BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE SPECIFIC	)	
RULE FOR SANITARY DISTRICT	)	R14-24
OF DECATUR FROM 35 ILL. ADM.	)	(Site Specific Rule – Water)
CODE SECTION 302.208(e).	)	

NOTICE OF FILING

TO: Don Brown
Clerk of the Board
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601
(VIA ELECTRONIC MAIL)

Tetyana Rabczak
Hearing Officer
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601
(VIA ELECTRONIC MAIL)

(SEE PERSONS ON ATTACHED SERVICE LIST)

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Illinois Pollution Control Board the **AMENDED PETITION FOR SITE SPECIFIC RULE, MOTION TO WAIVE REQUIREMENT TO SUBMIT 200 SIGNATURES, PROPOSED RULE LANGUAGE, and MOTION FOR LEAVE TO SUPPLEMENT,** copies of which are herewith served upon you.

Respectfully submitted,

SANITARY DISTRICT OF DECATUR

Dated: November 30, 2017

By: /s/ Joshua J. Houser
One of Its Attorneys

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CERTIFICATE OF SERVICE

I, Joshua J. Houser, the undersigned, on oath state the following:

That I have served the attached **AMENDED PETITION FOR SITE SPECIFIC RULE, MOTION TO WAIVE REQUIREMENT TO SUBMIT 200 SIGNATURES, PROPOSED RULE LANGUAGE, and MOTION FOR LEAVE TO SUPPLEMENT,** via electronic mail upon:

Don Brown
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That my email address is Joshua.Houser@heplerbroom.com.

That the number of pages in the email transmission is 1,265.

That the email transmission took place before 5:00 p.m. on the date of November 30, 2017.

/s/ Joshua J. Houser
Joshua J. Houser

Date: November 30, 2017

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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AMENDED PETITION FOR SITE SPECIFIC RULE

The SANITARY DISTRICT OF DECATUR ("District"), by and through its attorneys, HEPLERBROOM, LLC, and pursuant to 415 ILCS 5/27 and 5/28, and 35 Ill. Admin. Code §§ 102.202 and 102.210, hereby amends its pending petition with the Illinois Pollution Control Board ("Board") for a site specific rule. The proposed site specific rule would authorize an alternative chronic water quality standard for nickel according to the terms outlined in this Amended Petition for Site Specific Rule ("Amended Petition"). The District is submitting this amendment to update the pending petition with additional information acquired since the petition was originally filed with the Board on June 30, 2014 ("Original Petition").

I. PROPOSED SITE SPECIFIC RULE

The District is seeking a site specific rule to establish an alternative chronic water quality standard for nickel from the point of its Main Sewage Treatment Plant's ("Main Plant") discharge into the Sangamon River to the point of the confluence of the Sangamon River with the South Fork of the Sangamon River near Riverton.

The general use water quality standard for nickel, which is set forth in Section 302.208(e), is defined by a calculation for dissolved nickel based on stream hardness. 35 Ill. Admin. Code § 302.208(e). The acute standard for nickel is defined as "exp[A+Bln(H)] X 0.998*, where A=0.5173 and B=0.8460," and the chronic standard for nickel is defined as

"exp[A+Bln(H)] X 0.997*, where A=-2.286 and B=0.8460." *Id.* The acute standard for nickel "shall not be exceeded at any time," except as provided in Section 302.102. 35 Ill. Admin. Code § 302.208(a). The chronic standard for nickel "shall not be exceeded by the arithmetic average of at least four consecutive samples collected over any period of at least four days," except as provided in Section 302.102. 35 Ill. Admin. Code § 302.208(b). No change is proposed for the general use acute water quality standard for nickel.

The site specific chronic water quality standard for nickel proposed by the District would provide as follows:

> Section 303.410 Chronic Nickel Water Quality Standard for Segment of the Sangamon River
>
> The general use chronic water quality standard for dissolved nickel contained in Section 302.208(e) shall not apply to the Sangamon River, which receives discharges from the Sanitary District of Decatur's Main STP, from that facility's Outfall 001 located at 39° 49' 56" North Latitude, 89° 0' 7" West Longitude, to the point of the confluence of the Sangamon River with the South Fork of the Sangamon River near Riverton. Instead, nickel levels in such waters shall meet a chronic water quality standard for dissolved nickel as follows:
>
> > Chronic Dissolved Nickel Standard = exp[A+Bln(H)] x 0.997* x WER,
> > where A = -2.286, B = 0.846, ln(H) = natural logarithm of Hardness,
> > * = conversion factor multiplier for dissolved metals, and WER = 2.33

In addition, and as further discussed below, the District requests that the Board direct the Illinois Environmental Protection Agency ("Illinois EPA" or "Agency") to revise the District's National Pollutant Discharge Elimination System ("NPDES") permit to reflect that the District will be required to meet a total nickel permit limit based upon the site specific chronic water quality standard for nickel requested above, where the hardness value used in the equation shall be 359 mg/L critical hardness, as determined by the District's ambient monitoring and Illinois EPA's previous determination.

As more fully discussed below, this Amended Petition demonstrates the following:

- The proposed nickel bioavailability-based alternative to the existing general use chronic water quality standard is equally protective of aquatic life and stream use (no change is proposed to the general use acute water quality standard for nickel);
- Treatment to meet the existing general use chronic water quality standard for nickel is technically infeasible and economically unreasonable for the portion of the Sangamon River to which the Main Plant discharges; and
- The Board may grant the requested relief consistent with federal law because the proposed standard is protective of general use waters.

II. STATEMENT OF FACTS

A. District Facility and Operations

Located in Macon County, the District treats wastewater for the City of Decatur, the Villages of Forsyth, Mt. Zion, Oreana, and Argenta, and for industrial and commercial users in the Decatur, Illinois, metropolitan area. The District formed in 1917 and completed the original Main Plant, located at 501 Dipper Lane, Decatur, Illinois, in 1924. The District made major expansions and plant upgrades in 1928, 1957, 1964, and 1976, and completed the current plant in 1990. Numerous plant improvements to increase reliability and efficiency have been completed since 2002, and upgrades are ongoing. The District employs approximately 55 full-time employees and serves approximately 32,000 active billing accounts, including 25 significant industrial users ("SIUs"), and 2,400 other industrial and commercial users.

The Main Plant processes an average flow of approximately 28 million gallons per day ("MGD"), which is then discharged into the Sangamon River. The Main Plant has a design

average flow of 41.0 MGD and a design maximum flow of 125.0 MGD. Treatment at the Main Plant consists of screening, grit removal, primary clarification, activated sludge, secondary clarification, disinfection, dechlorination, discharge to surface water, anaerobic digestion, sludge thickening, and land application of sludge on area farmland. The District has an approved pretreatment program with 13 noncategorical SIUs and 11 categorical SIUs.

Two industrial users, Archer Daniels Midland Company ("ADM") and Tate & Lyle Ingredients Americas, Inc. ("Tate & Lyle"), contribute a large portion of the flow to the Main Plant. These companies process grain (corn and soybeans) and produce a variety of products. On an annual average basis, ADM and Tate & Lyle discharge approximately 10 MGD and 5 MGD, respectively, and constitute an average of approximately 45% of the District's flow. This percentage increases to as much as 56% of the District's flow during extended dry weather periods.

The Main Plant's main discharge is via Outfall 001 to the Sangamon River at 39° 49' 56" North Latitude, 89° 0' 7" West Longitude. At the discharge point, the Sangamon River is designated as a General Use Water under Section 303.201 of the Board's rules.

B. District's Current NPDES Permit

The District's NPDES permit (No. IL0028321) was issued by Illinois EPA on April 20, 2007, effective on July 1, 2007, modified on July 1, 2009, and originally set to expire on June 30, 2012, a copy of which is attached as Exhibit 1. However, because the District submitted a timely application for renewal of its NPDES permit on December 21, 2011, the District's NPDES permit is administratively continued pursuant to 35 Ill. Admin. Code § 309.104(a).

As issued on April 20, 2007, Special Condition 18 of the NPDES permit included a nickel effluent limit that Illinois EPA calculated using the general use water quality standard formula in Section 302.208(e). Specifically, the permitted nickel effluent limit was 0.011 mg/L measured as a monthly average with no daily maximum concentration limit stated. Special Condition 18 also included the following schedule for achieving compliance with the permitted nickel effluent limit (as well as the effluent limit for zinc):

a. An interim report on effluent and stream sampling to date and what measures are necessary to comply with final nickel and zinc limitations shall be completed 6 months from the effective date of the current NPDES permit, meaning by January 1, 2008.

b. An interim report shall be completed 12 months from the effective date of the current NPDES permit, meaning by July 1, 2008.

c. An interim report shall be completed 18 months from the effective date of the current NPDES permit, meaning by January 1, 2009.

d. The District must achieve compliance with final nickel and zinc limitations 24 months from the effective date of the current NPDES permit, meaning by July 1, 2009.

According to an Illinois EPA memorandum regarding the water quality based effluent limits in the District's 2007 NPDES permit, the nickel standard included therein was "based on hardness data collected at AWQMN station E-05, Sangamon River, SE of Niantic, with a critical hardness value of 242 mg/L as $CaCO_3$." Memorandum from S. Twait, Illinois EPA, to R. Hahn regarding Water Quality Based Effluent Limits, Decatur Sanitary District, NPDES #IL0028321 (Macon County) (Nov. 9, 2006), attached as Exhibit 2.

In addition, pursuant to Special Condition 17 of the 2007 NPDES permit, the District performed a Translator Study to determine the acute and chronic metals translators for nickel in the discharge from the Main Plant's final effluent. The main reference for the Translator Study

was "The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion," United States Environmental Protection Agency ("USEPA"), EPA 823-B-96-007 (June 1996). On December 20, 2007, the District forwarded the Translator Study to Illinois EPA as part of its first Interim Report, attached as Exhibit 3. Subsequently, Illinois EPA advised the District that, based on the Translator Study, the nickel permit limit could be adjusted to 0.015 mg/L (monthly average). *See* letter from S. Twait, Illinois EPA, to T. Kluge, District (Apr. 24, 2009), attached as Exhibit 4.

Accordingly, Illinois EPA modified the District's NPDES permit on July 1, 2009. Among other revisions made to the NPDES permit, Illinois EPA changed the permitted nickel and zinc limits based on the metals translators. *See* Exhibit 1, at cover letter. Specifically, Illinois EPA revised the nickel effluent limit to 0.015 mg/L measured as a monthly average with no daily maximum concentration limit stated. *Id.* at Special Condition 17.

In the modified NPDES permit, Illinois EPA also extended the existing compliance schedule for nickel and zinc from two years to three years, explaining as follows:

> This extension is necessary because work performed to date has not allowed achievement of numeric limitations for nickel and zinc. Work performed includes a translator study, source investigation and source elimination or reduction including change of cooling water additives containing zinc, housekeeping practices, pH addition and other investigations. The additional time will be used to investigate other treatment techniques that would include electro-coagulation and methods to break the [gluten] nickel [chelating] bond.

Id. at cover letter.

Special Condition 17 of the modified NPDES permit provided the extended compliance schedule, as follows:

1) An interim report on effluent and stream sampling to date and what measures are necessary to comply with final nickel and zinc limitations shall be completed 6

months from the effective date of the current NPDES permit, meaning by January 1, 2008.

2) An interim report shall be completed 12 months from the effective date of the current NPDES permit, meaning by July 1, 2008.

3) An interim report shall be completed 18 months from the effective date of the current NPDES permit, meaning by January 1, 2009.

4) An interim report shall be completed 24 months from the effective date of the current NPDES permit, meaning by July 1, 2009.

5) An interim report shall be completed 30 months from the effective date of the current NPDES permit, meaning by January 1, 2010.

6) The District must achieve compliance with final nickel and zinc limitations 36 months from the effective date of the current NPDES permit, meaning by July 1, 2010.

C. District's Variance for Nickel

On June 15, 2009, the District petitioned the Board for a variance that would authorize continued discharges of nickel and zinc from the District's Main Plant into the Sangamon River. *See Sanitary Dist. of Decatur v. Illinois EPA*, PCB No. 09-125. Specifically, the District sought a variance from the general use water quality standards for nickel and zinc (35 Ill. Admin. Code § 302.208(e)) and the rule establishing the methodology for developing water quality based effluent limits as it applies to nickel and zinc (35 Ill. Admin. Code § 304.105). The District requested the temporary relief to provide additional time to investigate and evaluate potential compliance options for its nickel and zinc discharges.

On January 7, 2010, the Board granted the District's requested variance, subject to the following conditions:

a. The variance applies only to the District's Main Plant, located at 501 Dipper Lane in Decatur, Macon County, and only with respect to the

District's discharge to the Sangamon River from the Main Plant's Outfall 001.

b. The variance begins on January 7, 2010, and ends on July 1, 2014.

c. The District must continue plant influent and effluent monitoring for nickel and zinc, along with monitoring upstream and downstream of the discharge in the Sangamon River. Monitoring for nickel and zinc must be performed at least twice monthly. Downstream monitoring must include at least the four locations in the Sangamon River referenced in the District's petition.

d. If the District has not already done so, the District must amend its pretreatment ordinance as soon as possible to include nickel and zinc limits for all Significant Industrial Users (SIUs), present and future, that will ensure compliance with the effluent limits for those parameters set forth in the District's National Pollutant Discharge Elimination System (NPDES) permit.

e. The District must investigate the possible development of stream flow-based compliance options; continue to investigate updated toxicity information and possible alternatives for applying a nickel water quality standard; and continue to investigate the possible development of a site-specific water quality standard.

f. The District must require, through authorizations to discharge issued by the District under its pretreatment ordinance, industrial monitoring for nickel and zinc at least twice monthly at Archer Daniels Midland Company (ADM) and Tate & Lyle Ingredients Americas, Inc. (Tate & Lyle) and at least semi-annually at other industrial users that could discharge nickel and zinc.

g. The District must continue refinement of pretreatment local limits for nickel and zinc necessary to meet its NPDES permit effluent limits, and must continue work with ADM and Tate & Lyle on options for achieving compliance with local limits. The District must require, through authorizations to discharge issued by the District under its pretreatment ordinance, that ongoing verification monitoring be conducted to confirm that cooling tower treatment programs are achieving the necessary zinc reductions. The District must remain in frequent contact with ADM personnel regarding ADM's ongoing work identifying nickel sources and control options and must continue to meet with ADM personnel at least semiannually and exchange information, and must meet more frequently as needed.

h. The District must require, through an authorization to discharge issued by the District under its pretreatment ordinance, that ADM complete the technology review as described below. Technologies may be evaluated based on compliance strategies involving both individual process streams and total effluent flows.

i. By December 31, 2010, complete technical and economic feasibility reviews for the following control technologies. The reviews must include determination of technical feasibility, capital and operating costs, reliability, and pilot testing as appropriate.

A. Nickel – Proprietary Precipitation Process. A wastewater treatment chemical company has evaluated process streams and has reported positive results for a metals precipitation process. Work is ongoing to determine feasibility and confirm results.

B. Nickel – Chemical Precipitation Process Using Carbamates or Organic Sulfides. Discussions with wastewater experts for metals have identified chemicals suited for low concentration precipitation of metals. Work is underway to complete confidentiality agreements and contracts to further evaluate. Concurrently, ADM has begun evaluation of these chemicals as provided by GE Betz Company.

C. Nickel – Reuse of Ion Exchange Resin. ADM currently disposes of resins from the fructose process that are no longer of suitable quality. Initial tests have indicated that there is suitable capacity to provide effective nickel reductions. The difference between use of spent ion exchange resin and the ion exchange process reviewed and determined to be infeasible is that the spent resin would not be regenerated, which saves significant chemical and energy costs.

D. Nickel and Zinc – Soybean Process Stream Alternative. ADM is considering installation of a thickening system necessary for sale of this product as a feed or fertilizer additive. Installation is dependent on funding and procurement of customers.

E. Nickel and Zinc – BioProducts Process Stream Alternative. ADM is reviewing options to install equipment to thicken a process stream for use as a fertilizer additive.

F. Nickel and Zinc – WWTP Sludge Removal System. Evaluation of options for sludge removal and management for the WWTP.

G. Nickel and Zinc – Reverse Osmosis. ADM has completed preliminary technical and cost evaluation for treating a portion of the effluent with reverse osmosis. Review has concluded that the technology will work to reduce both nickel and zinc. However, capital and operating costs are prohibitive based on the volume of wastewater to be treated. Continued evaluation of this option will occur in combination with other potential treatment options.

H. Nickel and Zinc – Sludge. Discussions are scheduled concerning a device that breaks apart WWTP organisms. The purpose would be to change the characteristics of the anaerobic sludge, stop its carryover, and thus lower nickel and zinc content in the sludge to the District.

I. Nickel and Zinc – Sludge Purchase. ADM has been contacted by a company that has the potential to purchase all of ADM's sludge. Testing of the sludge is scheduled at the company's site.

J. Electro-Chemical Decomposition and Capacitive Deionization. ADM has begun researching these technologies.

ii. Until July 1, 2012, continue to investigate the potential for other technologies and developments in technologies already evaluated.

i. By December 31, 2010, the District must complete the following tasks:

i. Review soluble/insoluble ratio of SIU discharges versus the District's total discharge numbers, and determine if pretreatment limits need to be adjusted.

ii. Determine how much of the insoluble nickel and zinc entering the District's Main Plant is removed in the sludge and whether or not

the pretreatment limits should be expressed as total or soluble limits.

iii. Pursue variable limits based on flow with the Illinois Environmental Protection Agency (Agency) and seek permit modifications as necessary.

j. By July 1, 2011, the District must complete the following tasks:

i. Compile various control strategies based on one or more of the feasible technologies. Develop flow diagrams depicting removal options, pros and cons, capital expenditures, and operating costs.

ii. Present findings to ADM division managers.

k. The District must comply with the following schedule for achieving compliance with NPDES permit effluent limits for nickel and zinc:

July 1, 2010	-	Submit an interim report to the Agency describing progress on each of the elements of the compliance plan above.
January 1, 2011	-	Submit interim report, as above.
July 1, 2011	-	Submit interim report, as above.
January 1, 2012	-	Submit interim report, as above.
July 1, 2012	-	Submit a final compliance plan to the Agency containing nickel and zinc controls, treatment technologies, proposed permit modifications, or proposed site-specific water quality standards that will achieve compliance with the District's NPDES permit effluent limits for nickel and zinc.
January 1, 2013	-	Submit interim report, as above.
July 1, 2013	-	Submit interim report, as above.
January 1, 2014	-	Submit interim report, as above.

July 1, 2014 - Achieve compliance with the District's NPDES permit effluent limits for nickel and zinc.

l. The District must include the Agency in meetings to discuss interim progress at the July 1, 2010 and July 1, 2011 benchmarks set forth in paragraph 1(k). If any technically reasonable technology is identified that does not impose an arbitrary or unreasonable hardship on the District and remedies the zinc and nickel water quality standards problem, in whole or in part, the District must pursue that technology as soon as possible after identification.

Board Opinion and Order, *Sanitary Dist. of Decatur v. Illinois EPA*, PCB No. 09-125, at 29 (Ill.Pol.Control.Bd. Jan. 7, 2010).

On May 25, 2011, the Agency issued a Public Notice for a permit modification that would, among other changes, reflect the compliance schedule for zinc and nickel as set forth in the variance proceeding, PCB No. 09-125. As of the date of filing this Amended Petition, no final Agency action had been taken on the permit modification. As set forth above, on December 21, 2011, the District submitted a timely application for the renewal of its NPDES permit.

D. District's Petition for Variance Extension and Subsequent Conversion to a Petition for a Time Limited Water Quality Standard

On February 21, 2014, the District petitioned the Board for a variance extension authorizing the continued discharge of nickel from its Main Plant into the Sangamon River. *See Sanitary Dist. of Decatur v. Illinois EPA*, PCB No. 14-111. Specifically, the District sought a one-year extension to allow it more time to continue its investigation and implementation of adequate solutions for its nickel discharges. In support of its request, the District noted that it had been actively collaborating with Illinois EPA and USEPA to develop a site-specific water quality standard for nickel based on the Biotic Ligand Model ("BLM") adjustment to the nickel criterion.

On March 6, 2014, the Board accepted the District's petition for variance extension and assigned a hearing officer to the proceeding. On April 7, 2014, the Illinois EPA filed its recommendation that the variance be denied based on a recent federal directive regarding "consistency with federal law" for water variances. On April 17, 2014, the District met with Illinois EPA to discuss the variance extension request and the issues associated with the federal directive.

On April 21, 2014, the District filed a motion to stay the variance extension proceeding consistent with its discussions with Illinois EPA during the April 17, 2014, meeting and in accordance with Illinois EPA's acknowledgment that "the District is clearly in need of additional time by which to achieve compliance with the applicable nickel water quality standard," and that additional time of one year would be sufficient "to complete the appropriate BLM research required to validate the resulting site-specific nickel standard and file a petition with the Board." Agency Recommendation, PCB No. 14-111, at 15-16 (Apr. 7, 2014), attached as Exhibit 5.

On May 1, 2014, the Board granted the motion to stay until October 1, 2014, as the District had provided a waiver of the decision deadline only until December 31, 2014. The Board granted the stay to allow the District to continue its investigation and development of a site-specific water quality standard proposal and to respond to questions from Illinois EPA and USEPA related to the District's proposed use of the BLM to support a site-specific standard petition. The Board directed the District and Illinois EPA to file a status report with the Board indicating how the case should proceed and noted that, if a proper waiver was filed, an additional stay would be considered.

On June 30, 2014, the District filed its Original Petition for a site-specific rulemaking in this instant proceeding seeking to establish an alternative chronic water quality standard for nickel. Petition for Site Specific Rule, R14-24 (Ill.Pol.Control.Bd. June 30, 2014). On August 29, 2014, the District filed a status report in this site-specific rulemaking, R14-24, indicating that the District was continuing to engage in discussions with USEPA concerning the technical studies at issue in the rulemaking proceeding.

On October 1, 2014, the District filed a motion to extend the stay of the variance extension proceeding along with an open waiver of the decision deadline. The District requested the extension due to the recent filing of its Original Petition for site specific rulemaking and needing more time for continued discussions with USEPA. On October 16, 2014, the Board granted an additional stay until April 1, 2015.

On April 1, 2015, the District filed a status report and a motion to continue the stay. The District was continuing to discuss the site-specific rule with both Illinois EPA and USEPA. The District met with Illinois EPA and USEPA on January 8, 2015, to discuss USEPA's additional review and comments on the District's written report to be submitted to USEPA. On April 9, 2015, the Board granted the motion to continue the stay until June 30, 2015. The Board directed the parties to submit a status report on June 30, 2015.

On June 30, 2015, the District submitted a status report noting continued discussions with USEPA and Illinois EPA, as well as additional testing by the District. The District requested an additional stay until December 31, 2015. On July 23, 2015, the Board granted the motion to continue the stay until December 31, 2015. The Board directed the parties to submit a status report on December 31, 2015.

On December 30, 2015, the District submitted a status report indicating that the District continued to discuss the variance with USEPA and Illinois EPA, including discussions in October 2015. The District reached conceptual agreement with USEPA and Illinois EPA on the toxicity testing protocol and was awaiting a report summarizing the results. The District requested that the stay be extended until June 30, 2016. On January 21, 2016, the Board granted the motion to continue the stay until June 30, 2016. The Board directed the parties to submit a status report on June 30, 2016.

On June 29, 2016, the District submitted a status report indicating that the District was continuing to engage in discussions with USEPA and Illinois EPA concerning technical studies at issue in the proceeding. Specifically, as requested by USEPA, the District's consultants had completed an extensive, additional evaluation of related literature and toxicity studies and submitted a final draft report to USEPA and Illinois EPA. In addition, after the District reached conceptual agreement on the toxicity testing protocol with USEPA and Illinois EPA, the Oregon State University ("OSU") testing laboratory completed testing in December 2015 and submitted a progress report to USEPA and Illinois EPA on April 12, 2016. On May 19, 2016, the parties held a conference call to discuss OSU's report and USEPA then expressed comments on the same. OSU and the District's consultants then began working on responding to USEPA's comments. On June 6, 2016, the parties held a conference call to discuss the District's consultants' final draft literature review report, as requested by USEPA, and USEPA then expressed comments on the same. USEPA and the District's consultants then planned to continue reviewing the final draft report together in detail. The District requested that the stay be extended until December 31, 2016. On August 11, 2016, the Board granted the motion to

continue the stay until December 31, 2016. The Board directed the parties to submit a status report by December 31, 2016.

On December 29, 2016, the District submitted a status report indicating that the District was continuing to engage in discussions with USEPA and Illinois EPA concerning technical studies at issue in the proceeding. Specifically, the District had continued its discussions with USEPA and Illinois EPA regarding USEPA's comments on OSU's toxicity testing report, which had been submitted to USEPA and Illinois EPA on April 12, 2016. Subsequently, USEPA requested that the District perform an additional round of toxicity testing in order to address USEPA's comments. OSU and the District's consultants then began working on an additional testing protocol to submit to USEPA for approval. On October 5, 2016, OSU submitted a proposed protocol to USEPA for review and approval, and the District provided Illinois EPA with the proposed protocol the following day on October 6, 2016. On November 1, 2016, USEPA provided OSU with comments on the proposed protocol. On November 17, 2016, OSU provided the District with a revised testing protocol that addressed USEPA's comments. On December 15, 2016, the District instructed OSU to begin the additional round of USEPA-required toxicity testing using the approved testing protocol. OSU completed the additional testing and reported the testing results to USEPA and Illinois EPA for review and comment. The District requested that the stay be extended until June 30, 2017. On January 19, 2017, the Board granted the motion to continue the stay until June 30, 2017. The Board directed the District to submit a status report by June 30, 2017.

On February 24, 2017, Public Act 99-937 was signed into law. This legislation created Section 38.5 of the Illinois Environmental Protection Act ("Act"), 415 ILCS 38.5, which

provides the Board with authority to adopt time-limited water quality standards ("TLWQS"). Pursuant to Section 38.5(c) of the Act, the District's pending variance petition in PCB 14-111 was converted, by operation of law, into a petition for a TLWQS under Section 38.5.

Pursuant to Section 38.5(e) of the Act, Illinois EPA filed its 21-day response in the TLWQS proceeding on March 16, 2017. In its response, Illinois EPA identified the District as the only discharger or class of discharger affected by the nickel water quality standard, the affected water as the Sangamon River downstream of Lake Decatur, and the appropriate type of relief as an individual TLWQS. Illinois EPA did not identify any deadline for the District to file an amended petition. *See* Illinois EPA's Response to the Variance Petition, PCB 14-111 (Ill.Pol.Control.Bd. Mar. 16, 2017).

Pursuant to Section 38.5(f) of the Act, the Board entered its 30-day order in the TLWQS proceeding on April 12, 2017. In its order, the Board found that, based on Illinois EPA's response, the District is the only discharger that may be covered by the requested standard. Further, the Board's order established May 12, 2017, as the deadline for the District to file an amended petition complying with Section 38.5 of the Act and 40 C.F.R. § 131.14. The Board also moved forward the deadline for the District to submit its next status report to May 12, 2017. *See* Order of the Board, PCB 14-111 (Ill.Pol.Control.Bd. Apr. 12, 2017).

On April 24, 2017, the District filed a motion for extension of time to extend its deadline for filing a substantially compliant TLWQS petition until 90 days after the Board adopts rules implementing Section 38.5 of the Act. The District explained that an amended petition requires an analysis of the most recent round of toxicity testing requested by USEPA in the site specific rulemaking, and that the additional time was required to complete this analysis and allow time

for review by USEPA and Illinois EPA. *See* Petitioner's Motion for Extension of Time, PCB 14-111 (Ill.Pol.Control.Bd. Apr. 24, 2017). On May 3, 2017, the Board granted the District an extension, but only until July 11, 2017, and the Board retained the deadline of May 12, 2017, for the District to file its next status report. *See* Order of the Board, PCB 14-111 (Ill.Pol.Control.Bd. May 3, 2017).

On May 12, 2017, the District submitted a status report indicating that the data and timing required for the District to file a substantially compliant petition for a TLWQS is dependent upon the District's completion of its technical studies in the related site specific rule proceeding, and that the District was continuing to engage in discussions with USEPA and Illinois EPA concerning technical studies at issue in the site specific rulemaking proceeding. Specifically, in mid-2016, USEPA provided comments on the District's then-recently completed round of toxicity testing and subsequently requested that the District perform another round of toxicity testing to address USEPA's comments. Pursuant to this request, the District's testing consultants at OSU's testing laboratory worked with USEPA to develop a testing protocol that addressed USEPA's comments and completed the additional round of toxicity testing in December 2016. In April 2017, OSU provided the toxicity test results and chemistry data to the District's modelling consultant, Windward Environmental, LLC. Windward Environmental then completed the updated toxicity modelling using the most recent data and provided the modelling results back to OSU for use in preparing a draft toxicity test report based on the December 2016 data. OSU was then working on preparing a draft report for internal review and subsequent distribution to USEPA and Illinois EPA for review and scheduling a conference call to discuss same.

On June 30, 2017, the District filed a motion for extension of time to extend its deadline for filing a substantially compliant TLWQS petition until October 9, 2017. The District explained that the data and timing required for the District to file a substantially compliant petition for a TLWQS is dependent upon the District's completion of its technical studies in the related site specific rule proceeding, and that the District was continuing to engage in discussions with USEPA and Illinois EPA concerning technical studies at issue in the site specific rulemaking proceeding. Specifically, the District received and reviewed OSU's draft toxicity test report at the end of May 2017 and provided a copy of the draft report to USEPA and Illinois EPA for review and comment on June 1, 2017. On June 15, 2017, the parties held a conference call to discuss OSU's draft report and any comments or questions from USEPA or Illinois EPA. During the call, OSU and Windward Environmental discussed the specific testing methodologies and results from the report. However, USEPA indicated that it needed additional time to review and internally discuss the report and requested that an additional follow-up conference call be scheduled. The parties scheduled that follow-up call for July 18, 2017, during which the District understood that USEPA and Illinois EPA intended to discuss any comments or questions that they may have regarding OSU's draft report. On July 5, 2017, the Hearing Officer granted the motion to extend the District's deadline for filing a substantially compliant TLWQS petition until October 9, 2017.

On September 29, 2017, the District filed a motion for extension of time to extend its deadline for filing a substantially compliant TLWQS petition until December 31, 2018. The District explained that, in its original variance petition filed in PCB 14-111, the District requested a variance extension in order to pursue a site specific rule for nickel, which the District

was pursuing in this instant proceeding. The District needs to maintain the current TLWQS proceeding as an alternative form of relief in the event that the Board declines to promulgate the requested site specific rule. Also, if the Board declines to promulgate the site specific rule, the District will need additional time to prepare and file a substantially compliant amended petition for a TLWQS. The District committed to continuing its diligent pursuit of its requested site specific rule. The District noted that it had made significant progress with USEPA and Illinois EPA in the site specific rule proceeding and was in the process of finalizing its Amended Petition. The District committed to filing its Amended Petition and supporting documentation by the deadline of November 30, 2017. Barring any unforeseen delays, the District anticipated that the site specific rule proceeding should come to a final decision within 12 months after the Amended Petition was filed. Thus, the District's requested extension of the deadline for the District to file an amended TLWQS petition until December 31, 2018, would allow for the site specific rule proceeding to conclude and, if necessary, for the District to file a substantially compliant amended TLWQS petition.

On October 5, 2017, the Board issued an order considering the District's September 29, 2017, motion as a request to stay PCB 14-111. The Board granted the District a stay of the TLWQS proceeding in PCB 14-111 until December 31, 2018, to allow the related site specific rule proceeding to reach a conclusion. The Board set December 31, 2018, as the District's deadline to file a substantially compliant amended petition for a TLWQS.

E. History of the District's Nickel Mitigation Efforts

Since Illinois EPA's issuance of the District's NPDES permit on April 20, 2007, the District has diligently pursued compliance with the nickel and zinc effluent limits contained

therein. The District is currently achieving compliance with the zinc limit due, in large part, to ADM's and Tate & Lyle's efforts to identify sources of zinc and cease using zinc as a corrosion inhibitor in cooling towers located at their respective facilities. Therefore, this Amended Petition focuses on relief only from the general use chronic water quality standard for nickel. This Petition is not seeking relief from the general use acute water quality standard for nickel.

As soon as its NPDES permit became effective, the District began investigating several alternatives, including reduction of industrial contributions through the existing industrial pretreatment program, potential adjustments to the permit limits (including the Translator Study), and treatment technology that could potentially be employed to improve removal at the District's Main Plant. The District's first effort toward compliance was to complete the Translator Study discussed above. The work on the Translator Study started in March 2007, prior to the permit issuance in April 2007, and continued through November 2007. As the Translator Study progressed, the District determined that it would provide very little relief. However, the District provided the Translator Study to Illinois EPA on December 20, 2007, as part of the District's first Interim Report. *See* Exhibit 3, at 4-5 (discussing the proposed nickel limits, as calculated in the Translator Study).

Also, within one or two months after the effective date of the District's NPDES permit, the District compiled sample data, including industrial samples, the District's effluent samples, and stream sampling information, which showed that the most significant source of nickel in the District's wastewater was ADM's pretreated industrial flow. Therefore, the District met with SIUs, including ADM and Tate & Lyle, in August and September 2007 to discuss nickel issues. Personnel from ADM and Tate & Lyle were made aware of the District's newly permitted nickel

limit at those meetings. The District then met with Illinois EPA on October 30, 2007, to discuss the situation. The summary of sample data that was given to Illinois EPA personnel during the meeting on October 30, 2007, is attached as Exhibit 6.

After the District's October 2007 meeting with Illinois EPA, the District made significant efforts to identify treatment options regarding its nickel discharge. As recommended by Illinois EPA, the District discussed options for reducing nickel loadings with ADM and Tate & Lyle. In early 2008, the District calculated new local pretreatment limits that would allow it to meet the upcoming effluent limit for nickel. These proposed limits were provided to ADM and Tate & Lyle and were the basis for numerous discussions with the companies during 2008.

Upon review of the District's first Interim Report submitted in December 2007, Illinois EPA indicated that slightly higher permit limits could be justified based on the hardness data the District had collected.[1] *See* E-mail from Scott Twait, Illinois EPA, to Tim Kluge, District (Jan. 2, 2008), attached as Exhibit 7. The District also increased its metals monitoring to twice per month at the major industrial users and the Main Plant.

Also in January 2008, the District again met with ADM and Tate & Lyle and reviewed the data on their discharges and the pretreatment numbers. ADM was identified as the primary source of nickel. Since that time, ADM has extensively reviewed nickel source control and treatment technology as further described below.

In 2007, the District also began reviewing information that could potentially support a site specific chronic water quality standard for nickel. *See* Exhibit 3. At the suggestion of Illinois EPA and USEPA, the District reviewed guidance for determining a Water Effect Ratio

[1] This conclusion led to Illinois EPA later modifying the District's NPDES permit in July 2009 to revise the limits for both nickel and zinc.

("WER") and whether that might apply to the District's situation. *Id.* The District also reviewed information in the BLM to determine its potential usefulness. *Id.*

Following consultation with Illinois EPA in 2008, the District continued to investigate the BLM and WER. *See* District's December 29, 2008, Interim Report, attached as Exhibit 8. The District contacted a consultant regarding the approaches and gathered information to evaluate their possible application. *Id.*

In 2009, the District continued investigating the BLM and WER, while at the same time seeking a variance from the Board for continued discharges of nickel and zinc, as discussed above. *See* District's December 30, 2009, Interim Report, attached as Exhibit 9. The District retained Mr. Robert Santore of Windward Environmental, LLC in East Syracuse, New York,[2] to evaluate the applicability of the BLM and WER based on available data. *Id.* Mr. Santore's scope of work included the following: 1) obtain water quality data from the District to assemble or estimate appropriate BLM inputs in order to calculate nickel bioavailability in the receiving waters; 2) run the BLM using those data to predict nickel bioavailability to sensitive aquatic organisms; 3) summarize those results and the calibration of the BLM from other data from the literature; and 4) based on those results, advise the District of the relative merits of pursuing bioavailability modeling. *Id.*

The District provided Illinois EPA with a preliminary summary of Mr. Santore's evaluation of the applicability of the BLM and WER based on available data. *See* Attachment to the District's July 1, 2010, Interim Report, attached as Exhibit 10. The evaluation indicated that a significantly higher site specific nickel criteria could be justified based on bioavailability to

[2] When the District filed its Original Petition on June 30, 2014, Mr. Santore worked for HDR|HydroQual, Inc. in Syracuse, New York.

aquatic organisms. *Id.* Mr. Santore based his analysis on chemical data from the District's effluent, which contributes most or all of the Sangamon River's flow during critical low flow conditions. *Id.*

In late summer 2010, additional river sampling was conducted during low flow conditions to verify stream concentrations. *See* District's December 29, 2010, Interim Report, attached as Exhibit 11. On December 9, 2010, the District initiated discussions with Illinois EPA and USEPA regarding the District possibly pursuing a bioavailability approach. *Id.* USEPA indicated they would like to review published information regarding the nickel BLM and discuss at a later date. *Id.*

Variability information regarding the BLM and WER was compiled and reviewed prior to discussion in a follow-up conference call with Illinois EPA and USEPA on June 6, 2011. *See* District's June 29, 2011, Interim Report, attached as Exhibit 12; Presentation Slides Accompanying the June 6, 2011, Conference Call, attached as Exhibit 13; *see also* Robert Santore, *Estimate of the BLM Adjustment to the Nickel Criterion for the Sanitary District of Decatur, Illinois* (Jan. 16, 2014) ("BLM Adjustment Report"), attached as Exhibit 14.[3]

For additional information regarding the District's nickel mitigation efforts during the term of the 2007 NPDES permit, please see the District's December 21, 2011, Interim Report, attached as Exhibit 15; the District's June 25, 2012, Interim Report, attached as Exhibit 16; the District's December 19, 2012, Interim Report, attached as Exhibit 17; the District's June 27,

[3] The reports authored by the District's consultants that were prepared in support of the District's Amended Petition are unpublished. Therefore, 35 Ill. Admin. Code § 102.210(c) is inapplicable. Nevertheless, these reports are attached as exhibits to this Amended Petition and, therefore, are available to the public.

2013, Interim Report, attached as Exhibit 18; and the District's December 20, 2013, Interim Report, attached as Exhibit 19.

F. History of ADM's Nickel Mitigation Efforts

As set forth above, in August 2007, the District notified ADM of the nickel effluent limit included in the District's 2007 NPDES permit. Based on sampling conducted by the District, ADM was identified as a significant contributor of nickel. In January 2008, the District met with ADM and shared the proposed limit calculated from the sampling data, with which ADM would be required to comply by July 2009. It was not until that time that ADM first recognized the implications that this limit could have on its operations.

ADM's Decatur Complex consists of multiple, separate processing plants which discharge their wastewater to the on-site wastewater treatment plant ("WWTP"). These processing plants consist of the Corn Plant (Wet Corn Mill, Alcohol Plant, and Sorbitol Plant), BioProducts Plant, Cogeneration Plant, East Soybean Processing Plant, West Plant (West Soybean Processing Plant, Vitamin E Plant, and Corn Germ Processing Plant), Glycols Plant, and the Polyols Plant (permanently shut down in 2015). Each of these individual plants produces multiple products, using both batch and continuous processes, and creates unique process waters which generally are reused multiple times prior to being discharged as wastewater to the WWTP. The WWTP treats approximately 11 MGD through an anaerobic treatment system followed by aerobic treatment prior to discharge to the District.

ADM has tested its raw materials and process water streams from each plant to determine the sources of nickel in ADM wastewater and has identified those streams that contain the highest concentration of nickel. Three primary sources of nickel have been identified:

1. Nickel contained in incoming soybeans (approximately 4.1 mg/kg soybeans) and corn (approximately 0.53 mg/kg corn);
2. Nickel solubilized from nickel catalysts used in hydrogenation; and
3. Nickel solubilized from metallurgy during processing.

The contribution and total quantity of nickel to the WWTP from each of the ADM plants is summarized in Table 1, attached hereto as Exhibit 20; data in Table 1 was derived from the August to November 2010 weekly samplings.

ADM spent several years investigating the sources of nickel in its wastewaters and potential treatment strategies to reduce its nickel discharges. As the incoming nickel in soybeans (approximately 4.1 mg/kg soybeans) and corn (approximately 0.53 mg/kg corn) cannot be controlled, ADM initially focused on the potential to control major sources of nickel streams discharging to its WWTP. To that end, it has performed four comprehensive nickel material balances of its Decatur Complex and traced the majority of nickel entering the WWTP to the East Soybean Plant, Corn Plant and Polyols Plant.

As a result of its evaluation of the individual nickel-containing wastewater streams, ADM has taken, or is taking, several steps to reduce the nickel that reaches the WWTP from each of its processing facilities. These steps include:

1. Spent and spilled catalyst from the West Soybean Processing Plant is collected and managed to keep it out of the wastewater system.
2. Particulate catalyst from the Corn Plant Sorbitol production is captured by filters and physically recovered for recycling or disposal as solid waste. ADM installed

an ion exchange resin system at the Sorbitol Plant to capture soluble nickel from wastewater. Used resin is managed in accordance with applicable regulations.

3. The East Soybean Processing Plant has installed a system that removes the soy molasses stream (containing approximately 2.4 lb/day, approximately 35% of the soluble nickel from the Decatur Complex) from the WWTP.

4. The Polyols Plant accounts for approximately 11% of the soluble nickel from the Decatur Complex. The Polyols Plant determined that this nickel could be precipitated by pH adjustment. ADM installed a precipitation and filtration treatment system which reduced the nickel from this process. This plant was permanently shut down in the fourth quarter of 2015.

5. During 2015, elevated nickel in the effluent occurred as a result of solids carry-over from the high-salt slow rate anaerobic digestion reactors. ADM has developed and implemented a sludge management plan to address the maintenance and removal of sludge from the anaerobic wastewater system. This plan includes removal and dewatering of solids from the system, short-term management of the solids in newly constructed storage basins, and land application of the sludge under Water Pollution Control Permit No. 2015-SC-60414 issued by Illinois EPA on December 29, 2015 (see further discussion below), or other appropriate disposal or reuse method. During 2016, ADM removed approximately 10.08 million pounds of sludge from the system and is on target to remove a similar amount during 2017.

ADM intends to employ these process changes continuously to reduce the nickel content in wastewater to ADM's WWTP, independent of flow in the Sangamon River.

ADM has continued to monitor total and soluble nickel in the effluent to the District's Main Plant, and since the fall of 2010, there has been a gradual decline in nickel from about 0.120 mg/L to about 0.060 mg/L. *See* Figure 1, attached as Exhibit 21.

ADM has experienced five events with elevated total nickel effluent during this monitoring period (spring 2009, summer 2010, fall 2011, fall 2013, and 2014/2015). ADM has identified the source of the event in the summer of 2010 as a failure of Sorbitol catalyst capture filters and has since implemented additional filtration and the ion exchanged based nickel capture system. The events from the spring of 2009 and the fall of 2011 are of an indeterminate cause. The event in the fall of 2013 was attributed to a process change at ADM's pretreatment facility that was implemented to reduce long-term discharges of nickel. The event in 2014/2015 involved several short-term spikes which were the result of solids carry-over from the high-salt slow rate anaerobic digestion reactors.[4]

The above-described work that ADM has undertaken to reduce nickel within the individual wastewater streams has resulted in considerable reductions of nickel loads to the Decatur Complex WWTP. To complement those efforts, ADM has also investigated a number of technologies to determine their associated potential to control nickel at the Decatur Complex WWTP; those technologies are discussed in further detail in Section III.E. Nevertheless, ADM's

[4] On December 29, 2015, Illinois EPA issued an operating permit to ADM (Land Application Permit No. 2015-SC-60414 referred to above in paragraph 5) authorizing application of approximately 6,000 dry tons per year of anaerobically digested industrial biosolids to agricultural lands at rates not to exceed the agronomic nitrogen demand of the crop grown, attached as Exhibit 22. On February 1, 2016, the District issued an Executive Order to ADM, attached as Exhibit 23, that addressed recent exceedances of the nickel limit in ADM's pretreatment permit.

efforts have not disclosed a means for it to consistently meet the proposed nickel limit[5] that the District determined would apply to ADM based upon the District's current NPDES permit.

For additional information regarding ADM's nickel mitigation efforts, please see the District's December 21, 2011, Interim Report, attached as Exhibit 15; the District's June 25, 2012, Interim Report, attached as Exhibit 16; the District's December 19, 2012, Interim Report, attached as Exhibit 17; the District's June 27, 2013, Interim Report, attached as Exhibit 18; and the District's December 20, 2013, Interim Report, attached as Exhibit 19.

G. Update on Consultations with USEPA and Illinois EPA

Prior to the District's variance, and continuing through the filing of this Amended Petition, the District has worked cooperatively with Illinois EPA and USEPA on preparing this proposed site-specific standard with the intent that it be consistent with federal law, supported by Illinois EPA, and approvable by USEPA. During the summer and fall of 2013 and spring 2014, the District participated in a number of telephone conference calls with personnel from Illinois EPA, USEPA Region 5, USEPA's Duluth Research Laboratory, and USEPA Headquarters. Several of the USEPA personnel involved in the calls had not previously been involved in conversations with the District and Illinois EPA. During this period, USEPA raised a number of additional questions regarding the technical basis of the BLM and information on a number of nickel toxicity studies reported in the scientific literature. These questions were summarized in a memorandum that was provided to the District on August 26, 2013. The questions were further discussed and clarified in subsequent conversations throughout 2013. The District's consultant

[5] Approximately 3.58 lbs/day.

obtained the additional data that USEPA requested be reviewed and continued a comprehensive evaluation of the same.

Also during these telephone conversations, USEPA suggested the option of performing aquatic toxicity testing as additional confirmation of the proposed WER based on the BLM. After consultation with USEPA, the District prepared and submitted a proposed WER testing plan to Illinois EPA and USEPA Region 5 on January 30, 2014, and received review comments from USEPA Region 5 on March 7, 2014. The District's consultant prepared responses to the testing plan review comments, and the District also provided those responses to USEPA and Illinois EPA on April 23, 2014. *See* Response to U.S. EPA Toxicity Testing Comments Sanitary District of Decatur, Illinois, attached as Exhibit 24. Thereafter, on May 23, 2014, USEPA provided follow up on the District's April 23, 2014, responses, attached as Exhibit 25. The District preferred not to perform this testing until USEPA approved the District's WER testing plan. The District continued its efforts to address USEPA's follow up questions and comments on the District's proposed WER testing plan. The District understood that, at that time, once USEPA was satisfied with the District's (and its consultant's) evaluations and responses to questions posed, as well as completion of the WER testing suggested by USEPA, USEPA would then be in a position to review and approve the proposed site-specific rule, if granted by the Board. The District has continued to work closely with Illinois EPA and USEPA to provide the additional support for federal approval of the proposed site specific rule as requested by USEPA, including the WER testing.

On June 30, 2014, the District filed its Original Petition for Site Specific Rule in this matter. Due to the District's ongoing discussions with USEPA and Illinois EPA regarding the

issues relevant to this site specific rule, the District requested that the Board postpone hearing on the Petition in order to allow the District time to continue working with USEPA and Illinois EPA. The Board granted this request on July 29, 2014. Since that time, the District has timely submitted status reports to the Board and continued to request, and the Board has continued to grant, additional time for the District, USEPA, and Illinois EPA to continue working on issues related to the District's Petition. *See* District's Status Reports to the Board dated Aug. 29, 2014; Oct. 28, 2014; Dec. 22, 2014; Feb. 27, 2015; May 1, 2015; Aug. 3, 2015; Nov. 3, 2015; Feb. 1, 2016; May 2, 2016; Aug. 1, 2016; Dec. 29, 2016; and May 12, 2017.

Consistent with its requests for additional time, the District has been continuously working with USEPA and Illinois EPA toward developing this proposed site-specific standard with the intent that it be consistent with federal law, supported by Illinois EPA, and approvable by USEPA. Specifically, on July 31, 2014, and again on August 28, 2014, the District submitted additional and supplemental information responsive to USEPA's questions regarding the aforementioned technical studies. The District had agreed to perform effluent toxicity testing and was working with USEPA to gain acceptance of its testing protocol. The District's consultant was continuing to develop responses to questions from USEPA regarding the BLM.

On October 27, 2014, the District held discussions with USEPA concerning the technical studies at issue. The District understood that USEPA was preparing an updated summary of questions for the District to address to determine whether a site-specific nickel standard would be approvable by USEPA, as well as additional comments on the District's testing protocol.

On December 2, 2014, the District received another set of comments from USEPA regarding the District's proposed testing protocol. On December 11, 2014, and again on

December 18, 2014, the District, USEPA, and Illinois EPA held conference calls to discuss the District's consultants' prepared responses to USEPA's comments. The District's consultants then proceeded to prepare a written report for submittal to USEPA and Illinois EPA.

On January 8, 2015, the District met with USEPA and Illinois EPA in Chicago to discuss the status of, and schedule for, additional USEPA review and comment on the District's written report. Then, on February 2, 2015, the District received another set of comments from USEPA regarding the District's proposed testing protocol. The District reviewed USEPA's comments with its consultant and with personnel from OSU, the university laboratory that would be performing the toxicity testing. During the week of March 16, 2015, OSU began initial testing, with further testing to follow based on the initial results and further discussion with USEPA.

On May 22, 2015, the District submitted a draft report to USEPA and Illinois EPA regarding the consultant's completed additional evaluation of related literature and toxicity studies, as requested by USEPA. On June 23, 2015, USEPA provided additional comments on that draft report. On June 24, 2015, the District, USEPA, and Illinois EPA held a conference call to address USEPA's additional comments on the draft report and to plan for further testing following the initial testing performed back in March 2015. The District's consultant then began working on completing the report, and OSU began acclimating test organisms for the final testing.

On October 26, 2015, the District, USEPA, and Illinois EPA held a conference call to discuss continued work on completing the draft report, as well as the plan for further testing, and the parties reached conceptual agreement on the toxicity testing protocol. OSU then completed testing in December 2015.

On April 12, 2016, the District forwarded to USEPA and Illinois EPA its consultant's then-current draft written report, entitled "A review of water quality factors that affect nickel bioavailability to aquatic organisms: Refinement of the [BLM] for Nickel in acute and chronic exposures," attached as Exhibit 26. Simultaneously, the District also forwarded to USEPA and Illinois EPA the testing report prepared by OSU, entitled "Progress Report – Nickel WER Project," attached as Exhibit 27. On May 19, 2016, the District, USEPA, and Illinois EPA held a conference call to discuss OSU's testing report and USEPA's comments on same, and the parties held a follow-up conference call on June 6, 2016, to discuss the District's consultant's final draft written report discussing refinement of the BLM.

Subsequently, USEPA requested that the District perform an additional round of toxicity testing in order to address USEPA's comments. OSU and the District's consultants then began working on an additional testing protocol to submit to USEPA for approval. On October 5, 2016, OSU submitted a proposed protocol to USEPA for review and approval, and the District provided Illinois EPA with the proposed protocol the following day on October 6, 2016. On November 1, 2016, USEPA provided OSU with comments on the proposed protocol. On November 17, 2016, OSU provided the District with a revised testing protocol that addressed USEPA's comments. On December 15, 2016, the District instructed OSU to begin the additional round of USEPA-required toxicity testing using the approved testing protocol.

In April 2017, OSU provided the toxicity test results and chemistry data to Mr. Santore. Mr. Santore then completed the updated toxicity modelling using the most recent data and provided the modelling results back to OSU for use in preparing a draft toxicity test report based on the December 2016 data. OSU then began working on preparing a draft report for internal

review and subsequent distribution to USEPA and Illinois EPA for review and scheduling a conference call to discuss same.

The District received and reviewed OSU's draft toxicity test report at the end of May 2017 and provided a copy of the draft report to USEPA and Illinois EPA for review and comment on June 1, 2017. *See* OSU, Chronic Toxicity of a Nickel-Spiked Simulated Effluent, With and Without Dissolved Organic Carbon (DOC), to the Cladoceran, *Ceriodaphnia dubia* (May 2017), attached as Appendix 1 of Exhibit 28. On June 15, 2017, the parties held a conference call to discuss OSU's draft report and any comments or questions from USEPA or Illinois EPA. During the call, Mr. Santore and OSU discussed the specific testing methodologies and results from the report. However, USEPA indicated that it needed additional time to review and internally discuss the report and requested that an additional follow-up conference call be scheduled. The parties scheduled that follow-up call for July 18, 2017, during which the District understood that USEPA and Illinois EPA intended to discuss any comments or questions that they may have regarding OSU's draft report.

On July 18, 2017, the parties participated in the scheduled conference call during which Illinois EPA and USEPA expressed their comments on OSU's draft report. The agencies also requested that the District begin analyzing how to proceed with the site specific rule using dissolved organic carbon ("DOC") as a basis, rather than the nickel BLM that USEPA originally suggested. Mr. Santore and the agencies discussed how to proceed with analyzing a DOC-based approach. The agencies requested that Mr. Santore research and analyze additional DOC data for discussion during a follow-up conference call. USEPA also provided additional comments

on the data used in OSU's toxicity testing report. Mr. Santore and OSU then began working on addressing the agencies' additional comments and requests for further analyses.

On August 3, 2017, the parties participated in another conference call. OSU and Mr. Santore presented the results from their analyses requested by USEPA and Illinois EPA, specifically addressing a proposed DOC relationship to use as the basis for a WER calculation for the Sangamon River. USEPA and Illinois EPA then discussed their comments on the presented data and requested that the District perform additional analyses and revisions to address USEPA's and Illinois EPA's comments, including revising the District's proposal to reflect using the toxicity mitigating effects of DOC in the effluent and stream, rather than the BLM, as the basis for the site specific rule. BLM would still be used as an additional support mechanism to help verify the DOC effects. Mr. Santore and OSU then began working on addressing the agencies' additional comments and requests for further analyses.

On September 21, 2017, the parties participated in another follow-up conference call. Mr. Santore and OSU discussed their updates to address USEPA's and Illinois EPA's comments from the previous call. Specifically, they presented updated analyses to use the reproduction endpoint from the OSU tests rather than survival, compare the DOC response in these data to other data in the scientific literature, and calculate a site specific water quality criteria for the Sangamon River. USEPA then expressed its additional comments on the presented data and requested that the District perform additional analyses to address its comments. USEPA requested another conference call to follow-up on and discuss the same.

On October 16, 2017, the parties participated in another follow-up conference call. Mr. Santore discussed the additional analyses requested by USEPA, including an uncertainty analysis

of the DOC response, determining if the synthetic water used in the OSU tests for *C. dubia* is representative of conditions used to generate the Illinois water quality criteria for nickel, and showing that the DOC response for fathead minnow is expected to be low based on the relative insensitivity of that organism. Mr. Santore also presented a recap of the site specific rule petition and WER for the Sangamon River. USEPA and Illinois EPA then had additional comments and questions about the presented analyses and requested additional follow-up information and indicated that the agencies would be discussing internally and provide more follow-up comments and/or questions. Mr. Santore then began working on addressing USEPA's and Illinois EPA's comments and requested additional analyses.

On October 31, 2017, USEPA provided via email an extensive list of technical comments and questions prepared by USEPA and Illinois EPA in response to Mr. Santore's presentation during the conference call on October 16, 2017. USEPA requested that the District address the comments and questions as part of the supporting information for the District's requested site specific rule. The District, Mr. Santore, and OSU then began working to address USEPA's emailed list of technical comments and questions.

On November 17, 2017, the District provided a draft of this Amended Petition to USEPA and Illinois EPA for review and comment. In response, the District received comments on the Amended Petition from USEPA and Illinois EPA on November 21 and 22, 2017, respectively. The District, Mr. Santore, and OSU then began working to address USEPA's and Illinois EPA's comments. As part of this response, and in further support for the District's relief requested herein, Mr. Santore prepared a written report entitled "Development of a Water Effect Ratio for Nickel in the Sangamon River" (Nov. 29, 2017 Draft) ("WER Report"), attached as Exhibit 28.

Mr. Santore also provided the current working draft of the written report regarding the refinement of the BLM for nickel. *See* Robert C. Santore *et al.*, Draft Manuscript, "A review of water quality factors that affect nickel bioavailability to aquatic organisms: Refinement of the Biotic Ligand Model for Nickel in acute and chronic exposures" (draft current as of Nov. 29, 2017) ("Santore Manuscript"), attached as Exhibit 29.

III. STATEMENT OF PURPOSE AND EFFECT OF PROPOSAL

A. Nature of Receiving Stream

1. Historical Flow and Nickel Concentrations in the Receiving Stream

The Sangamon River watershed comprises approximately 5,419 square miles, all in central Illinois, and practically all of it is tillable and generally cultivated. The Sangamon River originates in central McLean County, east of Bloomington, flows generally southwesterly to Decatur, then westerly to Springfield, northwesterly to the confluence with Salt Creek near Oakford, and then joins the Illinois River north of Beardstown. Its total length is about 250 miles.

The only impoundment on the main stem of the Sangamon River is Lake Decatur, formed by a dam in the southern portion of the City of Decatur. The District's Main Plant discharge to the Sangamon River is located approximately three miles downstream from the Lake Decatur dam. Lake Decatur is the primary water source for the City of Decatur, and the lake is managed to maintain a continuous water supply. Consequently, river flow downstream from the dam is highly variable. During periods of dry weather, little or no water is released from the lake, and little flow exists between the dam and the District's discharge point. At these times, the

District's discharge constitutes the primary flow in the Sangamon River between Decatur and Springfield.

2. Current Water Quality in the Receiving Stream

Beginning prior to the issuance of the District's NPDES permit on April 20, 2007, the District has monitored for nickel in its treated discharge and in the Sangamon River upstream and downstream of the discharge point. Monitoring results from March 2007 through October 2017 are summarized in Table 2, attached as Exhibit 30.

The Main Plant's main discharge is via Outfall 001 to the Sangamon River at 39º 49' 56" North Latitude, 89° 0' 7" West Longitude. At the discharge point, the Sangamon River is designated as a General Use Water under Section 303.201 of the Board's rules. As discussed above, the general use water quality standard for nickel is defined by a calculation for dissolved nickel based on stream hardness. 35 Ill. Admin. Code § 302.208(e). The chronic standard for nickel is defined as "exp[A+Bln(H)] X 0.997*, where A=-2.286 and B=0.8460." *Id.* Based on the District's Translator Study referenced above, the Agency advised the District that a critical hardness value of 359 mg/L would be used for permitting. Using this hardness value, the calculated general use chronic water quality standard for nickel is 0.015 mg/L.

The segment of the Sangamon River that receives the Main Plant's discharge (Assessment Unit ID IL_E-09) is listed on Illinois' 303(d) List of impaired waters for 2016. *See* Appendix A-2, Illinois' 2016 303(d) List (Sorted by Name), at 39, *available at* http://www.epa.illinois.gov/topics/water-quality/watershed-management/tmdls/303d-list/. The impaired uses for this segment are fish consumption and primary contact recreation. *Id.* The

potential causes of impairment given for the segment are polychlorinated biphenyls and fecal coliform. *Id.*

The Illinois State Water Survey ("ISWS") has mapped the seven-day, ten-year low flow ("7Q10") of Illinois' streams, including the Sangamon River, its tributaries, and wastewater plant flows. The 7Q10 flow is important because Illinois EPA uses this flow to establish water quality based effluent limits. The ISWS map for the Sangamon River Region shows a 7Q10 flow of zero below the Lake Decatur dam and upstream of the District's discharge point, meaning that on average, over a period of ten years, the stream will have no flow for at least one period of seven consecutive days. *See* ISWS Map for the Sangamon River Region (Apr. 2002), attached as Exhibit 31.

The ISWS map indicates that flow for the District's discharge is 34.7 cfs or 22.4 MGD, which is representative for dry weather conditions. The 7Q10 flow shown for the Sangamon River between the District's discharge and the confluence with the South Fork southeast of Riverton varies between 36.0 and 40.9 cfs. A number of small tributaries enter this stretch of the Sangamon River, and all but one of those tributaries are shown with zero low flow in either their entire length or in all but their extreme lower reaches.

The U.S. Geological Survey ("USGS") maintains a stream flow measurement station at the Illinois Route 48 bridge crossing over the Sangamon River, approximately one mile downstream from the Lake Decatur dam, that provides continuous river flow data upstream of the District's discharge. USGS' website provides flow data from this stream measurement station from October 1, 1982, to the present. *See* http://waterdata.usgs.gov/il/nwis/uv?site_no=05573540.

The District's sampling and observations conducted during low flow periods confirm that the stretch of the Sangamon River between the District's discharge and the confluence with the South Fork is similar to the Main Plant's discharge in volume and chemical characteristics. Then, at the confluence point where the South Fork and Sugar Creek (which carries flow from the Springfield Metro Sanitary District's Sugar Creek wastewater treatment plant) flow into the Sangamon River, the Sangamon River's volume and water chemistry noticeably change. Due to those changes occurring at that location, the District proposes that the Board establish the confluence of the South Fork with the Sangamon River as the endpoint for the proposed site specific chronic water quality standard for nickel.

3. Aquatic and Fisheries Data

Researchers from Eastern Illinois University ("EIU") have studied the overall impact of the District's discharge on water quality and biology from 1998 to the present and reported the study's results on an annual basis. These biological studies continue to document similar or improved water quality conditions downstream of the District's discharge point, as compared to upstream, based on various assessments of the occurring macroinvertebrate communities:

> A total of 58 different taxa were identified from the seven sites sampled. When comparing overall assemblages there was no significant difference between the 2 reaches for Simpson's Diversity (p = 0.159). However, estimated abundance, richness, percent EPT, EPT richness, and MBI [were] significantly higher (lower for MBI) downstream of [the District's] main outfall (estimated abundance p = 0.006, richness p = <0.001, percent EPT p = <0.001, EPT richness p = <0.001, MBI p = <0.001).

R. Colombo, J. Laursen, and C. Pederson, Eastern Illinois University, *Ecological Condition of a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur: Focusing on Water Chemistry, Qualitative Habitat Assessment, and the Mussel,*

Macroinvertebrate, and Fish Assemblages, at 9-10 (May 2017) (internal citations omitted), attached as Exhibit 32 ("EIU May 2017 Report"). Similarly, EIU's study results have regularly reported that fish species diversity in the Sangamon River is comparable to other Midwestern streams:

> The diversity of fish species was comparable to other Midwestern streams (Colombo unpublished data), with Steelcolor Shiner and Spotfin Shiner Shiners being the most numerically abundant non-game species and Bluegill being the most abundant sportfish species.

R. Colombo, J. Laursen, and C. Pederson, Eastern Illinois University, *Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur: Focusing on Chemical Assessment, Macroinvertebrate Assemblage, Mussel Assemblage, Tiered-Aquatic Life Use, and the Sport Fishery*, at 17 (May 2015), attached as Exhibit 33 ("EIU May 2015 Report").

EIU has regularly concluded that the higher concentrations of soluble nickel occurring in the Sangamon River downstream of the District's effluent discharge do not appear to be affecting fish or macroinvertebrate communities. *See id.* Regarding the most recently completed annual assessment for 2016, EIU assessed physical parameters using a modified Ohio's Quality Habitat Evaluation Index ("QHEI") for seven sites. EIU May 2017 Report, Exhibit 32, at 5. At the sites, EIU measured substrate type and depth and estimated the percent of each instream cover type, the channel morphology, the amount of riparian zone and bank erosion, the pool and riffle quality, and gradient. *Id*. at 5-6. Higher QHEI scores were typical of sites downstream of the District's discharge. *Id*. at 9. EIU observed that the consistent flow downstream of the District's discharge during low discharge periods of low Decatur reservoir discharge periods may help

maintain the physical habitat quality while the upstream reach becomes disconnected pools. *Id.* at 12.

EIU sampled fish using pulsed DC electrofishing to determine if fish communities are affected by water quality upstream and downstream of the District's effluent discharge. *See id.* at 10. EIU used catch-per-unit-effort ("CPUE") to calculate the relative density of fish and determined that, for 2016, CPUE was highest in the upstream reach and lowest in the downstream reach. *Id.* at 11. However, previous years of studies have regularly determined that there was no significant difference in the number of fish caught per hour between reaches upstream and downstream of the District's main outfall. *See, e.g.*, EIU May 2015 Report, Exhibit 33, at 17.

EIU has also measured diversity of the fish community in each reach using Simpson's Diversity Index. *See id.* This measure of diversity showed no difference between reaches upstream and downstream of the District's main outfall. *See id.* The upstream reach was primarily made up of Catostomidae (39%) and Clupeidae (31%) species. *See id.* The downstream reach was dominated by Catostomidae species (55%), and Clupeidae species were also present (6%). *See id.* Lepisosteidae species made up 5% of the sample upstream, compared to 10% in the downstream reach. *See id.* Based on those results, EIU concluded that fish communities are not different between reaches and did not appear to be affected by soluble nickel within the study area. *See id.*

In the most recent sampling in 2016, EIU sampled a total of 179 individuals from 21 species. EIU May 2017 Report, Exhibit 32, at 10-11. The most dominant family sampled was Catostomidae and comprised over 56% of the total sample. *Id.* The sportfish community in the

Sangamon River comprised a small percentage of the total sample and included White Bass (*Morone chrysop*s), Black Crappie (*Pomoxis nigromaculatus*), Sauger (*Sander canadensis*), and Largemouth Bass (*Micropterus salmoides*). *Id*. The non-sportfish community was dominated by Buffalo species *(Ictiobus sp.)* and Gizzard Shad *(Dorosoma cepedianum)*.

EIU also sampled macroinvertebrates in the summer of 2014, as well as the fall of 2015, in the upstream and downstream reaches. *See* EIU May 2015 Report, Exhibit 33, at 17. EIU found no significant difference between the two reaches either year for estimated relative abundance, total taxa richness, and EPT richness. *See id.* However, percent EPT was significantly higher in the downstream reach in both years, and Simpson's Diversity was higher downstream in 2015. *See id.* Based on these results, EIU concluded that there are very few differences in macroinvertebrate communities between reaches, that all differences indicate higher quality communities in the downstream reach of the study area, and that macroinvertebrate communities in the study area are impacted more by habitat type and quality than by water quality and concentrations of soluble nickel. *See id.*

In the most recent sampling for 2016, a total of 58 different taxa were identified from the seven sites sampled. *See* EIU May 2017 Report, Exhibit 32, at 9. When comparing overall assemblages, there was no significant difference between the two reaches for Simpson's Diversity. *Id*. at 9-10. However, estimated abundance, richness, percent EPT, and EPT richness were significantly higher (MBI was lower) downstream of the District's main outfall. *Id*. at 10. Midges were abundant in both reaches while Hydropsychid caddisflies were much more abundant in the downstream reach but still had a strong presence upstream. *Id*. Taxa unique to the upstream reach included operculate snails and planorbid snails. *Id*. Taxa unique to the

downstream reach included dobsonflies, stoneflies, caddisflies belonging to the families hydroptilidae and philopotamidae, and other taxa. *Id*.

In addition to the 2017 and 2015 assessment, EIU's annual biotic assessments from previous years are attached to this Petition for reference. *See* R. Colombo, J. Laursen, and C. Pederson, Eastern Illinois University, *Ecological Condition of a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur: Focusing on Water Chemistry, Qualitative Habitat Assessment, and the Mussel, Macroinvertebrate, and Fish Assemblages* (May 2016), attached as Exhibit 34; R. Colombo, J. Laursen, and C. Pederson, Eastern Illinois University, *Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur: Focusing on Chemical Assessment, Macroinvertebrate Assemblage, Mussel Assemblage, Tiered-Aquatic Life Use, and the Sport Fishery*, at 19 (May 2014), attached as Exhibit 35; R. Colombo, J. Laursen, and C. Pederson, Eastern Illinois University, *Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur: Focusing on Chemical Assessment, Macroinvertebrate Assemblage, Mussel Assemblage, Tiered-Aquatic Life Use, and the Sport Fishery* (May 2013), attached as Exhibit 36; R. Colombo, J. Laursen, and C. Pederson, Eastern Illinois University, *Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur: Focusing on Chemical Assessment, Mussel Assemblage, Tiered-Aquatic Life Use, and the Sport Fishery* (May 2012), attached as Exhibit 37; R. Colombo, J. Laursen, and C. Pederson, Eastern Illinois University, *Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur: Focusing on Qualitative Habitat Assessment, Mussel*

Assemblage, Tiered-Aquatic Life Use, and the Sport Fishery (May 2011), attached as Exhibit 38; C. Pederson and R. Fischer, Eastern Illinois University, *Biotic Assessment of Water Quality in a Reach of the Sangamon River Receiving Effluent from the Sanitary District of Decatur* (Aug. 2010), attached as Exhibit 39; C. Pederson and R. Fischer, Eastern Illinois University, *Biotic Assessment of Water Quality in a Reach of the Sangamon River Receiving Effluent from the Sanitary District of Decatur* (July 2009), attached as Exhibit 40.

4. Threatened/Endangered Species and Natural Areas

The District performed Ecological Compliance Assessment Tool ("EcoCAT") searches of the Illinois Natural Heritage Database and found no records of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location. *See* EcoCAT Report (Nov. 29, 2017), attached as Exhibit 41. The Illinois Department of Natural Resources ("IDNR") lists the following endangered species in Macon County: Upland Sandpiper (*Bartramia longicauda*), Wild Hyacinth (*Camassia angusta*) and Bewick's Wren (*Thryomanes bewickii*). *See* IDNR, Illinois Threatened and Endangered Species by County (Oct. 2014), *available at* https://www.dnr.illinois.gov/ESPB/Documents/ET_by_County.pdf. Additionally IDNR lists the following threatened and endangered species in Sangamon County: Smooth Softshell (*Apalone mutica*), Short-eared Owl (*Asio flammeus*), Northern Harrier (*Circus cyaneus*), Kirtland's Snake (*Clonophis kirtlandi*), Least Bittern (*Ixobrychus exilis*), Loggerhead Shrike (*Lanius ludovicianus*), Bunchflower (*Melanthium virginicum*), Indiana Bat (*Myotis sodalist*), Mudpuppy (*Necturus masculosus*), Black-crowned Night-Heron (*Nycticorax nycticorax*), Heart-leaved Plantain (*Plantago cordata*), Franklin's Ground Squirrel (*Poliocitellus*

franklinii), Royal Catchfly (*Silene regia*), Great Chickweed (*Stellaria pubera*), Ornate Box Turtle (*Terrapene ornate*), Lined Snake (*Tropidoclonion lineatum*), and Barn Owl (*Tyto alba*). *See id.*

5. Other Dischargers to the Subject Segment of the Receiving Stream and Their Effluent Nickel Concentrations

The ISWS map indicates six municipal wastewater effluents discharging to various tributaries of the subject segment of the Sangamon River. All six of these effluents are lagoon-type treatment systems that may discharge little or no flow during dry weather. The only discharge of more than 0.09 cfs shown on the ISWS map in this reach of the Sangamon River is Borden Chemical Company near Illiopolis. This manufacturing plant, subsequently purchased by Formosa Plastics Corporation ("Formosa"), was heavily damaged by an explosion in April 2004 and does not currently have a continuous discharge. Indeed, pursuant to Formosa's request, Illinois EPA terminated Formosa's NPDES permit on October 6, 2015, due to the elimination of Formosa's discharge. The District reviewed each of the NPDES permits for all of the aforementioned dischargers, and none of those permits contain limits for nickel.[6]

B. <u>The Proposed Site Specific Rule Provides Aquatic Life Protection at Least as Protective as the Existing General Use Chronic Water Quality Standard for Nickel</u>

1. Summary of Data and Evaluation Procedures Upon Which the Current Water Quality Standard is Based

Water quality criteria ("WQC") are based on scientific assessments of health or ecological effects from pollutants, and are developed with guidance from USEPA. *See* C.E. Stephan *et al*., Guidelines for Deriving Numerical National Water Quality Criteria for the

[6] Prior to its termination, Formosa's NPDES permit (IL0001350) required semi-annual sampling of stormwater discharges for several parameters, including total nickel; however, the permit did not include a nickel limit.

Protection of Aquatic Organisms and Their Uses, PB85- 227049 (1985) ("Stephan Guidelines"); USEPA, Water Quality Standards Handbook, 2nd ed., EPA-823-B94-005b (1994) ("USEPA WQS Handbook"). The WQC are based on the 5th percentile of a distribution of toxicity data from a large number of organisms that include species of suitable diversity to meet the minimum numbers of biological families specified in the guidelines. *Id*. WQC establishment allows consideration of factors that affect bioavailability, including water quality characteristics such as pH, salinity, and hardness. *See* Stephan Guidelines. For example, the Illinois WQC for nickel is based on water hardness. The term "hardness" refers to the mineral content of the water and is primarily associated with the combined concentration of calcium and magnesium ions. Hardness is one of several key water quality characteristics that affects nickel bioavailability and toxicity. As discussed above in Section I, the Illinois water quality standards for nickel use a simple empirical equation that relates the value of the standard to the hardness of the receiving water.

2. Site-Specific Criteria Based on WER Testing and Bioavailability Modeling

Consistent with its discussions with Illinois EPA and USEPA, the District initiated WER testing to derive its proposed site-specific rule. The WER testing was conducted with *Ceriodaphnia dubia*, a freshwater invertebrate organism that is sensitive to nickel toxicity. The high sensitivity of *C. dubia* makes it the most sensitive organism in the Illinois standard for nickel. This sensitivity also makes *C. dubia* a suitable test organism for the establishment of a nickel WER. As additional supporting evidence, the District is also using the BLM to provide an independent verification of the nickel WER.

Although other factors, such as pH and natural organic matter, also affect nickel bioavailability and toxicity, these factors have not been incorporated into simple empirical

equations used to derive metal standards. *See* KB Wu *et al*., Water Environment Research Federation (WERF), Development of a Biotic Ligand Model for Nickel: Phase I, WERF 01-ECO-10T (2003). As a result, metals criteria are often overprotective because they do not consider some key water quality constituents. USEPA has long acknowledged this problem and has published guidance for establishing a WER that deals with local factors affecting bioavailability. *See* USEPA, Interim Guidance on Determination and Use of Water-Effect Ratios for Metals, EPA-823-B-04-001 (1994) ("USEPA WER Guidance"). The WER depends on biological testing of a site's receiving waters. A comparison of observed toxicity in a site's receiving waters with observed toxicity in reference water can be used to document the presence of local factors affecting toxicity and to quantify the magnitude of their effects. In the OSU WER test, a modified procedure was used based on a synthetic water that matched the average ion composition of the receiving water. The synthetic test water was necessary in part because initial results at OSU showed that *C. dubia* required acclimation to the very high hardness conditions typical of the Sangamon River. The WER is usually determined with one or more sensitive organisms, which may include fish or aquatic invertebrates. After determining a WER, a site-specific WQC can be obtained by using the WER value as a multiplier that modifies the ambient criteria. *Id*.

The BLM can be used to determine modifications to chemistry of receiving water using a procedure that is analogous to the WER. The BLM is a computational approach that can simulate the effects of water chemistry on metal toxicity and on aquatic organisms' physiological responses to metals. *See* D.M. Di Toro *et al*., A Biotic Ligand Model of the Acute Toxicity of Metals, I. Technical Basis, Environmental Toxicology and Chemistry, 20:2383-2396 (2001);

R.C. Santore *et al.*, A Biotic Ligand Model of the Acute Toxicity of Metals. II. Application to Acute Copper Toxicity in Freshwater Fish and Daphnia, Environmental Toxicology and Chemistry, 20(10):2397-2402 (2001). The BLM provides information that is similar to the WER, but does so based on mathematical relationships that represent the chemistry and biology processes involved in understanding the toxicity. The BLM is a mechanistic approach, not an empirical approach like the hardness equation, and it considers effects from numerous chemical factors such as pH, natural organic matter, alkalinity, and major ions (including cations that contribute to hardness). USEPA adopted the BLM as a replacement for the hardness equation in the most recently updated copper criteria. *See* USEPA, Aquatic Life Ambient Freshwater Quality Criteria – Copper, EPA-822-R-07-001 (Feb. 2007). The BLM for nickel has been developed and has been shown to be able to predict bioavailability effects on nickel toxicity to freshwater organisms. *See* Santore Manuscript, at 1, attached as Exhibit 29. The use of the BLM provides an additional supporting line of evidence that can be used to determine if the WER is reasonable given the chemical and biological factors known to be characteristic of a given site.

C. Derivation of Proposed Site-Specific Chronic Water Quality Standard for Nickel

Chronic survival and reproduction endpoints for *C. dubia* were determined in synthetic waters designed to match the ionic content of the receiving water during low-flow (i.e., effluent dominated) conditions. *See* OSU, Supplemental Data: Additional Statistical Analysis Nickel Water-Effect Ratio (WER) Toxicity Test Data (Aug. 11, 2017), attached as Appendix 1 of Exhibit 28. Since reproductive effects occurred at slightly lower nickel concentrations, these concentrations were used for developing this proposed site specific rule. The role of natural

organic matter ("NOM") was investigated in these waters by the addition of a concentrated NOM source from the Suwannee River. The NOM addition was designed to target a DOC concentration of 10 mg/L, which is representative of the NOM content of the receiving water. Approximately 50% of the mass of NOM is attributed to organic carbon, so measuring DOC is a simple way of determining how much NOM is present. From the chronic toxicity measurements with and without added NOM, a relationship between nickel toxicity and DOC was established. The DOC slope was calculated using an ANCOVA analysis to derive a common slope that considers the OSU data as well as toxicity data from the literature. The relationship is described by the following equation:

$$\text{Equation 1: Ni EC20 (reproduction)} = 10^{[0.329 * \log10(\text{DOC}) + 0.919]}$$

This equation can be used to predict how NOM in the receiving water would affect nickel toxicity and, therefore, can be used to calculate how NOM concentrations at the site determine the WER:

$$\text{Equation 2: Ni WER} = \frac{\text{Ni effect in site water}}{\text{Ni effect in reference water}}$$

Both the numerator and denominator in Equation 2 are calculated by substituting appropriate DOC concentrations in Equation 1. The reference water in Equation 2 would be a typical laboratory culture water. The reference water used in the OSU study was based on a synthetic laboratory water that was designed to match the ion content of the receiving water. OSU reported this water to have a DOC of 0.5 mg/L. For the site water, the DOC would represent the average conditions in the Sangamon River downstream of the District's Main Plant. Based on measurements from 22 downstream samples, the average DOC was 6.525 mg/L. Using these DOC concentrations with Equations 1 and 2 gives the following WER:

$$\text{Equation 3: Ni WER (Sangamon)} = \frac{15.381}{6.606} = 2.33$$

The nickel WER can then be used as a modifier to the Illinois state nickel water quality standard to calculate chronic site specific water quality criteria for nickel. The State of Illinois has a chronic dissolved nickel water quality standard that is specified by the following equation:

$$\text{Equation 4: } \textit{Illinois}\text{ Ni WQC (chronic)} = e^{-2.286\,+\,0.846\,*\ln(\text{hardness})} * 0.997$$

Site specific chronic water quality criteria for the Sangamon River can be derived by combining the WER and WQC equations:

$$\text{Equation 5: SiteSpecific Ni WQC (chronic)} = \textit{Illinois}\text{ Ni WQC (chronic)} * \text{WER}$$

$$\text{Equation 6: } e^{-2.286\,+\,0.846\,*\ln(\text{hardness})} * 0.997 * 2.33$$

This site specific water quality criteria for nickel will consider the effects of both hardness and NOM on nickel toxicity. The hardness relationship comes from the Illinois state WQS (Equation 4), and the NOM relationship comes from the ANCOVA analysis (Equation 1). Together, these two relationships consider the two most important water quality factors that affect nickel toxicity. *See* Santore Manuscript, Exhibit 29.

As an independent check on this site specific water quality criteria for nickel in the Sangamon River, the nickel BLM was also used to assess the effects of water chemistry on nickel toxicity. Water quality parameters used as input data to the BLM were determined at two downstream locations on two separate sampling events (at Rock Springs B and at Lincoln Homestead). The nickel BLM was used to predict nickel toxicity in site water and reference water. From this analysis, a WER of 2.48 was determined. *See* BLM Adjustment Report, Exhibit 14. This BLM-derived result further demonstrates that the DOC relationship-based WER of 2.33 is reasonable for the Sangamon River and protective for sensitive aquatic life.

For further discussion, please refer to the WER Report (including OSU's reports in Appendix 1) and the Santore Manuscript, attached as Exhibit 28 and Exhibit 29, respectively.

The District anticipates that the proposed site-specific nickel water quality standard, if adopted by the Board, will be used in conjunction with the critical hardness, metals translator, and mixing provisions of Board regulations to develop an effluent limit in the District's NPDES permit.

D. Alternative Technology is Not Technically Feasible or Economically Reasonable

As explained above regarding the nickel mitigation efforts undertaken to-date, the District and ADM have investigated numerous alternatives over the past several years, but no alternative has been identified that can consistently meet the required nickel limit and is also both technically feasible and economically reasonable.

1. District

The District considered applying additional treatment technologies at the Main Plant to remove nickel, which the District discussed in its Petition for Variance:

> With regard to treatment at the District's Main Plant, any treatment process would need to be sized to handle at least the design average flow of 41 MGD, and potentially the design maximum flow of 125 MGD. While treatment technologies for removing relatively high concentrations of metals from such streams as electroplating wastewater are well-established, their applicability is limited by the very low concentrations in the District's wastewater stream. For example, precipitation as nickel hydroxide is one technology for removing nickel from a solution. However, the solubility of nickel hydroxide at the high pH level required (pH 10 - 11) is approximately 0.12 mg/L, nearly an order of magnitude higher than the expected effluent limit. Even under ideal conditions, [hydroxide] precipitation could not achieve the limit.
>
> Another common metals removal technology, filtration, would not effectively treat the District's effluent. Mechanisms for improving the incidental removal of metals in municipal wastewater treatment plants vary depending on whether the

> metal species is particulate or dissolved (either as a metal ion or a metal complexed with another material). Removal of particulates or dissolved metals adsorbed onto particulates (for example, activated sludge floc) can potentially be improved by effluent filtration using sand or other filter media. Sampling of the District's effluent, however, shows that the majority of effluent nickel is in the dissolved form and would not be removed by filtration.
>
> Add-on chemical treatment technologies, such as ion exchange and reverse osmosis, would be expected to remove dissolved nickel from the District's Main Plant effluent. Both treatment technologies remove metals from the bulk effluent flow stream and concentrate them into a smaller volume, high concentration stream that requires further management. Both also require significant operating costs for energy, labor, and membranes (reverse osmosis) or resin (ion exchange).
>
> The [engineering] consulting firm Black and Veatch has provided the District with a preliminary capital cost estimate of $4 per gallon per day capacity for reverse osmosis treatment, not considering the cost of brine disposal and operating costs. At a minimum, approximately 25 MGD of the District's flow would need to be treated to meet the proposed permit limit of 0.016 mg/L, resulting in a minimum capital cost of $100 million, not considering brine disposal. A brine disposal system could double the capital cost. This exceeds the construction cost of the District's entire plant, to achieve a removal of approximately six pounds per day or less of nickel from the effluent.
>
> In general, the capital cost of an ion exchange system would be expected to total less than that of a reverse osmosis treatment system, perhaps by half. However, a substantial amount of research would be required to find an ion exchange resin suitable for removing nickel that is likely to be in a complexed form in the District's effluent. Sizing of the system would also
> depend on the removal efficiency that could be achieved, but again, would be a minimum of 25 MGD of the District's flow and possibly substantially more.

Petition for Variance, *Sanitary Dist. of Decatur v. Illinois EPA*, PCB No. 09-125, at 14-16 (Ill.Pol.Control.Bd. June 15, 2009).

The District determined that precipitation and filtration technologies were technically infeasible because they would not meet the District's NPDES permit limit. Also, although ion exchange and reverse osmosis technologies are potentially capable of meeting the permit limit, both of those technologies concentrate the removed nickel and a substantial amount of other

constituents into a wastewater stream that requires further treatment or disposal. After filing the Petition for Variance in PCB No. 09-125, Black and Veatch determined that the construction cost for reverse osmosis treatment, including necessary pretreatment and brine disposal using a "zero liquid discharge" process, was approximately $9.4 million per MGD of design flow, meaning the District's treatment of 25 MGD would require capital costs of approximately $235 million.

Thus, overall, the District could not identify any technically feasible and economically reasonable technologies for removing nickel from its entire plant flow due to the very low concentrations of nickel in the District's wastewater stream and the very large flow to be treated. The District's investigations then shifted focus to evaluations of nickel minimization and removal at ADM, the largest source of nickel in the District's wastewater.

2. ADM

a. Technologies Evaluated by ADM

As described in Section II.E. of this Petition, ADM has completed a substantial amount of work to identify and reduce nickel within its individual wastewater streams at the Decatur Complex. Additionally, ADM has identified and evaluated a number of technologies to determine whether any of them (or combination of them) could control nickel at the Decatur Complex WWTP significantly to allow the District to consistently meet the nickel limit in its current NPDES permit, while also being technically feasible and economically reasonable.

Table 3, attached hereto as Exhibit 42, summarizes all of the technologies ADM evaluated under the variance granted by the Board on January 7, 2010, along with some relevant facts about that research.

As indicated in Table 3, these nickel reduction technologies can be segregated into a number of different categories. ADM's review included an assessment of the relevant technology's technical feasibility, capital and operating costs, and reliability. Furthermore, the relevant technologies were pilot tested, as appropriate.

Below is a list of the key categories where ADM could not identify any technically feasible technologies. Accompanying each categorical listing is a description of the bases for ADM's technical feasibility determinations.

1. **Nickel Proprietary Precipitation Process:** ADM investigated this category of technologies using various materials, such as modified clays for selective adsorption of nickel from the wastewater. Most of the materials required high dosages (4% wt/wt or higher) or were bench scale proprietary technologies that the technology-supplying companies were unable to scale up. For example, using acidic clays to treat an 11 MGD stream would have required ADM to handle between 400-1200 tons of dry clay every day for adsorption and land filling of the nickel bound clay. This type of treatment and materials management is not technically feasible because of the large volume of material handling required. To put it into perspective, about 4-12 rail cars of incoming material would be needed each day and an equivalent amount of waste would be generated and have to be landfilled. Therefore, technologies in this category are not technically feasible.

2. **Nickel Chemical Precipitation Using Carbamates or Organic Sulfides:** ADM investigated this category of technologies by scaling nickel precipitation using polymeric dimethyl dithiocarbamate chemistry. A portion of these technologies were not scaled because of low levels of nickel removal, associated aquatic toxicity of the chemical and lack of commercial manufacturing capabilities by the vendors. The technologies that were scaled did not result in a consistent reduction in total nickel to below 0.037 mg/L due to variability in results from bench scale testing at the vendors' facilities and at ADM. Therefore, technologies evaluated in this category are not technically feasible. Nevertheless, ADM piloted a few of the technologies in this category and shared the data with Illinois EPA in its Annual Updates in June 2010 and July 2011.

3. **Commercial Resins:** ADM investigated this category of technologies using nonfunctionalized styrene divinyl benzene resins from Dow and Purolite. Testing with Vivenano resins showed no effective nickel reduction as the resin was competing for all the ions in the matrix as opposed to being selective for nickel.

While tests with Dow and Purolite resins showed the ability to adsorb nickel from ADM's effluent stream, resin usage was extremely large, being between 5-10% wt/wt of the stream being treated. In addition, regeneration of the resin required the use of a pH 10 ethanol solution at an elevated temperature. Because resin volumes are very large and the technologies require the use of hot, caustic ethanol for regeneration of the resin, this process would be extremely difficult to scale up. Therefore, technologies in this category are not technically feasible.

4. **Filtration:** ADM investigated this category of technologies using several approaches, including the use of various combinations of reverse osmosis, sand filtration and microfiltration. However, ADM's wastewater streams contain materials which significantly foul membranes. Additionally, the best recoveries with reverse osmosis, a key technology feature of the filtration technologies assessed, were under 30%. The remaining 70% wastewater would need to be evaporated and the recovered solids would have to be landfilled. This would require the evaporation of about 7.7 MGD of water. Therefore, technologies in this category are not technically feasible.

5. **Noncommercial, Experimental Technologies**: In response to suggestions by Illinois EPA, ADM investigated several experimental techniques to reduce nickel, including electrocoagulation, captive deionization and advanced oxidation. However, those studies did not result in the identification of any other technically feasible alternatives. For instance, there are currently no commercial manufacturers of electrocoagulation equipment. Additionally, captive deionization captures more than just nickel in the effluent stream and is easily fouled. Finally, advanced oxidation (such as ozone and chlorine dioxide) did not show a consistent reduction in nickel. Moreover, ADM could not trial chlorine dioxide on a larger scale due to the District's permitted chlorine residual limit. Therefore, technologies in this category are not technically feasible.

Additional details about some of the technologies identified in Table 3 are presented in Table 4, attached as Exhibit 43, including a general list of reasons why certain of those technologies are not technically feasible and are not currently being pursued.

Thus, of all of the technologies investigated by ADM to date, the only viable option that has been fully planned, installed and employed by ADM is the nickel capture process based upon high pH precipitation at the Polyols Plant. Because such technology has been determined to be both technically feasible and economically reasonable for the specific application, ADM

installed this system at the Polyols Plant. As noted previously, the Polyols Plant is now permanently shut down. ADM believes that, with the current influent streams to the WWTP, a nickel reduction below 0.040 mg/L - 0.050 mg/L soluble nickel is not feasible within the limits of any technologies that have been evaluated.

b. ADM Investment to Date Regarding Nickel Mitigation

ADM's investment to date to identify and implement viable solutions to meet the nickel standard has been approximately $1.02 million in employee costs and $0.45 million in equipment rental and pilot trial costs from 2009 to December 2011. In addition, ADM has spent $450,000 to install a resin capture system at the Decatur Sorbitol plant. It also spent an additional $2.7 million to install a system to allow removal of the soy molasses stream and roughly $750,000 to install a high pH precipitation and filtration process at the Polyols Plant. Recently, ADM spent $450,000 to install facilities to manage removal of excess sludge from the wastewater treatment plant. ADM has also significantly improved housekeeping in the West Plant to prevent nickel catalyst from entering the wastewater system. At this point, all reasonably identifiable options have been explored and all technically feasible and economically reasonable solutions are being pursued.

When considering the cost of compliance for ADM alone, the site specific rule is clearly necessary because there is no technically feasible and economically reasonable treatment available that will allow ADM to meet the nickel limit proposed by the District for ADM's wastewater effluent. *See* ADM's Industrial Discharge Permit with the District, attached hereto as Exhibit 44. Since no such technologies exist, ADM anticipates that, if the existing rules were to apply, ADM would have to curtail its soy processing operations at the Decatur Complex and

evaluate possible shutdown at this location. Such a move would likely result in a loss of approximately 150 jobs.

Even if some of the untested, unproven and experimental technologies that ADM evaluated were commercially available and scalable, ADM estimates that it would have to spend about $32.5 million in the first year to install a mix of technologies and chemicals, which may only remove between 3-7 lbs of nickel per day in a stream that averages 11 MGD. On a per pound nickel basis, that rate equates to a mitigation cost between $7,500 and $18,000 per pound of nickel removed. Moreover, the technology and chemical mix would likely generate about 15-20 tons per day of landfill waste.

Based in large part on Mr. Robert Santore's analysis described in this Amended Petition, the District's proposed site specific rule in this Amended Petition has little or no adverse impact on the environment. The steps already taken by ADM at a great cost have significantly reduced soluble nickel output by the Decatur Complex WWTP and will allow the District to maintain nickel levels at or below the proposed limit in this Amended Petition. Requiring further reductions in nickel from ADM, including those suggested above, will be both economically cost prohibitive and technically uncertain in effectiveness and will not produce a measurable improvement in the waterway ecology.

E. Other Similar Persons' or Sites' Ability to Comply With the General Rule

The District was unable to identify any other Illinois site specific rules or adjusted standards that establish alternative water quality standards for nickel. The District located only two currently active NPDES permits from Illinois EPA with limits and compliance schedules for nickel. *See* NPDES Permit No. IL0001724, issued September 19, 2014, for the American

Nickeloid Company's electroplating, metal finishing, and coil coating facility located in Peru, Illinois; NPDES Permit No. IL0024473, issued October 29, 2015, for Aqua Illinois, Inc.'s University Park WWTF facility that treats domestic wastewater for University Park and Monee in Will County, Illinois. Also, the District located a public notice draft of the NPDES permit to be issued for Lake County Department of Public Works' New Century Town STP that included limits and a compliance schedule for nickel. *See* Public Notice Draft NPDES Permit No. IL0022071, sent to public notice April 28, 2011. However, the nickel limits and compliance schedule were not included in the final issued permit. *See* NPDES Permit No. IL0022071, issued June 4, 2015.

F. Economic Impact of the Proposed Site Specific Rule

As noted above, the District requires this proposed site specific rule because there are no technically feasible and economically reasonable treatments or other alternatives. The only technically feasible alternative identified above, reverse osmosis with associated pretreatment and waste stream disposal, has a projected capital cost of $235 million, which far exceeds any cost estimate for ADM to pretreat its wastewater before discharging it into the District's sewer system. In addition, research by ADM described above has not identified a commercial ion exchange resin that is technically feasible for removing nickel to the required concentration. Thus, there is no technically feasible and economically reasonable treatment process that would enable the entire District flow to meet a permit limit based on the current water quality standard for nickel.

ADM's estimated costs to implement this proposed site specific rule and its pretreatment changes described above are $4.35 million in capital costs and about $4.25 million in annual

operating, chemical, and personnel costs. There is no significant cost to the District or its customers and industrial users (other than ADM) to comply with the proposed site specific rule, but there will be substantial cost to the District and its customers if the site specific rule is not adopted. Thus, while not only effective, the proposed site specific rule will save the District, its customers, and industrial users substantial costs in comparison to the alternatives, with no adverse impact on the environment.

IV. SYNOPSIS OF TESTIMONY

The District will call several individuals to testify on the facts set forth in this Amended Petition and requested relief, including the following:

A. Tim Kluge

Tim Kluge, former Technical Director of the District, will testify regarding, among other things: the District's Main Plant; the District's NPDES permit and its included limits; the District's investigations of nickel sources; the District's investigation of nickel treatment options; the District's investigation of industrial pretreatment options; the District's nickel water quality standard investigations; receiving stream impacts; and a summary of the District's proposed site specific standard.

B. Robert Santore

Robert Santore, of Windward Environmental, LLC, will testify regarding, among other things: the derivation of national water quality criteria; the need for approaches that consider local conditions to evaluate bioavailability effects, and the use of either toxicity testing or bioavailability modeling to consider these effects; how factors affecting the bioavailability of nickel in the Sangamon River downstream of the District's Main Plant indicate that a site-

specific adjustment to the chronic water quality criteria for nickel is appropriate; development of a site-specific adjustment to the nickel standard for use in deriving a permit limit for the District; reasons why the proposed site-specific water quality standard will provide aquatic life protection equal to the existing general use water quality standard; and derivation of the proposed site-specific water quality standards for nickel.

C. Paul Bloom, Ph.D.

Paul Bloom, Ph.D., Vice President, Process & Chemical Research from ADM, will testify regarding, among other things: ADM's Decatur Complex; how the District's NPDES permit nickel effluent limit impacts ADM; ADM's identification and evaluation of methods and technologies to control and reduce nickel in the Decatur Complex's wastewater, and the technical feasibility and economic reasonableness of such methods and technologies; and the steps that ADM has undertaken to control and reduce nickel at the Decatur Complex.

D. Jeffery Laursen, Ph.D., Charles Pederson, Ph.D., or Robert Colombo, Ph.D.

Jeffery Laursen, Ph.D., Charles Pederson, Ph.D., or Robert Colombo, Ph.D., all professors at Eastern Illinois University, will testify regarding, among other things: their sampling conducted on the stretch of the Sangamon River beginning just below the Lake Decatur Dam and extending downstream to incorporate the discharges of the District. The testifying individual will further testify that the river study characterizes stream habitat quality and biotic integrity resulting from ongoing municipal and reservoir management by evaluating biotic integrity at various trophic levels in the context of the physical and chemical nature of the Sangamon River.

V. MOTION FOR WAIVER OF SIGNATURE REQUIREMENT

In a separate Motion filed simultaneously with this Petition, Petitioners respectfully request that the Board waive the requirement, set forth at 35 Ill. Admin. Code § 102.202(g), that a petition for rulemaking be signed by at least 200 persons.

VI. EXHIBITS

The District includes the following exhibits as parts of this Amended Petition in support of the proposed site specific rule:

Exhibit 1.	District's NPDES Permit (No. IL0028321)
Exhibit 2.	Illinois EPA Memo Regarding Water Quality Based Effluent Limits at the District (November 9, 2006)
Exhibit 3.	District Interim Report (December 20, 2007)
Exhibit 4.	Illinois EPA Letter to the District (April 24, 2009)
Exhibit 5.	Recommendation of the Illinois EPA (April 7, 2014) in PCB 14-111 (Variance – Water)
Exhibit 6.	District Summary of Sample Data Presented to Illinois EPA on October 30, 2007
Exhibit 7.	Illinois EPA e-mail indicating higher permit limit could be justified based on Interim Report (January 2, 2008)
Exhibit 8.	District Interim Report (December 29, 2008)
Exhibit 9.	District Interim Report (December 30, 2009)
Exhibit 10.	District Interim Report (July 1, 2010)
Exhibit 11.	District Interim Report (December 29, 2010)
Exhibit 12.	District Interim Report (June 29, 2011)
Exhibit 13.	Presentation Slides from June 6, 2011 Telephone Call with Illinois EPA and USEPA
Exhibit 14.	Estimate of the BLM Adjustment to the Nickel Criterion for the Sanitary District of Decatur, Illinois, dated January 16, 2014
Exhibit 15.	District Interim Report (December 21, 2011)
Exhibit 16.	District Interim Report (June 25, 2012)
Exhibit 17.	District Interim Report (December 19, 2012)
Exhibit 18.	District Interim Report (June 27, 2013)
Exhibit 19.	District Interim Report (December 20, 2013)
Exhibit 20.	Table 1 – Weekly Loads to ADM Decatur Complex WWTP (August – November 2010)

Exhibit 21. Figure 1 – ADM Flow Data
Exhibit 22. ADM Operating Permit No. 2015-SC-60414 (Dec. 29, 2015)
Exhibit 23. District Executive Order to ADM (Feb. 1, 2016)
Exhibit 24. District's Response to U.S. EPA Toxicity Testing Comments Sanitary District of Decatur, Illinois;
Exhibit 25. U.S. EPA Follow Up to the District's Response to U.S. EPA Toxicity Testing Comments Sanitary District of Decatur, Illinois;
Exhibit 26. Review of Water Quality Factors that Affect Nickel Bioavailbility to Aquatic Organisms, R. Santore Draft Manuscript (provided on April 12, 2016)
Exhibit 27. Progress Report – Nickel WER Project (March 2016)
Exhibit 28. Development of a Water Effect Ratio for Nickel in the Sangamon River (Nov. 29, 2017 Draft)
Exhibit 29. A Review of Water Quality Factors that Affect nickel Bioavailability to Aquatic Organisms, R. Santore, Current Draft Manuscript (Draft Current as of Nov. 29, 2017)
Exhibit 30. Table 2 – Monitoring Data (March 2007 – October 2017)
Exhibit 31. ISWS Map 5 Sangamon Region (April 2002)
Exhibit 32. Ecological Condition of a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (May 2017)
Exhibit 33. Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (May 2015)
Exhibit 34. Ecological Condition of a Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (May 2016)
Exhibit 35. Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (May 2014)
Exhibit 36. Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (May 2013)
Exhibit 37. Biotic Assessment of Water Quality in a Stretch of the Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (May 2012)
Exhibit 38. Biotic Assessment of Water Quality in a Reach of the Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (May 2011)

Exhibit 39. Biotic Assessment of Water Quality in a Reach of the Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (August 2010)
Exhibit 40. Biotic Assessment of Water Quality in a Reach of the Sangamon River Receiving Effluent from the Sanitary District of Decatur, Eastern Illinois University Report (July 2009)
Exhibit 41. EcoCAT Report (Nov. 29, 2017)
Exhibit 42. Table 3 – Summary of Technologies Reviewed by ADM Under Variance Granted by Board
Exhibit 43. Table 4 – Technical Challenges on Scale Up for Nickel Remediation Chemistries
Exhibit 44. ADM Industrial Discharge Permit

VII. THE BOARD MAY GRANT THE REQUESTED RELIEF CONSISTENT WITH FEDERAL LAW

The Board has authority to adopt water quality standards for submittal to USEPA for approval. This proposal provides the necessary support for the Board to promulgate, and for USEPA to approve, a site-specific water quality standard for the stretch of the Sangamon River described above. The nickel standard proposed in this Amended Petition is protective of general use waters. The proposed standard merely takes into account site-specific conditions. Therefore, the District is not requesting or required to remove a use from the Sangamon River.

A. Background on Board Adoption and USEPA Approval of State Standards

Section 5(c) of the Act, 415 ILCS 5/5(c), gives the Board "authority to act for the State in regard to the adoption of standards for submission to the United States under any federal law respecting environmental protection. Such standards shall be adopted in accordance with Title VII of the Act and upon adoption shall be forwarded to the Environmental Protection Agency for submission to the United States…." Section 13(a) of the Act, 415 ILCS 5/13(a), specifically lists water quality standards and effluent standards as the types of regulations the Board may adopt.

See also 415 ILCS 5/27(a) ("The Board may adopt substantive regulations as described in this Act.").

The Board has recognized that it has the authority and broad discretion, consistent with federal law, to adopt water quality standards and effluent standards that do not adversely affect the designated uses of a water body. *See In re: Petition of Exelon Generation Co. for an Adjusted Standard from 35 Ill. Adm. Code 302.208,* AS 03-1 (Ill.Pol.Control.Bd. June 19, 2003); *In re: Site Specific Rule for City of Effingham Treatment Plant Fluoride Discharge, 35 Ill. Adm. Code 304.233,* R03-11 (Ill.Pol.Control.Bd. July 24, 2003); *In re: Proposed Site Specific Rule for City of Springfield, Illinois, Office of Public Utilities, City Water, Light and Power and Springfield Metro Sanitary District from 35 Ill. Adm. Code 302.208(g): New 35 Ill. Adm. Code 303.446,* R09-8 (Ill.Pol.Control.Bd. April 2, 2009).

> Generally, states must adopt water quality standards which protect the designated use of interstate and intrastate waters. 33 U.S.C. § 1313(c) (1998). The Board has adopted the water quality standards . . . in compliance with federal law. States may also revise water quality standards. 40 C.F.R. § 131.4 (1998).
>
> * * *
>
> The Board has stated previously that federal directives give it "broad discretion in determining the appropriate standard of control to apply to discharges from water treatment plants." *In re* Site Specific Exception to Effluent Standards for the Illinois American Water Company, East St. Louis Treatment Plant (February 2, 1989), R85-11, slip op. at 10.

Board Opinion and Order, *In re: Petition of Illinois American Water Co.'s Alton Public Water Supply Replacement Facility Discharge to the Mississippi River for an Adjusted Standard from 35 Ill. Adm. Code 302.203, 304.106, and 304.124,* AS 99-6, at 20 (Ill.Pol.Control.Bd. Sept. 7, 2000).

Thus, the Board has authority and broad discretion to determine that the District's proposed site-specific water quality standard for nickel is the appropriate standard of control and will protect the portions of the water bodies identified above.

USEPA's regulations in 40 C.F.R. Parts 131 and 132 implement the Clean Water Act's water quality standard requirements in Sections 101(a)(2), 118, and 303(c)(2). 40 C.F.R. § 131.21 requires USEPA to review and approve/disapprove new and revised water quality standards adopted by states and tribes, including site-specific water quality standards:

> § 131.21 EPA review and approval of water quality standards.
>
> (a) After the State submits its officially adopted revisions, the Regional Administrator shall either:
>
> (1) Notify the State within 60 days that the revisions are approved, or
>
> (2) Notify the State within 90 days that the revisions are disapproved. Such notification of disapproval shall specify the changes needed to assure compliance with the requirements of the Act and this regulation, and shall explain why the State standard is not in compliance with such requirements. Any new or revised State standard must be accompanied by some type of supporting analysis.
>
> (b) The Regional Administrator's approval or disapproval of a State water quality standard shall be based on the requirements of the Act as described in §§ 131.5 and 131.6, and, with respect to Great Lakes States or Tribes (as defined in 40 CFR 132.2), 40 CFR part 132.

40 C.F.R § 131.21(a)-(b).

40 C.F.R. §§ 131.5 and 131.6 provide as follows:

> § 131.5 EPA authority.
>
> (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of:

(1) Whether the State has adopted designated water uses that are consistent with the requirements of the Clean Water Act;

(2) Whether the State has adopted criteria that protect the designated water uses based on sound scientific rationale consistent with §131.11;

(3) Whether the State has adopted an antidegradation policy that is consistent with §131.12, and whether any State adopted antidegradation implementation methods are consistent with §131.12;

(4) Whether any State adopted WQS variance is consistent with §131.14;

(5) Whether any State adopted provision authorizing the use of schedules of compliance for water quality-based effluent limits in NPDES permits is consistent with §131.15;

(6) Whether the State has followed applicable legal procedures for revising or adopting standards;

(7) Whether the State standards which do not include the uses specified in section 101(a)(2) of the Act are based upon appropriate technical and scientific data and analyses, and

(8) Whether the State submission meets the requirements included in §131.6 of this part and, for Great Lakes States or Great Lakes Tribes (as defined in 40 CFR 132.2) to conform to section 118 of the Act, the requirements of 40 CFR part 132.

(b) If EPA determines that the State's or Tribe's water quality standards are consistent with the factors listed in paragraphs (a)(1) through (8) of this section, EPA approves the standards. EPA must disapprove the State's or Tribe's water quality standards and promulgate Federal standards under section 303(c)(4), and for Great Lakes States or Great Lakes Tribes under section 118(c)(2)(C) of the Act, if State or Tribal adopted standards are not consistent with the factors listed in paragraphs (a)(1) through (8) of this section. EPA may also promulgate a new or revised standard when necessary to meet the requirements of the Act.

(c) Section 401 of the Clean Water Act authorizes EPA to issue certifications pursuant to the requirements of section 401 in any case where a State or interstate agency has no authority for issuing such certifications.

40 C.F.R. § 131.5.

§ 131.6 Minimum requirements for water quality standards submission.

The following elements must be included in each State's water quality standards submitted to EPA for review:

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

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

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

(d) An antidegradation policy consistent with § 131.12.

(e) Certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law.

(f) General information which will aid the Agency in determining the adequacy of the scientific basis of the standards which do not include the uses specified in section 101(a)(2) of the Act as well as information on general policies applicable to State standards which may affect their application and implementation.

40 C.F.R. § 131.6.

This Petition provides the information necessary to support the adoption of site-specific water quality standards that meet the requirements in Section 131.6. Likewise, if the site-specific water quality standards are promulgated by the Board, this Petition includes the information necessary for USEPA approval. Specifically, it demonstrates that the proposed standard is protective of general use waters and is based on sound scientific rationale.

B. Removing Designated Uses and Recent Clarifications by USEPA

Water quality standards must be sufficient to protect designated uses. 40 C.F.R. § 131.6(c). The site-specific nickel standard proposed by the District is protective of general use waters. It merely takes into consideration site-specific conditions.

USEPA's regulations at 40 C.F.R. Part 131 were revised in August 2015. 80 Fed. Reg. 51020 (Aug. 21, 2015). Among the changes, USEPA revised and clarified regulations related to the designation of uses at 40 C.F.R. § 131.10. In particular, USEPA clarified that when "adopting new or revised designated uses other than the uses specified in section 101(a)(2)[7] of the [Clean Water] Act, or removing designated uses, States must submit documentation justifying how their consideration of the use and value of water for those uses listed in this paragraph appropriately supports the State's action." 40 C.F.R. § 131.10.

However, in this case, the District is not proposing new or revised designated uses, and the uses specified in Section 101(a)(2) of the Clean Water Act for the Sangamon River remain intact. The proposed standard will continue to be protective of general use waters.

VIII. CONCLUSION

The District's current discharge exceeds the current general use chronic water quality standard for nickel due to the influent contributions primarily from one industrial user. However, the nickel standard proposed herein, which merely takes into account site-specific conditions and considers the bioavailability of nickel to aquatic life, is as protective of the Sangamon River and its designated uses as the existing nickel standard for General Use waters.

[7] Uses specified in Section 101(a)(2) of the Clean Water Act are "uses that provide for protection and propagation of fish, shellfish and wildlife, and recreation in and on the water, as well as for the protection of human health when consuming fish, shellfish, and other aquatic life." 80 Fed. Reg. 51020, 51024.

Utilizing WER testing with support from the BLM, the District's proposed site-specific chronic water quality standard for dissolved nickel is as follows:

> Section 303.410 Chronic Nickel Water Quality Standard for Segment of the Sangamon River
>
> The general use chronic water quality standard for dissolved nickel contained in Section 302.208(e) shall not apply to the Sangamon River, which receives discharges from the Sanitary District of Decatur's Main STP, from that facility's Outfall 001 located at 39° 49' 56" North Latitude, 89° 0' 7" West Longitude, to the point of the confluence of the Sangamon River with the South Fork of the Sangamon River near Riverton. Instead, nickel levels in such waters shall meet a chronic water quality standard for dissolved nickel as follows:
>
> > Chronic Dissolved Nickel Standard = exp[A+Bln(H)] x 0.997* x WER,
> > where A = -2.286, B = 0.846, ln(H) = natural logarithm of Hardness,
> > * = conversion factor multiplier for dissolved metals, and WER = 2.33

In addition, the District requests that the Board direct the Illinois EPA to revise the District's NPDES permit to reflect that the District will be required to meet a total nickel permit limit based upon the site specific chronic water quality standard for nickel requested above, where the hardness value used in the equation shall be 359 mg/L critical hardness, as determined by the District's ambient monitoring and in accord with Illinois EPA's previous determination. *See* Exhibit 7.

The District's proposed site-specific chronic water quality standard for dissolved nickel is justified based on sound scientific rationale. Studies of the aquatic life in the Sangamon River indicate that, at the District's current discharge levels, no water quality concerns attributed to nickel have been noted.

This Petition satisfies the requirements of Sections 102.202 and 102.210 of the Board's rules because the Petition:

- Details the language of the proposed site specific rule;

- Discusses details of the operations and facilities of the District;
- States facts in support of the proposal, including environmental, technical and economic justification;
- Demonstrates that requiring compliance with the existing general use chronic water quality standard for nickel is neither technically feasible nor economically reasonable;
- Discusses other persons' or sites' ability to comply with the general rule;
- Discusses the receiving body of water;
- Includes a synopsis of testimony to be presented at hearing;
- Describes the research and studies relied upon under the rule; and
- Demonstrates that the requested relief is consistent with federal law.

WHEREFORE, Petitioner, the SANITARY DISTRICT OF DECATUR, respectfully requests that the Illinois Pollution Control Board adopt the site specific chronic water quality standard for nickel proposed herein; direct the Illinois EPA to revise the District's NPDES permit to reflect that the District will be required to meet a total nickel permit limit based upon the site specific chronic water quality standard for nickel requested herein, where the hardness value used in the equation shall be 359 mg/L critical hardness; and take such other action as requested herein.

SANITARY DISTRICT OF DECATUR,

Dated: November 30, 2017

By: /s/ Joshua J. Houser
One of Its Attorneys

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE SPECIFIC	)	
RULE FOR SANITARY DISTRICT	)	R14-24
OF DECATUR FROM 35 ILL. ADM.	)	(Site Specific Rule – Water)
CODE SECTION 302.208(e).	)	

MOTION TO WAIVE REQUIREMENT TO SUBMIT 200 SIGNATURES

The SANITARY DISTRICT OF DECATUR ("District"), by and through its attorneys, HEPLERBROOM, LLC, hereby requests the Illinois Pollution Control Board ("Board") to waive the requirement, under 35 Ill. Admin. Code § 102.202(g), to submit 200 signatures with its Amended Petition for Site Specific Rule ("Amended Petition"). In support of this Motion to Waive Requirement to Submit 200 Signatures ("Motion"), the District states as follows:

1. The District, located in Macon County, is engaged in the treatment of wastewater for the City of Decatur, the Villages of Forsyth, Mt. Zion, Oreana and Argenta, and for industrial and commercial users in the Decatur, Illinois, metropolitan area. The District employs approximately 55 full-time employees and was formed in 1917. The original Main Sewage Treatment Plant ("Main Plant"), located at 501 Dipper Lane, Decatur, Illinois, was completed in 1924. Major expansions and plant upgrades were made in 1928, 1957, 1964, and 1976 and the current plant was completed in 1990. The District serves approximately 32,000 active billing accounts, including 25 significant industrial users ("SIUs") and 2,400 other industrial and commercial users.

2. An average flow of approximately 28 million gallons per day ("MGD") is processed at the Main Plant and then discharged into the Sangamon River. The Main Plant has a design average flow of 41.0 MGD and a design maximum flow of 125.0 MGD. Treatment at the Main Plant consists of screening, grit removal, primary clarification, activated sludge, secondary

clarification, disinfection, dechlorination, discharge to surface water, anaerobic digestion, sludge thickening, and land application of sludge on area farmland. The District has an approved pretreatment program with 13 noncategorical SIUs and 11 categorical SIUs.

3. Attached to this Motion is the Amended Petition, in which the District is seeking a site specific rule to establish an alternative chronic water quality standard for nickel from the point of its Main Plant's discharge into the Sangamon River to the point of the confluence of the Sangamon River with the South Fork of the Sangamon River near Riverton.

4. The general use water quality standard for nickel, which is set forth in Section 302.208(e), is defined by a calculation for dissolved nickel based on stream hardness. 35 Ill. Admin. Code § 302.208(e). The chronic standard for nickel is defined as "exp[A+Bln(H)] X 0.997*, where A = -2.286 and B = 0.8460." *Id.* The chronic standard for nickel "shall not be exceeded by the arithmetic average of at least four consecutive samples collected over any period of at least four days," except as provided in Section 302.102. 35 Ill. Admin. Code § 302.208(b). No change is proposed for the general use acute water quality standard for nickel.

5. The District is requesting an alternative chronic water quality standard for nickel because the District's current discharge exceeds the current general use chronic water quality standard for nickel due to the influent contributions primarily from one industrial user. A different numeric standard, which considers the bioavailability of nickel to aquatic life, would provide equivalent protection of the Sangamon River and its designated uses. Utilizing Water Effect Ratio testing with additional support from using the Biotic Ligand Model, a proposed site specific chronic water quality standard for dissolved nickel, which is justified based on sound scientific rationale, is proposed in the Amended Petition. Studies of the aquatic life in the

Sangamon River indicate that, at current discharge levels, no water quality concerns attributed to nickel have been noted.

6. The Board has waived signature requirements for site specific rulemaking petitioners in the past, including in *In the Matter of: City of Galva Site Specific Water Quality Standard for Boron Discharges to Edwards River and Mud Creek; 35 Ill. Adm. Code 303.447 and 303.448*, PCB No. R09-11, slip op. at 3 (Ill.Pol.Control.Bd. Feb. 5, 2009); *In the Matter of: Proposed Site Specific Rule for City of Springfield, Illinois, Office of Public Utilities, City Water, Light and Power and Springfield Metro Sanitary District from 35 Ill. Adm. Code 302.208(g)*, PCB No. R09-8, slip op. at 2 (Ill.Pol.Control.Bd. Sept. 16, 2008); *In the Matter of: Petition of Central Illinois Light Company (E.D. Edwards Generating Station) for a Site-Specific Air Regulation: 35 Ill. Adm. Code 214.561*, PCB No. R02-21, slip op. at 3 (Ill.Pol.Control.Bd. May 2, 2002); *In the Matter of: Site Specific Rule for City of Effingham Treatment Plant Fluoride Discharge, 35 Ill. Adm. Code 304.233*, PCB No. R03-11, slip op. at 1 (Ill.Pol.Control.Bd. Nov. 7, 2002); *In the Matter of: Proposed Site Specific Regulation Applicability to Ameren Energy Generating Company, Elgin, Amending 35 Ill. Adm. Code Part 901*, PCB No. R04-11, slip op. at 2 (Ill.Pol.Control.Bd. Nov. 6, 2003).

7. Granting this Motion is in the public interest because the Main Plant provides the District's residential users, SIUs, and other industrial and commercial users with a critical service and must do so in accordance with the terms of its National Pollutant Discharge Elimination System permit.

WHEREFORE, for the above and foregoing reasons, the SANITARY DISTRICT OF DECATUR hereby respectfully requests that the Illinois Pollution Control Board enter an Order granting its Motion to Waive Requirement to Submit 200 Signatures, waiving the requirement

for the SANITARY DISTRICT OF DECATUR to submit 200 signatures in support of its Amended Petition for Site Specific Rule, and granting such other and further relief in the SANITARY DISTRICT OF DECATUR'S favor as the Illinois Pollution Control Board deems just and proper.

Respectfully submitted,

SANITARY DISTRICT OF DECATUR,

Dated: November 30, 2017

By: /s/ Joshua J. Houser
One of Its Attorneys

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