

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	Tim Fox
Clerk of the Board	Hearing Officer
Illinois Pollution Control Board	Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500	100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601	Chicago, Illinois 60601
(VIA ELECTRONIC MAIL)	(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 **SANITARY DISTRICT OF DECATUR’S FOLLOW-UP RESPONSES TO QUESTIONS POSED BY THE BOARD AT THE MAY 16, 2018 HEARING**, copies of which are herewith served upon you.

Respectfully submitted,

SANITARY DISTRICT OF DECATUR

Date: May 31, 2018

By: /s/ Katherine D. Hodge
One of Its Attorneys

Katherine D. Hodge
 Daniel L. Siegfried
 Joshua J. Houser
 Melissa S. Brown
 HEPLERBROOM, LLC
 4340 Acer Grove Drive
 Springfield, Illinois 62711
Katherine.Hodge@heplerbroom.com
Daniel.Siegfried@heplerbroom.com
Joshua.Houser@heplerbroom.com
Melissa.Brown@heplerbroom.com
 (217) 528-3674

CERTIFICATE OF SERVICE

I, Katherine D. Hodge, the undersigned, on oath state the following:

That I have served the attached **SANITARY DISTRICT OF DECATUR'S FOLLOW-UP RESPONSES TO QUESTIONS POSED BY THE BOARD AT THE MAY 16, 2018**

HEARING, via electronic mail upon:

Don Brown
Clerk of the Board
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601
Don.Brown@illinois.gov

Tim Fox
Hearing Officer
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601
Tim.Fox@illinois.gov

Sara Terranova
Division of Legal Counsel
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
Sara.Terranova@illinois.gov

That my email address is Katherine.Hodge@heplerbroom.com.

That the number of pages in the email transmission is 9.

That the email transmission took place before 5:00 p.m. on the date of May 31, 2018.

/s/ Katherine D. Hodge
Katherine D. Hodge

Date: May 31, 2018

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SANITARY DISTRICT OF DECATUR’S FOLLOW-UP RESPONSES TO QUESTIONS POSED BY THE BOARD AT THE MAY 16, 2018 HEARING

The Petitioner, SANITARY DISTRICT OF DECATUR (“District”), by and through its attorneys, HEPLERBROOM, LLC, hereby submits follow-up responses to questions by the Illinois Pollution Control Board (“Board”) at the hearing held on this matter on May 16, 2018.

1. On May 16, 2018, a hearing was held on this matter in Decatur, Illinois.

2. At the hearing, the District presented witnesses to answer questions and the Board propounded questions to the District’s witnesses. These questions are contained in the document “Hearing Questions for Witnesses: Sanitary District of Decatur,” which was entered as Exhibit 7 at hearing.

3. The District’s witnesses provided responses to the Board’s questions at the hearing, and the District agreed to provide follow-up responses to the Board on Questions #1, #23, #32, and #40. *See* Hearing Transcript, *In the Matter of Proposed Site Specific Rule for Sanitary District of Decatur from 35 Ill. Adm. Code Section 302.208(e)*, PCB R 14-24, 86:4-21 (May 16, 2018).

4. At the May 16, 2018 hearing, the Hearing Officer established a deadline of June 15, 2018 for this response. However, the District is filing its response early in the hope of facilitating any follow-up questions by the Board by June 7, 2018 (i.e., 7 days after the District’s response, as directed by the Hearing Officer), so that the Board would be able to address the

District's proposed site specific rule and issue a First Notice Opinion and Order, should the Board deem it appropriate, as early as the Board's July 12, 2018 meeting.

5. The District's follow-up responses to the Board's questions are provided below and attached (as referenced below).

Board Question # 1, directed to Timothy Kluge: Would you direct us to the translator study in the record?

At the May 16, 2018 hearing, Mr. Timothy Kluge indicated that the District would submit the translator study into the record. The translator study is included in the District's first Interim Report, dated December 20, 2007, which is attached to the District's Amended Petition for Site Specific Rule, filed on November 30, 2017 ("Amended Petition"), as Exhibit 3. Additionally, a letter from the Illinois Environmental Protection Agency ("Illinois EPA") to the District, dated April 24, 2009, establishing the translator value based on the District's translator study is attached to the District's Amended Petition as Exhibit 4.

Board Question #23, directed to Robert Santore: Please provide the equation and show mathematically how the anticipated NPDES permit limit of 0.03820 mg/L is calculated?

At hearing, Mr. Robert Santore agreed to provide an equation into the record and provide an explanation for it. The equations used to calculate the NPDES permit limit of 0.03820 mg/L and explanation thereof is provided below.

The site-specific guideline developed for the Sanitary District of Decatur includes a water effect ratio (WER) multiplier that adjusts the Illinois state chronic guideline for nickel. The state guideline includes hardness effects on nickel toxicity, and the WER is based on an equation that considers the additional influence of dissolved organic carbon ("DOC").

The State of Illinois chronic nickel ("Ni") standard is specified by the following equations.

$$\text{Illinois Ni WQC (chronic)} = e^{-2.286 + 0.846 * \ln(\text{hardness})}$$

Where:

Hardness: is the hardness value in units of mg/L as CaCO₃. The critical hardness for the District's permit is 359 mg/L.

The Ni WER is based on an equation that relates the most sensitive endpoint (reproduction) of the most sensitive species in the nickel toxicity database (*Ceriodaphnia dubia*) to the presence of DOC. The equation is as follows:

$$\text{Ni EC20 (reproduction)} = 10^{[0.3260 * \log_{10}(\text{DOC}) + 0.9215]}$$

Where:

DOC is the concentration of dissolved organic carbon in mg/L

The WER uses the DOC equation to calculate *C. dubia* reproduction in a reference and a site water.

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

Where:

The site water has the average downstream DOC concentration of 8.33 mg/L, and the reference water has a DOC concentration of 0.5 mg/L.

The WER equation with the site and reference DOC values results in a WER value of 2.50.

$$\text{Ni WER} = \frac{10[0.3260 * \log_{10}(8.33) + 0.9215]}{10[0.3260 * \log_{10}(0.5) + 0.9215]} = 2.50$$

These equations are combined to develop an equation for the site-specific guideline.

$$\text{Site Specific Ni WQC (chronic)} = \text{Illinois Ni WQC (chronic)} * \text{Ni WER}$$

Finally, a translator of 0.966 is used to translate from dissolved to total.

These equations can be combined algebraically into an overall equation:

$$\text{Site Specific total Ni WQC} = [e^{-2.286 + 0.846 * \ln(\text{hardness})}] * \left[\frac{10[0.3260 * \log_{10}(\text{DOC-site}) + 0.9215]}{10[0.3260 * \log_{10}(0.5) + 0.9215]} \right] / 0.966$$

Solving this equation for a hardness of 359 and a DOC of 8.33 results in a site specific total Ni guideline of 38.20 µg/L, which results in an anticipated NPDES permit limit of 0.03820 mg/L.

Board Question #32, directed to Robert Santore: Has either USEPA or IEPA provided comment on Decatur's revised proposal with a WER of 2.50?

At hearing, Mr. Santore offered to provide into the record additional communications between the District and Illinois EPA and the United States Environmental Protection Agency ("USEPA") regarding the WER of 2.50. A summary of those communications is provided below.

On February 8, 2018, the District provided its response to comments from Illinois EPA and USEPA regarding the District's Amended Petition. See Exhibit 45 to the Amended Petition (attached to the District's Motion to File Revised Exhibits 14 and 28, New Exhibits 45 and 46, Revised Exhibit List, and Minor Revision to Proposed Subsection 303.410 filed on April 20,

2018 (“Motion to File”). The District’s February 8, 2018 response (shown in blue text in Exhibit 45) indicates that the WER value is 2.52.

Subsequently, USEPA recommended to the District that it revise the Amended Petition and supporting documentation to (1) update the DOC value used in the WER based on a full dataset and (2) provide a side-by-side comparison of the proposed WER with a BLM-derived WER (for support). This recommendation is memorialized in USEPA’s February 26, 2018 comments to the District’s Response to Comments, shown in Comment JA2 of Exhibit 45.

Mr. Santore then (1) updated the Estimate of the BLM Adjustment to the Nickel Criterion for the Sanitary District of Decatur, Illinois (“BLM Report”) to add a BLM calculation using average DOC that is consistent with the Development of a Water Effect Ratio for Nickel in the Sangamon River (“WER Report”) and (2) updated the WER Report to reference the BLM result using average chemistry and an average DOC that is consistent with the value used in the DOC-WER equation. *See* Exhibit 45 to Amended Petition at 3, Comment R4. The updated BLM Report and WER Report are dated April 10, 2018 and April 12, 2018, respectively. *See* Exhibits 14 and 28 to the Amended Petition (attached to the District’s Motion to File). The reevaluation resulted in an updated WER value of 2.50.

Mr. Santore drafted responses to USEPA’s February 26, 2018 comments on March 8 and March 21, 2018. In the responses (shown in comment bubbles in Exhibit 45), Mr. Santore noted that he updated the BLM Report and WER Report and that the new WER value is 2.50. *See* Exhibit 45 to the Amended Petition at 3, Comments R3 and R4.

On April 16, 2018, the undersigned on behalf of the District provided a draft of the District’s Motion to File, which included Exhibit 45, to Illinois EPA and USEPA via email. Thus, as of April 16, 2018, both Illinois EPA and USEPA were aware of the updated WER value of 2.50. Illinois EPA did not provide the District with any comments regarding the draft Motion to File or exhibits thereto. On April 18 and April 19, 2018, USEPA provided the District with comments regarding the draft Motion to File and exhibits. USEPA’s comments, however, did not concern the updated WER value. Since providing Exhibit 45 to Illinois EPA and USEPA on April 16, 2018, the District has not received written comments or questions from either agency on the updated WER value of 2.50.

At the May 16, 2018 hearing, Mr. Brian Koch, an Environmental Protection Specialist III at Illinois EPA Bureau of Water, confirmed that neither agency has provided written confirmation of the WER of 2.50. Hearing Transcript at 82: 3-4. Mr. Koch testified that it was his understanding that the discussions shown in Exhibit 45 concerning the development of the WER had essentially concluded the District’s and the agencies’ discussion on the WER. *Id.* at 82:4-11. Additionally, when asked whether he believes that the District’s proposed site specific water quality standard was protective of the Sangamon River, Mr. Koch testified that he “believe[d] the Water Effect Ratio of 2.5, as proposed by the District, would be protective of the Sangamon River. I believe it’s a good representation of the actual toxicity of nickel in the environment.” *Id.* at 79:10-14.

Lastly, the WER value was a topic of discussions on several telephone conferences between the District, Illinois EPA, and USEPA and neither agency expressed an objection to the WER value. Therefore, based on conversations with Illinois EPA and USEPA, the discussions shown in Exhibit 45, and Mr. Koch's testimony, it is the District's understanding that Illinois EPA and USEPA do not object to the WER of 2.50.

Board Question #40, directed to Paul Bloom: The Amended Petition states that Table 4 of Exhibit 43 contains additional details about some of the technologies identified in Table 3 of Exh. 42. Table 4 is "Technical Challenges on Scale Up for Nickel Remediation Chemistries". The first column is blacked out. Should it list the nickel remediation chemistries for each row? If not, would you please explain to which chemistries each row in Table 4 is referring?

At hearing, Dr. Paul Bloom indicated that he would submit additional information into what had been submitted to the Board as Exhibit #43. A revised Table 4, which includes the chemistries for each line item, is attached hereto as Attachment A.

Respectfully submitted,

SANITARY DISTRICT OF DECATUR,

By: /s/ Katherine D. Hodge
One of Its Attorneys

Date: May 31, 2018

Katherine D. Hodge
Daniel L. Siegfried
Joshua J. Houser
Melissa S. Brown
HEPLERBROOM, LLC
4340 Acer Grove Dr.
Springfield, Illinois 62711
Katherine.Hodge@heplerbroom.com
Daniel.Siegfried@heplerbroom.com
Joshua.Houser@heplerbroom.com
Melissa.Brown@heplerbroom.com

Table 4: Technical Challenges on Scale Up for Nickel Remediation Chemistries

<i>Chemistry/Technology</i>	<i>Vendor not cooperative with samples</i>	<i>Assessed and determined not effective</i>	<i>Not commercially available</i>	<i>High Dosages required</i>	<i>Results not scalable beyond bench scale</i>	<i>Low recoveries and brine disposal concerns</i>	<i>Technically Feasible (y/n)</i>	<i>Comments</i>
Activated Clay	X		X				No	
Acidic Clay		X		X			No	Would require 5 million pounds of additive per day
Chitosan Based			X	X			No	
Proprietary (company went out of business)	X			X			No	
Metclear				X			No	Requires a pH to <2 then to pH 5.5 then to pH 10
Proprietary/Not disclosed	X						No	
Polymeric Dimethyl Dithiocarbamate					X		No	Plant pilot trial did not achieve required Nickel reduction.
Polymeric Dimethyl Dithiocarbamate		X			X		No	Plant pilot trial did not achieve required Nickel reduction.
Polymeric Dimethyl Dithiocarbamate					X		No	Plant pilot trial did not achieve required Nickel reduction.
Polymeric Dimethyl Dithiocarbamate			X				No	
Dimethyl Dithiocarbamate							No	
Styrene Divinyl Benzene				X			No	
Styrene Divinyl Benzene				X			No	Decolorization resin needs 3,000 cubic feet of resin at \$300/cubic foot. Resin, beds and regeneration equipment estimated at \$8 - 10 million and uses Ethanol to regenerate resin.
Immobilized Ion Exchange Beads		X		X			No	
Used Ion Exchange Resin							Yes*	Installed at Sorbitol plant
Phosphate precipitation + Reverse Osmosis						X	No	
Low pressure Reverse Osmosis						X	No	

Table 4: Technical Challenges on Scale Up for Nickel Remediation Chemistries

Sand Filtration						X	No	
Carbon Aerogels (company went out of business)			X				No	
Electrocoagulation		X	X				No	
Ferric Chloride Precipitation		X					No	Requires over 30,000 pounds of ferric salts per day
Bioactive Peptides			X				No	
Advanced Oxidation		X					No	Raise the pH 10 and add ozone and hydrogen peroxide. Large amounts of chemicals required.
Protein Based - Metallothionein			X				No	
pH Swing Based Precipitation							Yes	Suitable for <~50,000 GPD, non-grain based wastewater with non-chelated, salt-form nickel such as Polyols Plant IX regen waste
* The amount of used ion exchange resin is limited and it is most effective on non-chelated nickel. Therefore, it is being used to capture nickel from the sorbitol process.								