetiringBaseloadUnitsVolumeITheCriticalRoleofThermalUnits_031318.pdf

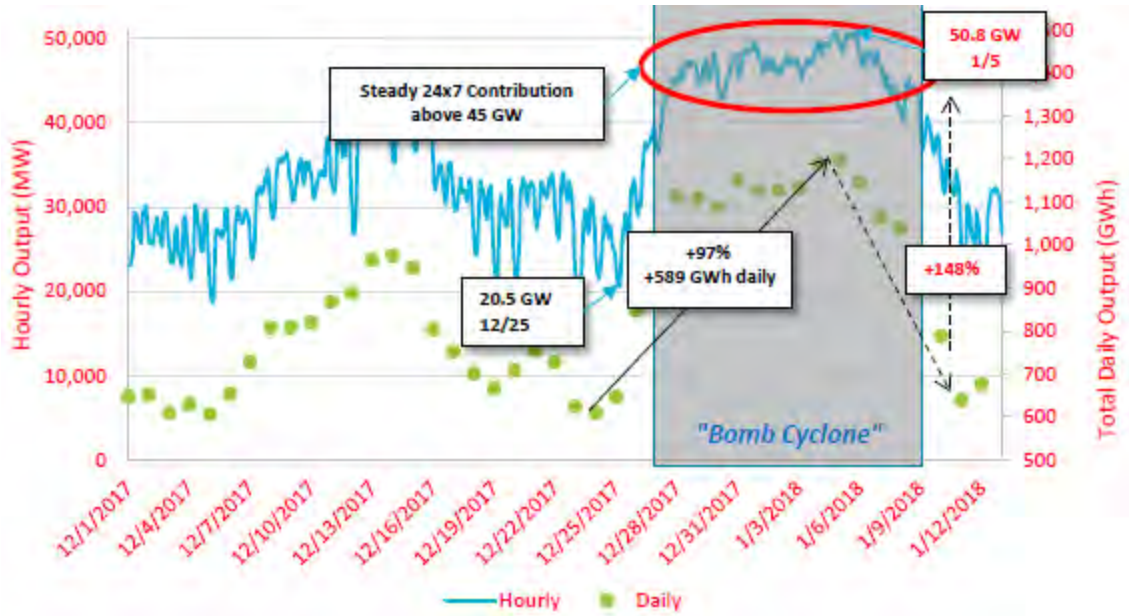


Figure 9 - Chart of Increased Coal-Based Power Generation in PJM during "Bomb Cyclone", from National Energy Technology Laboratory Study.

iii. Power price impact

The Will County and Joliet Stations are located within the PJM ISO (“Independent System Operator”) and provide energy to the PJM system. PJM ISO is a regional transmission organization that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia. PJM consists of many sub-regions, typically identified as electric distribution company zones like Commonwealth Edison, or ComEd, where the Will County and Joliet Stations are located. Figure 10 below shows these zones, with the left most zone being ComEd.

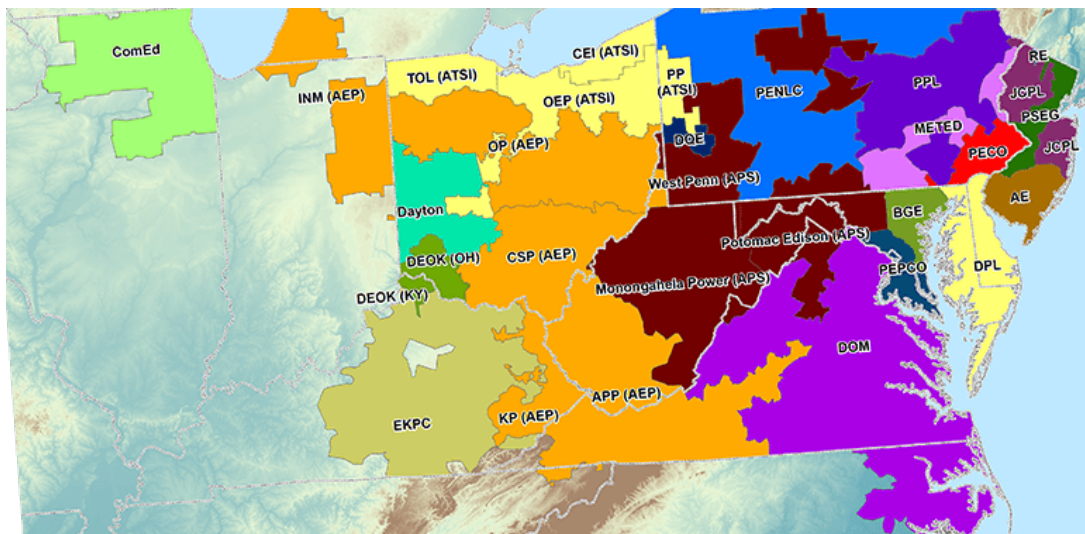


Figure 10 - Map of PJM Local Deliverability Areas

By providing energy to the PJM system, Will County and Joliet help lower the costs of energy in the ComEd zone as well as other nearby zones in the PJM ISO. Conversely, the absence of Will County (in full or in part) will result in higher prices to the ComEd zone and other nearby PJM zones. This price impact is a function of the economic dispatch performed by PJM (the method by which ISO's bring generators online and/or increase their output to meet load needs). While economic dispatch is a complex topic, it can be thought of in its simplest form as an algorithm that provides a least cost solution to serve load by dispatching the most efficient, least cost generation. During times when Will County and Joliet are running, they are part of the least cost dispatch. If they were unable to provide energy to the system (in full or in part), a higher cost generation resource would be needed to replace the energy that would have otherwise been provided by Will County or Joliet.

MWGen's parent company, NRG, models price impacts in the PJM grid via the Aurora model developed by EPIS.⁵⁴ Aurora is an electric system forecasting and analysis tool that simulates real time-operation of the electric grid. While industry uses of Aurora vary (*e.g.*, rate cases, budgeting, market design analysis, etc.), NRG's primary use of Aurora is energy price forecasting for the ISOs in which it operates. NRG maintains an up-to-date Aurora data set and NRG utilizes the model on a regular basis for various company analyses.

To evaluate price impacts if the new thermal standards go into effect, NRG ran Aurora for one year with and without the Will County and Joliet facilities. Each of these runs resulted in a forecasted power price for ComEd and other PJM zones. The difference in power prices between these runs represents the expected impact to power prices in the PJM system if these generating units were not available to provide energy to the PJM system.

The Aurora model produced average annual power prices that were approximately \$0.50/MWh higher annual power prices in the ComEd zone, and \$0.15/MWh higher in nearby PJM zones in the case where Will County and Joliet were unavailable to provide energy to the PJM grid. Since power prices are a key factor in determining end use rates to customers, higher power prices result in higher costs to consumers. The annual impact to customers can be determined by multiplying the average annual power price increase by the electric demand.

⁵⁴ <http://epis.com/aurora/>

For the ComEd zone, annual electric demand is approximately 100 TWh.⁵⁵ Multiplying 100 TWh * \$0.50/MWh results in an increase in electric costs to ComEd zone ratepayers of approximately \$50M/year. Similarly, other western PJM zones have an annual electric demand of approximately 300 TWh. Multiplying 300 TWh * \$0.15/MWh results in an increase in electric costs to Western PJM ratepayers of approximately \$45M/year.

This combined \$95 million dollar price increase assumes that the Will County and Joliet Stations will go completely offline to avoid exceeding the thermal water quality standards. But as a practical matter, MWGen estimates that the Stations may be able to avoid exceedances by decreasing their output, rather than fully shutting down Stations that do not have helper towers, like Joliet 9 and Will County, are at higher risk of shutting down from thermal discharge limits. In addition, shutdown due to financial impacts is still a possibility especially if performance penalties are incurred as further discussed in Section IV.F.3.d.iv, which could amount to tens of millions of dollars.

To that end, EA has modeled station operations to determine the degree of derating that will occur. MWGen estimates that the new thermal standards will require the Stations to derate by 15% although Joliet 29 is expected to derate significantly less than the other two stations because its helper towers are able to provide a 7°F cooling benefit).

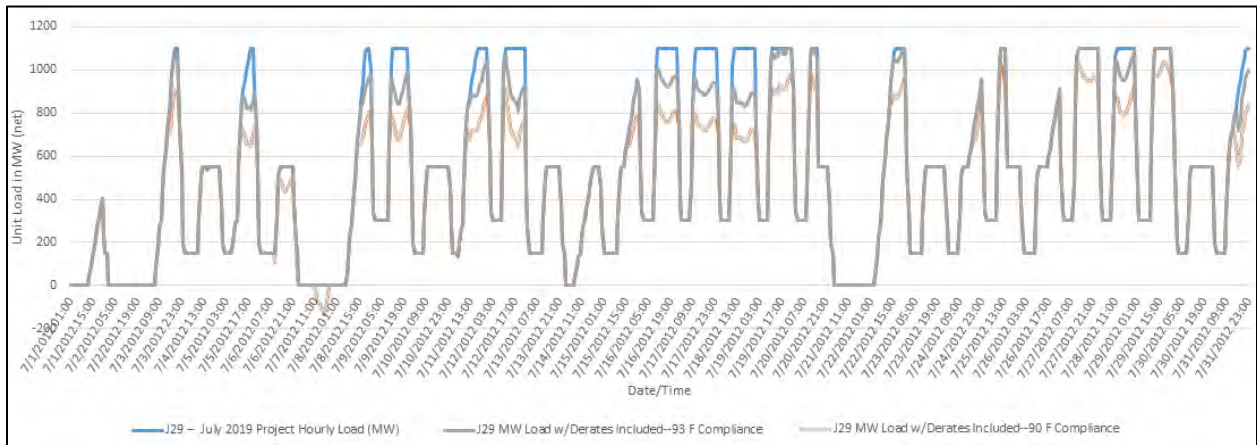


Figure 11 - Joliet 29 Derating Estimates Using July 2019 Load Projections and July 2012 Conditions

⁵⁵ Available at <http://www.pjm.com/-/media/library/reports-notice/load-forecast/2018-load-forecast-report.ashx?la=en>

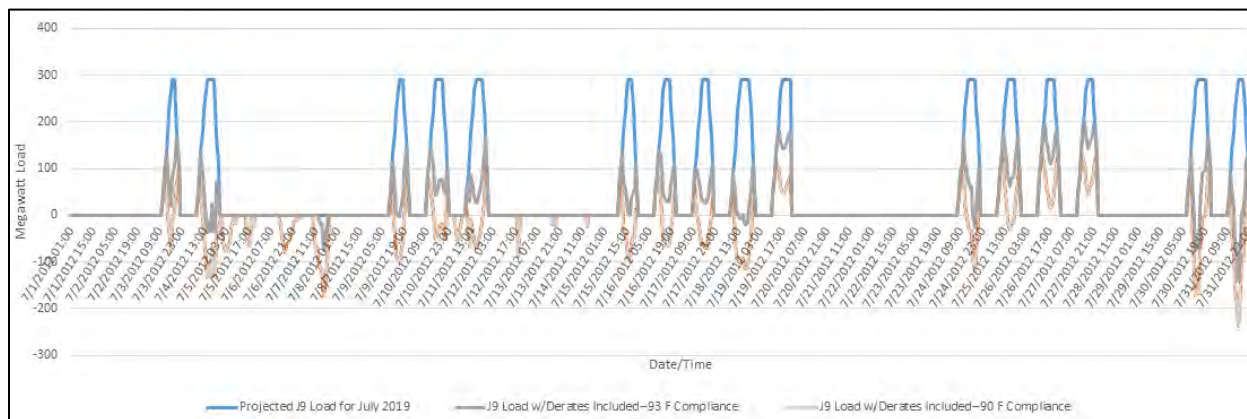


Figure 12 - Joliet 9 Derating Estimates Using July 2019 Load Projections and July 2012 Conditions⁵⁶

It is reasonable to assume, therefore, that ratepayers in PJM will pay an additional \$14.25 million dollars in energy prices per year (or 15% of \$95 million), if the new thermal standards become applicable to the CSSC, Brandon Pool, and UDIP.

iii. Capacity Price Impact

PJM’s capacity market, called the Reliability Pricing Model, ensures long-term grid reliability by securing the appropriate amount of power supply resources needed to meet predicted energy demand in the future.⁵⁷ The capacity auctions are held annually by PJM for the planning year that is three years in the future. The results of the capacity procurements (capacity auctions) are payments to generators to reserve their capacity for future use. These payments to generators are paid by PJM ratepayers and, while not listed explicitly on an electric bill, are typically bundled into their Electricity Supply Charge, which can be seen in a sample bill (<https://www.comed.com/MyAccount/MyBillUsage/Pages/SampleResidentialBill2.aspx>).

The price of capacity, determined through the procurement process, is influenced by supply and demand in any given auction; relatively lower supply results in a higher price and relatively higher supply results in a lower price.

To understand the impact to capacity prices (and hence the impact to ratepayers) if Will County and Joliet Stations were unable to participate in the capacity auction process, one can look

⁵⁶ If a Megawatt Load goes below “0”, this indicates that the intake temperatures were already above the applicable thermal standard. Essentially, the waterway would meet the thermal standard only if the generating station *absorbed* thermal energy from the water.

⁵⁷ Available at <http://learn.pjm.com/three-priorities/buying-and-selling-energy/capacity-markets.aspx>

to price sensitivities conducted by PJM.⁵⁸ For these sensitivities, PJM has used its modeling to evaluate the price sensitivities that could be caused by various scenarios where, for whatever reason, it loses output from a collection of generating resources.

PJM has used its modeling to evaluate the price sensitivities that could be caused by various scenarios where, for whatever reason, it loses output from a collection of Independent Power Producers.

| Scenario # | Scenario Description | Auction Results | RTO | COMED |
|------------|---|--------------------------------|------------------|-----------------|
| BASE | Actual 2020/21 results | CP RCP | \$76.53 | \$188.12 |
| | | Cleared CP Generation MW | 155,572.4 | 21,745.5 |
| | | Cleared CP DR MW | 7,531.5 | 1,425.9 |
| | | Cleared CP EE MW | 1,607.4 | 640.0 |
| | | Total Cleared CP MW | 164,711.3 | 23,811.4 |
| | | Cleared Matched Seasonal CP MW | 397.9 | 148.9 |
| | | TOTAL CLEARED MW | 165,109.2 | 23,960.3 |
| 4 | Remove 6000 MW of CP supply from bottom of supply curve in region outside of MAAC (3072.2 MW in rest of RTO, 1509.6 MW in ComEd, 582 MW in rest of ATSI, 292.7 MW in ATSI-Cleveland, 231.1 MW in DAY, 312.4 MW in DEOK) | CP RCP | \$98.43 | \$241.82 |
| | | Cleared CP Generation MW | 155,210.6 | 22,238.5 |
| | | Cleared CP DR MW | 7,583.7 | 1,244.7 |
| | | Cleared CP EE MW | 1,050.5 | 40.1 |
| | | Total Cleared CP MW | 163,844.8 | 23,523.3 |
| | | Cleared Matched Seasonal CP MW | 485.9 | 148.9 |
| | | TOTAL CLEARED MW | 164,330.7 | 23,672.2 |

Figure 13 - Excerpt from PJM 2020-2021 Scenario Analysis, available at <http://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2020-2021-bra-scenario-analysis.ashx?la=en>

Scenario #4 in Figure 9 above provides the best starting point. While this scenario includes a 4,490 MW reduction in supply in other parts of PJM, it also removes 1,500 MW of generating resources in ComEd, which is close to the 1,800 MW represented by Will County and Joliet. In this scenario the capacity price in the ComEd zone increases from \$188/MW-d to \$241/MW-d when these 6,000 MW are excluded from the capacity auction. If the 70% of reductions unrelated to MWGen ((6,000-1,800)/6,000) are excluded, then \$16.2MW-d of the total \$54/MW-d increase in capacity prices is attributable to the MWGen Stations shutdowns. Multiplying the roughly 22 GW⁵⁹ of generation capacity in the ComEd zone results in an increase in capacity payments (and consequently an increase in costs to ComEd ratepayers) of \$129M/year. Even if the prior assumption that the new standards could be met through a 15% derate, this still results in

⁵⁸ Available at <http://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2020-2021-bra-scenario-analysis.ashx?la=en>

⁵⁹ <http://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2021-2022/2021-2022-base-residual-auction-report.ashx?la=en>

\$19.4 million dollars increased capacity costs per year, in addition to the extra \$14.25 million in energy prices.

Thus, consumers in the PJM market would pay an additional \$33.65M per year for electricity (the vast majority of which is in the ComEd zone and impacts ComEd ratepayers).

iv. Harm to NRG/MWGen

These facilities participate in PJM's capacity market, and as such are obligated to deliver power to grid when needed. In particular, if an asset does not perform during an emergency event, a portion of their capacity revenue would be clawed back via a capacity performance penalty. In COMED, for every hour that an asset is not available during an emergency event, PJM will claw back at a rate of approximately \$3,103/MWh (close to \$5.6M per hour for the 1,800 MW at the Will County and Joliet Stations).

If the units are in a forced curtailment, they would be assessed this penalty for any emergency hours when they were not available. If there were between 5 and 10 emergency hours per year, and if those events coincide with "worst case" scenarios (high ambient temperatures and low flow) in the CAWS and LDPR, MWGen would be subject to non-performance financial penalties ranging between \$28M-\$56M/year.⁶⁰ And because emergency events tend to occur during times of peak energy demand, "worst case" conditions will tend to coincide with PJM's emergency events.

MWGen will suffer additional harm from energy market costs in certain cases if the units are in a forced curtailment. In the case where a MWGen unit receives a day ahead energy market award for providing energy and, during real time operations was unable to supply power due to a forced curtailment, it would have to purchase from the market an amount of electricity equivalent to what it had committed to deliver. The cost of this replacement power can be very high, particularly in times of high demand and/or emergency operations. PJM load-weighted average LMP in August 2017 was \$28/MWh, but COMED zone LMPs were sometimes as high as \$600-\$700/MWh. MWGen has no ability to pass these penalties and costs on to consumers. As an independent power producer, it must present competitive bids for its energy capacity to PJM's market. If MWGen were to attempt to raise offer prices to recover these penalties the resources

⁶⁰ The penalty is subject to a balancing-ratio calculation, which can send the penalty above or below \$8.50/MW-d depending on energy production and energy demand on the day of the emergency. The capacity costs estimated reflect NRG's estimate of the balancing ratio.

would be at significant risk of losing all revenues by effectively bidding its resources out of the market.

e. “Evaluate the economic benefits of cleaner water.”

The Interim Guidance also suggests consideration of whether the “cleaner water” produced through the underlying water quality standards will generate economic benefits. The EA thermal demonstration study for the Will County Station shows that the current thermal discharge temperatures, even under “worst case” scenarios, protect the balanced, indigenous, community of aquatic life in the CSSC. There is no discernable economic benefit to the community or to the state if the temperature of the CSSC is lowered.⁶¹

Based on the thermal and fish data collected so far, MWGen believes that the Joliet DSP, once complete, will be able to demonstrate that existing thermal effluent loading will also not cause any harm to the balanced, indigenous, community of aquatic life in the UDIP or, if applicable, the Five-Mile Stretch. As such, there are no meaningful economic benefits to be had by converting the MWGen Stations to closed-cycle cooling.⁶²

Finally, the Interim Guidance suggests looking at whether economic benefits will accrue to downstream dischargers that might benefit from additional assimilative capacity. As discussed, above, at Section IV.F.2, the thermal dischargers downstream of the Will County and Joliet Stations have thermal discharge volumes that are much smaller than the thermal discharge volumes of the MWGen Stations. Their discharge volumes also are much smaller than the flow of the Lower Des Plaines River, which means that their thermal discharges are capable of quickly dissipating within a very small “mixing” area of the receiving water. As such, EA’s preliminary determination is that they already have sufficient assimilative capacity in the waterway to operate unimpeded, although additional time is necessary to confirm this expectation and to determine the availability of sufficient assimilative capacity during “worst case” conditions.

⁶¹ The CSSC already has limited recreational uses and is limited to recreational activities causing only incidental contact with the water. *See* 35 Ill. Admin. Code 301.282 & 303.225(c).

⁶² As noted earlier, in Section IV.G.2.b, unknown factors are currently suppressing the population of Asian carp in the UDIP, which improves the effectiveness of the Brandon Road Lock and Dam in preventing upstream expansion. Thus, improvements in habitat or water quality could cause the populations to increase, and cause economic harm not only in the UDIP, but in the CAWS system as a whole and Lake Michigan.]

Realistically, the only industrial facility that is likely to generate enough heated effluent to compete with the Will County and Joliet Stations for assimilative capacity would be another generating station. And, to state the obvious, there would be no economic advantage to shutting down existing power plants so that a new one could be constructed.

f. “Public comment and debate period.”

The Interim Guidance includes an item with this title, but little explanation is given for the purpose of this step. It would appear to be met by the public notice of this variance request and the ability of members of the public to participate in this proceeding.

g. “If substantial and widespread economic and social impacts are demonstrated, determine which pollution option should be implemented.”

This provision duplicates the provision of Subpart E regarding Pollutant Minimization Programs. See 35 Ill. Admin. Code 104.530(a)(13). This issue is discussed, below, at Section IV.N.

H. Demonstration to assure that the proposed highest attainable condition does not conflict with the attainment of downstream water quality standards (Section 104.530(a)(17))

Under the last two years of operation of the MWGen Stations, there have been no exceedances of the General Use numeric thermal standards in the Five-Mile Stretch at the I-55 Bridge. Based on the work completed thus far as part of the Joliet DSP, there is compelling evidence that the dischargers named in this TLWQS petition do not meaningfully interfere with the attainment of water quality standards beyond the I-55 Bridge. The Demonstration Study being prepared by EA pursuant to the Joliet DSP will focus on the UDIP, but will also provide an assessment of Five-Mile Stretch biological conditions, based on available data.

I. Identification, by name of the permit holder and permit number, of the permits held by dischargers that might be affected by the adoption of the TLWQS. (Section 104.530(a)(9))

- MIDWEST GENERATION, LLC-WILL CO – NPDES Permit No. IL0002208
- MIDWEST GENERATION, LLC-JOLIET 9 – NPDES Permit No. IL0002216
- MIDWEST GENERATION, LLC-JOLIET 29 – NPDES Permit No. IL0064254
- Stepan Company – Elwood - NPDES Permit No. IL0002453
- Flint Hills Resources Chemical Intermediates. LLC – NPDES IL0001643
- Exxon Mobil Joliet Refinery – NPDES IL 0002861⁶³

⁶³ The Agency has said that “[b]ased on the Agency’s understanding and the review of initial data,” it is “possible but not likely” that the TLWQS standards requested by MWGen and FHR will affect Exxon Mobil (Agency’s Response, at 3.) Subsequently, while setting the class of dischargers for this petition, the Board cited Exxon Mobil as a “potentially-affected discharger, subject to the

J. The proposed highest attainable condition of the watershed, water body, or waterbody segment identified in subsection (a)(4) expressed as set forth in Section 104.565(d)(4), including projected changes in the highest attainable condition throughout the proposed term of the TLWQS (Section 104.530(a)(12))

Neither Section 38.5, nor the Board's TLWQS regulations define "highest attainable condition." According to U.S. EPA guidance documents regarding water-quality-standards variances, the highest attainable condition is "the condition that is both feasible to attain and is closest to the protection afforded by the designated use and criteria." U.S. EPA, Essay 8, at p. "3-298".

The Board's TLWQS regulations ask that petitioners describe the highest attainable condition in one of three ways

1. The highest attainable interim criterion; or
2. the interim effluent condition that reflects that greatest pollutant reduction achievable; or
3. if no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the State adopts the WQS variance, and the adoption and implementation of a Pollutant Minimization Program.

35 Ill. Admin. Code 104.565(d)(4)(A).

In the past, the U.S. EPA has explained that the "highest attainable interim criterion" and the "interim effluent condition" are two sides of the same coin:

Rather than identifying the highest attainable interim use and interim numeric criterion, a state . . . may choose to specify in its variance that the applicable interim water quality standard shall be defined by a numeric effluent condition that reflects the highest attainable condition for a specific permittee(s) during the term of the variance. Adopting a numeric effluent condition that reflects the highest attainable condition is reasonable because the resulting instream concentration reflects the highest attainable interim use and interim criterion and, therefore, the interim numeric effluent

Agency's further evaluation" (Board's Order of August 12, 2017). MWGen has no information on the status of the Agency's evaluation, and its listing of Exxon Mobil's NPDES permit does not constitute an admission that Exxon Mobil will be affected by the TLWQS standards requested here.

condition is acting as a surrogate for the interim use and interim criterion.

78 Fed. Reg. 54518, 54534 (Sept. 4, 2013) (proposed rule).

So in this context, the highest attainable interim criterion is a limit on the temperature of the main body of the receiving waters. The interim effluent condition would be a limit on the temperature of the permitted outfalls that are part of this TLWQS petition. Historically, the NPDES permits for the Will County and Joliet Stations place thermal limits on near and far-field waterway temperatures (subject to an appropriate mixing zone for the near-field limits) and place no direct limits on the temperature of the MWGen Stations' effluent.

Thus, this petition recommends that the highest attainable condition be expressed using two highest attainable interim criteria, one for the CSSC and Brandon Pool and the other for the UDIP and Five-Mile Stretch (to the extent that it could potentially be affected by upstream heat sources under adverse conditions.) This also avoids having to create six separate interim effluent conditions for each of the dischargers in the "class" of this multi-discharger petition.

Finally, because MWGen has no feasible pollutant control technology, it is describing this highest attainable interim criterion in conjunction with a Pollution Minimization Program. 35 Ill. Admin. Code 104.565(d)(4)(A). This Program is described below in Section IV.N.

1. Will County Receiving Waters

As discussed above, the Will County Station can comply with the General Use thermal standards most of the time. However, under conditions of low flow and elevated ambient temperatures, the Station cannot comply with the General Use standards, and while these "worst case" scenarios are uncommon, the 1% excursion hour allowance is insufficient. Based on Demonstration Studies performed as part of MWGen's Will County Station 316(a) Petition, the following thermal standards are the highest attainable condition (expressed as the highest attainable interim criterion) of the waterway.

(1) Water temperature at representative locations in the Chicago Sanitary and Ship Canal shall not exceed the maximum limits listed below for more than 5% of the time in a calendar year. Moreover, at no time shall water temperature exceed the daily maximum limit by more than 1.7°C (3°F).

(2) A zone of passage for aquatic life in which the proposed thermal alternative effluent limits are met shall be maintained at 50% or greater at all times.

(3) Proposed Numeric Thermal Alternative Effluent Limits for Will County Generating Station:

| Month | Daily Maximum (°F) |
|------------------------|--|
| January | 70 |
| February | 70 |
| March | 75 |
| April | 80 |
| May | 85 |
| June | 93 |
| July | 93 |
| August | 93 |
| September | 93 |
| October | 90 |
| November | 85 |
| December | 75 |
| Excursion Hours | Daily maximum not to be exceeded by more than 5% of the time in a calendar year; at no time shall water temperature exceed the maximum limits by more than 3°F |

MWGen’s Pollution Minimization Program for the Will County Station is described in Section IV.N, below.

2. UDIP Receiving Waters

Because the Subpart K thermal demonstration study for the Joliet Stations is not yet complete, MWGen cannot provide as detailed a description of the highest attainable condition (expressed as a highest attainable interim criterion) as it can for the Will County Station. Based on a preliminary review of the data collected by EA pursuant to the Joliet DSP, MWGen believes that the highest attainable condition in the UDIP can be represented as the interim thermal standards currently in effect under 35 Ill. Admin. Code 302.408(b). But, as originally proposed in MWGen’s 2015 variance petition and based on the preliminary data collected by EA, the waters can attain an interim criterion prohibiting temperatures above 96°F at any time, instead of the 100°F limit in section 302.408(b). Thus, MWGen believes that the interim criterion should incorporate a 96°F

thermal maximum. MWGen submits that the proposed interim criteria should also apply to the downstream dischargers identified in this petition, namely FHR, Stepan and ExxonMobil, at the edge of any allowed mixing zones for their discharges.

Compliance by the MWGen Stations with these standards would be measured at the edge of the allowed 26-acre mixing zone, as described in the current permits for the Joliet Stations. (Exhibits Z & AA) It also reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at this time, including the “helper” cooling towers at Joliet 29. It is also in accordance with the Pollution Management Plan for the facility, which calls for it to derate as necessary to avoid exceeding the maximum allowable temperature.

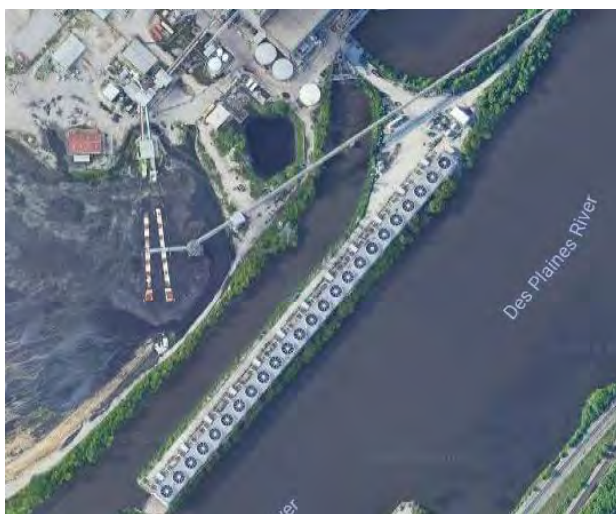


Figure 14 - "Helper" Towers at Joliet 29

MWGen further proposes that once it has completed the Joliet Station Subpart K demonstration study report, if the alternative effluent limits proposed in that study are stricter than the interim effluent criteria requested here, they should become the highest attainable interim criterion for the remainder of the TLWQS term.⁶⁴ This should go into effect if and when (1) MWGen files a Subpart K Petition for alternative effluent limits for Joliet 9 & Joliet 29, and (2) the EPA recommends that the Board grant the requested Subpart K relief, pursuant to 35 Ill. Admin. Code 309.263.

MWGen’s Pollution Minimization Plan for the UDIP is described below, in Section IV.N.

⁶⁴ As discussed in Section IV.F.2, FHR, Stepan, and ExxonMobil should be able to meet the highest attainable interim criterion at their outfalls much of the time and at the edge of allowed mixing zones during more challenging ambient conditions.

3. Five-Mile Stretch

The AS 96-10 thermal standards at the I-55 Bridge were only exceeded during abnormally warm and drought conditions in 2012.⁶⁵ It is reasonable, however, to believe that compliance with the AS 96-10 standards can be maintained, even during an abnormally warm summer, because of the subsequent shutdowns of the Crawford and Fisk Stations, the “mothballed” status of Unit 3 at Will County Station, and the conversion of the Joliet Stations to “peaker” operations. Thus, MWGen offers that the AS 96-10 thermal standards represent the highest attainable interim criterion for the I-55 Bridge, as well as the downstream waters of the Five-Mile Stretch, considering the absence of additional feasible pollution control technology, and the Pollution Minimization Program described below.

The Joliet Stations’ Subpart K demonstration studies will include an evaluation as to whether AS 96-10 relief is still needed under expected future operating conditions at the Joliet stations, and if so, whether these alternate thermal limits continue to be protective of a balanced, indigenous community of aquatic life at the I-55 Bridge. It will also look at whether the AS 96-10 standard needs to be modified, and whether such a modification will also protect a balanced, indigenous community of aquatic life. MWGen proposes that once it has completed its demonstration study, if the alternative effluent limits proposed in that study are stricter than those presented here, the TLWQS relief requested here should include a provision that the alternative effluent limits will become part of the TLWQS relief as the highest attainable condition. Alternatively, if no alternative effluent limits applicable at the I-55 Bridge are needed, then that portion of the requested TLWQS in this Petition would terminate and the General Use thermal standards would apply at the I-55 Bridge. This modification to the requested TLWQS relief should go into effect when (1) MWGen files a petition for alternative effluent limits at Joliet 9 & Joliet 29, and (2) the IEPA recommends that the Board grant the requested Subpart K relief, pursuant to 35 Ill. Admin. Code 309.263.

K. The proposed term of the TLWQS and justification that it is only as long as necessary to achieve the highest attainable condition, which includes a description of the relationship between the proposed pollution control activities and the proposed term; (Section 104.530(a)(14))

⁶⁵ As a formal matter, these standards were not exceeded, because the Stations’ owner obtained provisional variances and complied with the thermal limits set out in those temporary variances. See Section IV.E.2.

1. Will County Receiving Waters

MWGen is seeking a TLWQS term long enough for the Board to complete evaluation of the Will County Station's pending Subpart K AEL Petition (IPCB Docket No. PCB 2018-58) and, assuming the Board grants Subpart K relief, to obtain the U.S. EPA's decision on any Subpart K relief granted by the Board. Obviously, MWGen does not know how the Board will rule on the pending Subpart K AEL Petition or if Subpart K relief is granted, whether and when the U.S. EPA will approve any such relief. As to U.S. EPA, MWGen can only say that it sent a copy of the Will County thermal demonstration to U.S. EPA Region 5 on January 10, 2018 and has not received any response.

Because of these inherent uncertainties, MWGen is requesting that the TLWQS, as it pertains to the Will County Station, run until June 30, 2020 which should allow sufficient time to complete the pending Will County Station Subpart K proceeding and to obtain U.S. EPA approval of any relief granted. It also should provide sufficient time for MWGen to seek an extension of the term of the TLWQS on appropriate grounds should either the Board or the U.S. EPA disapprove the requested Subpart K relief and/or if the Board or the U.S. EPA requires any additional issues be addressed or requests additional supporting data for the Subpart K thermal demonstration is required before obtaining either approval. The term of the TLWQS may expire sooner than June 30, 2020 if before that date, Subpart K relief is granted by the Board, approved by the U.S. EPA and such relief is incorporated into the Will County Station's modified or renewed NPDES permit.

2. UDIP and I-55 Bridge

MWGen asks that the term for the TLWQS, as it relates to thermal dischargers to the UDIP, should be set based on the anticipated filing dates of the Subpart K petitions for alternative effluent limits at Joliet 9 and Joliet 29. As discussed above, based on the state of work already completed under the Joliet DSP, and the anticipated schedule for the remaining work to be done, the petition will be filed by January 31, 2020.

Accordingly, MWGen is asking for this part of the TLWQS to run until June 30, 2022. This is two years after the end of the TLWQS term for the Will County Station because the completion of the Joliet Station demonstration study will take two years longer than the study for the Will County Station. Because the Joliet Stations' study is not complete, it is not yet known whether the IEPA or IDNR will endorse its conclusions, as they did with the Will County Station's

Subpart K Petition and demonstration study. Nonetheless, June 30th, 2022 is reasonably expected to provide sufficient time to address even unexpectedly serious objections from the IEPA, IDNR, the Board or the U.S. EPA to the requested Subpart K relief for the Joliet Stations. The term of the TLWQS may expire sooner than June 30, 2022 if before that date, Subpart K relief is granted by the Board, approved by the U.S. EPA and such relief is incorporated into the respective Joliet Stations' modified or renewed NPDES permits.

3. Proposed Reevaluation schedule to reevaluate the highest attainable condition during the term of the TLWQS, if the proposed term of the TLWQS is longer than five years. (Section 104.530(a)(15))

The proposed term of the TLWQS is less than five years.

L. An identification and description of any process, activity or source that contributes to a violation of a water quality standard, including the material used in that process or activity (Section 104.530(a)(10))

Temperatures in the waterbody are influenced by multiple factors. There are six permitted thermal discharges into the waterbody that are part of the subject class of thermal dischargers: Will County Station, Joliet 9, Joliet 29, FHR, Stepan, and ExxonMobil. MWGen uses the water to cool equipment that has been heated through the combustion of coal or natural gas. The other dischargers will discuss the processes that cause them to generate heated effluent and the materials, if any, that are used in that process in separate pleadings. *See* 35 Ill. Admin. Code 104.530(d).

As discussed above, the waterbody temperatures are affected by factors unrelated to the dischargers. The waterway is unnatural and has limited overhanging vegetative cover, which can result in greater solar influences on water temperature during warmer weather periods. Also, the flows in the waterway are manipulated by the United States USACE for navigational purposes, and this can create a “bathtub” effect, when flow in the river dramatically slows and slows dissipation.

Finally, aquatic life within the CSSC and Brandon Pool risk being eradicated by piscicides, should the Asian carp present in the UDIP manage to migrate upstream through the Brandon Road Lock and Dam, thereby triggering natural resources agencies to implement this measure to prevent the spread of this species into Lake Michigan. This already occurred once in 2009, when Rotenone was administered to the CSSC near the Will County Station, and it remains part of the Multi-Agency Contingency Response Plan. Monitoring and Response Work Group, *2017 Asian Carp*

Monitoring and Response Plan, at 124.⁶⁶ Rotenone is highly toxic, not just to Asian carp, but to all fish and aquatic invertebrates. The decision to implement this response plan is in the sole discretion of IDNR, which already has a permit from the IEPA authorizing these discharges. See NPDES Permit No. ILG87.⁶⁷

M. A description and copies of all Pollutant Minimization Plans that are relevant to the relief requested and are currently being implemented or were implemented in the past (Section 104.530(a)(11))

A Pollutant Minimization Plan is not a defined term within the Board's TLWQS regulations. MWGen does not have a formal Pollutant Minimization Plan, because typically, the only dischargers that have these Plans are dischargers that have previously obtained a TLWQS variance. Because Will County and Joliet Stations have never received a TLWQS variance, they have no prior Pollution Minimization Plans, and they are not currently implementing a Pollution Minimization Plan. Further, as stated above, the MWGen Stations do not have any means of reducing their current thermal discharges other than to derate, or even deactivate, the Stations. MWGen has reduced its thermal loading to the subject waters by the closures of Fisk and Crawford Stations and the "mothballing" of Unit 3 at the Will County Station. It does not have the ability to do more to further minimize thermal discharges to these waters.

N. A demonstration of pollutant control activities proposed to achieve the highest attainable condition, including those activities identified through a Pollutant Minimization Program (Section 104.530(a)(13))

The Board defines a "Pollutant Minimization Program" as "a structured set of activities to improve processes and pollutant controls that will prevent and reduce pollutant loading." 35 Ill. Admin. Code 104.515. Over the last two decades, both the Will County Station and the Joliet Stations have significantly reduced their thermal output and added pollution control technology.

Power generating stations have few options, outside of large scale engineering projects—like the helper towers installed at Joliet 29—or decreased operations, to reduce their thermal effluent discharge. Both the Will County Generating Station and the Joliet Stations have

⁶⁶ Available at <http://www.asiancarp.us/documents/MRP2017.pdf>.

⁶⁷ Available at <http://www.epa.illinois.gov/Assets/iepa/water/permits/pesticide/general%20permit.pdf>.

significantly reduced their operations. In 2010, Will County Station had four generating units with a total capacity of 1,163 MW. It now has only one generating unit, which produces 551 MW.

Indeed, as discussed above, the operations at the Joliet Stations are now so intermittent that it is difficult to collect enough data on the operations to develop the thermal model necessary to predict the effect of the Stations' thermal discharges on the receiving waters' ambient temperatures.

The Joliet Stations are also subject to significant operational limits that are required to comply with their Illinois air permit. Permit I.D. No. 197809AAO (Exhibit BB). The permit restricts the three generating stations at the Joliet Stations to about 70 million MMBtu/year. The three units there have the capacity to produce around 140 million MMBtu/year, MWGen must run them on a 50% capacity factor to comply with the permit. *Id.* at 11.⁶⁸

Accordingly, MWGen proposes that its Pollution Minimization Plan consist of continuing to maintain and operate the pollution-control equipment existing at the Stations and to fully comply with the existing NPDES permits for the Stations, including any requirements added by permit modifications resulting from the approval of this TLWQS petition.

V. CONCLUSION

MWGen has diligently pursued the Board's guidance from the 2015 UAA Rulemaking, and it has been pursuing relief for thermal standards for the Will County and Joliet Stations. For the Use B (CSSC and Brandon Pool) portions of the waterway at issue here, MWGen has already demonstrated in its pending January 2018 Subpart K Petition that the General Use thermal standards are more stringent than necessary to protect the tolerant and moderately tolerant species that habitate the CSSC and Brandon Pool. The IEPA and IDNR agree with that conclusion. MWGen is reasonably seeking a limited duration TLWQS to allow the time necessary to obtain relief from the Board and the approval of that relief from the U.S. EPA, which is not expected to exceed the proposed two-year period extending to July 1, 2020 and could be much shorter.

MWGen has been no less diligent in pursuing thermal relief for the Joliet Stations. But because in 2016 the Joliet Stations were converted to gas and so now operate as "peakers," the

⁶⁸ Page 6 of the permit identifies that the three generating units at the Joliet Stations have the capacities to run at 3,543 mmBtu/hr, 6,034 mmBtu/hr, and 6,386 mmBtu/hr. When these numbers are expressed as an annual capacity (multiplying by 8,760 hours/year) this produces the 140,000,000 mmBtu/yr figure.

necessary studies to support a Subpart K thermal demonstration are still ongoing. But due to the reduced thermal loadings that accompany the change in the Joliet Stations' operations, MWGen has achieved reduced thermal loadings to the UDIP while it seeks the necessary thermal relief to keep these generating stations operating to remain financially viable. MWGen is not asking for an inordinate amount of time to complete the pursuit of alternative thermal standards for the UDIP and, if necessary, for any affected portion of the General Use waters at and below the I-55 Bridge.

It is appropriate to use a TLWQS to provide a petitioner time to conduct additional studies to assess what kinds of conditions can be feasibly attained in a waterbody. This purpose is found both in U.S. EPA guidance documents and in actual practice by state regulators, particularly those in Colorado. And, in effect, the three-year delayed applicability date that the Board granted in the UAA Rulemaking was a TLWQS Variance, functionally indistinguishable from the temporary modifications granted by Colorado to study site-specific criteria and use attainability. Thus, the relief requested in this TLWQS variance is best understood as a request to extend the term of a pre-existing TLWQS variance.

Both this Board's regulations and the U.S. EPA guidance make clear that a TLWQS variance must be tied to one or more UAA Factors. MWGen has demonstrated that one or more UAA Factors are satisfied here. As a matter of first impression, MWGen has demonstrated under UAA Factor 6 that widespread social and economic harm would result from requiring compliance with the new Use B and UDIP thermal standards. The loss of production from the Will County and Joliet Stations would be likely to occur at times of peak demand and would have a significant impact on grid reliability if the plants were forced to derate in order to comply with unnecessarily stringent thermal standards. This would cause millions of consumers in the local transmission network, and in some nearby networks, to pay higher energy prices and face the risks associated with relying on power from a less resilient network than one that includes the Will County and Joliet Stations.

Nor is UAA Factor Six the only applicable factor. The Board's conclusion that habitat in the UDIP might one day improve to the point that more tolerant species can survive there also recognizes that the UDIP does not provide quality habitat as of today. Maybe one of the most common uses of TLWQS variances is to cover the situation faced here: Where an impairment in a waterway is not permanent but cannot be remedied in the near future and prevents the attainment of the waterway's designated use. MWGen does not know of any plans by any entity to conduct

the habitat restoration that the Board alluded to in the UAA Rulemaking, and certainly there are no efforts projected for completion during the period of this requested TLWQS. The UDIP is currently not attaining its designated use because it lacks quality habitat necessary to do so, not because of thermal discharges. This accords with the data collected so far by EA, which shows no change in the populations of intolerant species in the UDIP, even during unusually cool water temperatures. Indeed, the USACE and IDNR have noted that the habitat is so low-quality that it might be playing a role in stopping the spread of Asian carp nuisance species (which are fairly tolerant) into the rest of the CAWS.

MWGen is not requesting the continuation of the status quo for the CSSC, Brandon Pool, and UDIP. For the CSSC and Brandon Pool, it is committing to maintain a “highest attainable condition” of thermal levels that are significantly more stringent than the previous Secondary Contact standards. And for the UDIP, it is committing to a lower maximum allowed temperature (96°F instead of 100°F) and perhaps more stringent standards if in the future EA’s Subpart K Demonstration Study concludes that such standards are necessary to preserve a balanced, indigenous, community in the UDIP.

And most importantly, the status quo in the waterway has already undergone significant changes since the UAA Rulemaking. Will County has mothballed one of its two generating units and discharges significantly less heat into the waterway than it did previously. The same is true for the Joliet Stations, which do not operate most days of the year, and which have adopted a significantly lower capacity factor as part of their IEPA air permit. Those changes are completed parts of this petition’s Pollutant Minimization Plan and are undoubtedly the most impactful parts of that Plan. MWGen will maintain this “new status quo” during the term of the TLWQS variances requested here.

Therefore, MWGen respectfully requests that the Board grant the following TLWQS relief:

(1) For the Will County Station, a TLWQS until June 30, 2020. The term of the TLWQS may expire sooner than June 30, 2020 if before that date, Subpart K relief is granted by the Board, approved by the U.S. EPA and such relief is incorporated into the Will County Station’s modified or renewed NPDES permit. The TLWQS conditions are as follows:

- (1) Water temperature at representative locations in the Chicago Sanitary and Ship Canal shall not exceed the maximum limits listed below for more than 5% of the time in a calendar year. Moreover, at

no time shall water temperature exceed the daily maximum limit by more than 1.7°C (3°F).

(2) A zone of passage for aquatic life in which the proposed thermal alternative effluent limits are met shall be maintained at 50% or greater at all times.

(3) Proposed Numeric Thermal Alternative Effluent Limits for Will County Generating Station:

| Month | Daily Maximum (°F) |
|------------------------|--|
| January | 70 |
| February | 70 |
| March | 75 |
| April | 80 |
| May | 85 |
| June | 93 |
| July | 93 |
| August | 93 |
| September | 93 |
| October | 90 |
| November | 85 |
| December | 75 |
| Excursion Hours | Daily maximum not to be exceeded by more than 5% of the time in a calendar year; at no time shall water temperature exceed the maximum limits by more than 3°F |

(2) For the Joliet Stations and downstream thermal dischargers in the UDIP, including FHR, Stepan and ExxonMobil, a TLWQS that begins on July 1, 2018 and ends on June 30, 2022, provided however that the term of the TLWQS may expire sooner than June 30, 2022 if before that date, Subpart K relief is granted to the Joliet Stations by the Board, approved by the U.S. EPA and such relief is incorporated into the respective Joliet Stations' modified or renewed NPDES permits. During the term of the TLWQS, the UDIP will not exceed 93°F more than 5% of the time, or 96°F at any time. Where a thermal discharger's NPDES permit allows a mixing zone, these temperature standards shall apply at the edge of the allowed mixing zone.

MWGen has made a significant effort to, and believes it has presented, sufficient information in this Petition and its accompanying exhibits to satisfy each of the required contents under the Board's Rules. However, in the event that the Board finds that additional information is

necessary to satisfy the applicable requirements, then MWGen requests that it be given a reasonable amount of time to provide the additional information to address the Board's findings.

Respectfully submitted,

Midwest Generation, LLC

By: /s/Susan M. Franzetti

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Dated: June 27, 2018

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