

**BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**

IN THE MATTER OF: )  
Petition of Emerald Performance ) AS 13-2  
Materials LLC for an Adjusted ) (Adjusted Standard)  
Standard from 35 Ill. Adm. Code. )  
304.122(b) )

**NOTICE OF FILING**

PLEASE TAKE NOTICE that I have filed today with the Illinois Pollution Control Board ILLINOIS EPA'S RESPONSE TO THE BOARD'S QUESTIONS, a copy of which is herewith served upon you.

Respectfully submitted,

ILLINOIS ENVIRONMENTAL  
PROTECTION AGENCY

By: \_\_\_\_\_

  
Joanne M. Olson  
Assistant Counsel

Joanne M. Olson #6293500  
Illinois Environmental Protection Agency  
Division of Legal Counsel  
1021 N. Grand Ave. East  
P.O. Box 19276  
Springfield, IL 62794-9276  
(217) 782-5544

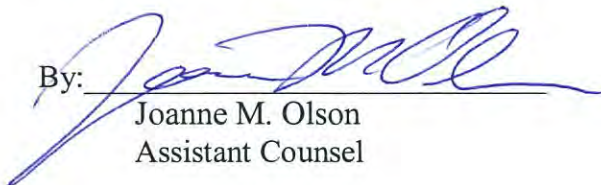
**BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**

IN THE MATTER OF: )  
Petition of Emerald Performance ) AS 13-2  
Materials LLC for an Adjusted ) (Adjusted Standard)  
Standard from 35 Ill. Adm. Code. )  
304.122(b) )

ILLINOIS EPA'S RESPONSE TO THE BOARD'S QUESTIONS

NOW COMES the ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,  
by and through its counsel, and hereby submits its response to Illinois Pollution Control Board's  
questions as directed by the Hearing Officer Order dated August 1, 2013. The Illinois EPA's  
responses are attached hereto as Exhibit 1.

ILLINOIS ENVIRONMENTAL  
PROTECTION AGENCY

By:   
Joanne M. Olson  
Assistant Counsel

Joanne M. Olson #6293500  
Illinois Environmental Protection Agency  
Division of Legal Counsel  
1021 N. Grand Ave. East  
P.O. Box 19276  
Springfield, IL 62794-9276  
(217) 782-5544

## Questions for the Illinois Environmental Protection Agency

### 5. Whole Effluent Toxicity Testing

The Agency Recommendation stated,

A recent WET [whole effluent toxicity] test with Emerald found that LC50 was <6.25% effluent for fathead minnows, a standard test organism ... The laboratory did not dilute the effluent sufficiently to determine the exact LC50 value ... The Emerald effluent may have been more toxic than the available dilution (47.9:1) in the ZID [zone of initial dilution] could render non-toxic. Ag. Rec. at 20-21.

- (a) Emerald submitted toxicity data into the record for a round of sampling in 2006 and four sampling events from 2011 to 2012. Resp. to HOO, Alt. 4. Please indicate if the LC50 < 6.25% result to which the Agency refers applies to the one sampling event for January 23, 2012?

**Agency Response: Yes, the January 23, 2012 whole effluent toxicity result is the one to which the Agency refers.**

- (b) In the ZID, Emerald states the dispersion provided is 39.8:1 (or 39.78:1) at 20 feet and 47.9 at 92 feet, while the dispersion required to meet the acute standard is 19.5:1 (or 19.2:1). Pet. Exh. 4 at vi, 3-14, Resp. to HOO at 10-11, 13, 15. For the toxicity data that Emerald submitted into the record, the corresponding dilution ratios appear to range from 4.4:1 to 11.8:1, with the January 23, 2012 result at >16.0:1. Except potentially for the January 23, 2012 result, the results appear to indicate LC50 was determined with less dilution than is provided or required in the ZID.

Does the Agency's statement above regarding the ability of the ZID to render the effluent non-toxic ("The Emerald effluent may have been more toxic than the available dilution (47.9:1) in the ZED could render non-toxic." Ag. Rec. at 20-21.) based only on conditions in the effluent for that one sampling event on January 23, 2012?

**Agency Response: Yes, the Agency's comment was based on the January 23, 2012 sample.**

### 6. Acute and Chronic Water Quality Standards and Effluent Limitations for Total Ammonia Nitrogen

The Agency Recommendation stated,

[U]nder the current state general use water quality standards for ammonia, Emerald may have a daily maximum ammonia concentration of up to 249.5 mg/L in the Spring and Fall months and a monthly average concentration of up to 213.7 mg/L in summer months and still be compliant with the water quality standards of 5.2 mg/L acute and 0.8 mg/L

chronic at the edge of the zone of initial dilution (ZID) and mixing zone, respectively. Ag. Rec. at 20.

- (a) Please indicate what pH and temperature values were used to calculate the water quality standards of 5.2 mg/L acute and 0.8 mg/L chronic stated above.

**Agency Response:** The 75<sup>th</sup> percentile pH value for spring and fall months resulting in an acute water quality standard of 5.2 mg/L total ammonia and a daily maximum permit limit of 249.5 mg/L total ammonia is 8.25 SU. The 75<sup>th</sup> percentile pH and temperature values for summer months resulting in a chronic water quality standard of 0.8 mg/L total ammonia and a monthly average permit limit of 213.7 mg/L are 8.08 SU and 27.5 degrees Celsius, respectively.

- (b) Please identify the source of these values.

**Agency Response:** The pH and temperature values were obtained from data the Agency collected at Ambient Water Quality Monitoring Network (AWQMN) station D-09, Illinois River at Lacon during the period 2006 through 2010.

- (c) Emerald states, based on IEPA's database, the annual 50th percentile background pH is 8.125 and temperature is 23.30 C. As such, Emerald calculates acute and chronic ammonia water quality standards for early life stages present of 6.62 mg/L (or 6.56 mg/L) and 1.14 mg/L, respectively. Resp. to HOO at 12-13. The Agency calculated acute and chronic standards as 5.2 mg/L and 0.8 mg/L, respectively, Ag. Rec. at 20. Please comment on the difference in the values arrived at by Emerald and the Agency.

**Agency Response:** The Agency's calculations follow 35 Ill. Adm. Code Part 355.203(a) whereby the 75<sup>th</sup> percentile pH and temperature data from the receiving stream are used to calculate water quality standards for ammonia and hence permit limits. Emerald did not correctly follow the instructions of Part 355; calculations were incorrectly made using the 50<sup>th</sup> percentile pH and temperature.

- (d) Please show your calculations for the effluent concentrations of 249.5 mg/L and 213.7 mg/L.

**Agency Response:** From 35 Ill. Adm. Code 302.212(b)(1):

$$AS = 0.411/(1 + 10^{7.204 - pH}) + 58.4/(1 + 10^{pH - 7.204})$$

$$AS = 0.377 + 4.818 = 5.195 \text{ mg/L for the spring and fall months}$$

The upstream ammonia concentration in the Illinois River (AWQMN Station D-16 at Hennepin) is 0.10 mg/L (average concentration for 2006 and 2007 spring/fall collected samples)

The dilution ratio for the zone of initial dilution is said to be 47.9:1

Using the mass balance equation

$$C_e = \frac{C_{ds}(Q_{us} + Q_e) - C_{us}Q_{us}}{Q_e} \quad \text{where}$$

$C_e$  = allowable permit limit

$Q_e$  = effluent flow = 1

$Q_{us}$  = upstream flow = 47.9

$C_{ds}$  = acute water quality standard = 5.2 mg/L

$C_{us}$  = ammonia concentration in upstream dilution water = 0.1 mg/L

The daily maximum permit limit for the spring/fall season is:

$$C_e = 5.2(47.9 + 1) - 0.1(47.9) / 1 = 249.49 \text{ mg/L}$$

According to 35 Ill. Adm. Code 302.121(b)(2)(A)(ii):

$$CS = \left( \frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right) (1.45 * 10^{0.028(25 - T)})$$

$$CS = (0.0436 + 0.6065) * 1.234 = 0.80 \text{ mg/L ammonia}$$

The upstream ammonia concentration in the Illinois River (AWQMN Station D-16 at Hennepin) is 0.09 mg/L (average concentration for 2006 and 2007 summer collected samples).

The mixing zone is said to supply 300:1 dilution.

$$C_e = \frac{C_{ds}(Q_{us} + Q_e) - C_{us}Q_{us}}{Q_e} \quad \text{where}$$

$C_e$  = allowable permit limit

$Q_e$  = effluent flow = 1

$Q_{us}$  = upstream flow = 300

**C<sub>ds</sub> = chronic water quality standard = 0.8 mg/L**

**C<sub>us</sub> = ammonia concentration in upstream dilution water = 0.09 mg/L**

**C<sub>e</sub> = 0.8(300 + 1) – 0.09(300)/ 1 = 213.8 mg/L is the monthly average summer permit limit (difference from 213.7 mg/L due to rounding).**

- (e) Please explain whether the effluent concentrations stated on page 20 of the Agency Recommendation represent water quality based effluent limits (WQBEL).

**Agency Response: Yes, the effluent concentrations are WQBELs.**

7. WQBELs based on 2009 USEPA Draft Water Quality Criteria for Ammonia

The Agency Recommendation stated,

The current Illinois water quality standards for ammonia are based on the 1999 national criteria and therefore, if the [Draft 2009 Update Aquatic Life Ambient Water Quality Criteria for Ammonia-Freshwater, EPA-822-D-09-001] is adopted our state ammonia standards will have to be lowered by a factor of five to be identical to the new national criteria ... The draft national criteria would cut the allowable effluent concentrations to approximately 50 mg/L as a daily maximum and 43 mg/L as a 30 day average. Ag. Rec. at 19-20.

**Agency Response: USEPA adopted a final version of its Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater in August, 2013. The acute and chronic criteria are not as stringent as those in the 2009 draft. There is no longer a “mussels present and mussels absent” dichotomy in the final version.**

- (a) Please indicate the water quality standards that were used to calculate the suggested allowable effluent concentrations under the draft national criteria of approximately 50 mg/L as a daily maximum and 43 mg/L as a 30 day average. Please indicate what pH, temperature, and draft national criteria were used (i.e. acute criterion: mussels present, acute criterion: mussels absent, chronic criterion: mussels present, chronic criterion: mussels absent and fish early life stages absent, etc.). Please show your calculations or indicate which tables of the 2009 draft national criteria the Agency used for determining the water quality standards that would be appropriate for WQBELs for Emerald.

**Agency Response: The new USEPA water quality criterion for acute effects (the Criterion Maximum Concentration) of total ammonia as N is as follows:**

$$\text{CMC} = 0.7249 \times 0.0114 / (1 + 10^{7.204 - \text{pH}}) + 1.6181 / (1 + 10^{\text{pH} - 7.204}) \times \text{MIN}(51.93, 23.12 \times 10^{0.036 \times (20 - T)})$$

The new USEPA water quality criterion for chronic effects (the Chronic Criterion Concentration) of total ammonia as N is as follows:

$$CCC = 0.8876 \times (0.0278 / (1 + 10^{7.688 - \text{pH}}) + 1.1994 / (1 + 10^{\text{pH} - 7.688})) \times (2.126 \times 10^{0.028 \times (20 - \text{MAX}(T,7))})$$

Using the above equations and the pH and temperature values as given in the Agency's answers to question 6, the spring/fall acute water quality criterion is 2.2 mg/L and the summer chronic water quality criterion is 0.4 mg/L.

Applying the zone of initial dilution:

$$C_e = \frac{C_{ds}(Q_{us} + Q_e) - C_{us}Q_{us}}{Q_e} \quad \text{where}$$

$C_e$  = allowable permit limit

$Q_e$  = effluent flow = 1

$Q_{us}$  = upstream flow = 47.9

$C_{ds}$  = acute water quality criterion

$C_{us}$  = ammonia concentration in upstream dilution water = 0.1 mg/L

The daily maximum permit limit for the spring/fall season is:

$$C_e = 2.2(47.9 + 1) - 0.1(47.9) / 1 = 102.8 \text{ mg/L}$$

Applying the mixing zone:

$$C_e = \frac{C_{ds}(Q_{us} + Q_e) - C_{us}Q_{us}}{Q_e} \quad \text{where}$$

$C_e$  = allowable permit limit

$Q_e$  = effluent flow = 1

$Q_{us}$  = upstream flow = 300

$C_{ds}$  = chronic water quality criterion

$C_{us}$  = ammonia concentration in upstream dilution water = 0.09 mg/L

$C_e = 0.4(300 + 1) - 0.09(300) / 1 = 106.9 \text{ mg/L}$  is the monthly average summer permit limit.

**Under the USEPA criteria, using existing implementation rules (Part 355) and the mixing zone and zone of initial dilution (ZID) dilution ratios used above, Emerald would have daily maximum and 30 day average permit limits for all seasons as given:**

<b>Ammonia limit (mg/L)</b>	<b>Daily Maximum</b>	<b>30 Day Average</b>
<b>Spring/fall</b>	<b>102.8</b>	<b>120.5</b>
<b>Summer</b>	<b>69.0</b>	<b>106.9</b>
<b>Winter</b>	<b>324.8</b>	<b>343.2</b>

**Given that under this scenario the 30 day average limits are all lower than the daily maximum limits, the permit would contain only daily maximum limits.**

- (b) Please show your calculations for the effluent concentrations of 50 mg/L and 43 mg/L.

**Agency Response: See above response.**

8. Agency Rulemaking Proposal for 2009 USEPA Draft Water Quality Criteria for Ammonia

The Agency Recommendation states,  
 ... if the [2009 draft national criteria] is adopted our state ammonia standards will have to be lowered by a factor of five to be identical to the new national criteria. Ag. Rec. at 20.

- (a) Please indicate if USEPA has identified a date by when the final national water quality criteria for ammonia would be published.

**Agency Response: USEPA published the 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater in August, 2013.**

- (b) Also, is the Agency planning to submit a proposal to revise the Board's ammonia water quality standards only after USEPA finalizes the draft national criteria? If not, please indicate when the Agency plans to file a proposal to update the ammonia standards.

**Agency Response: It is the Agency's understanding that under the Clean Water Act, states have one Triennial Review period in which to adopt as state standards published USEPA national criteria such as just finalized for ammonia.**

- (c) Please address how the proposal if adopted would affect implementation of this adjusted standard if granted.



**Agency Response: If Illinois adopts new ammonia water quality standards identical to the national criteria and uses the existing Part 355 implementation rules, the above daily maximum permit limits would be required in Emerald's NPDES permit regardless of any relief granted for 35 Ill. Adm. Code 304.122. At this time, the Agency does not know whether it will propose that the IPCB adopt the national ammonia criteria verbatim nor does it know if Part 355 is wholly suitable as implementation instructions for the new criteria. The Agency intends to study the issues and develop a plan for an upcoming general rulemaking, including holding stakeholder workgroups.**

9. Recommended Conditions of the Adjusted Standard

The Agency Recommendation included a number of suggested conditions if the Board were to grant the adjusted standard. The Agency's suggested condition H reads, "Emerald investigates and submits a study to Illinois EPA on the dilution of waste water from the polymer chemicals (PC) tank with water from the Illinois River". Ag. Rec. at 23.

- (a) Would you please further explain how the Agency sees this concept contributing to reduction of ammonia in Emerald's effluent? For instance, is the idea to provide dilution before the effluent is discharged, thereby reducing the concentration of ammonia in the effluent at the outfall?

**Agency Response: The idea would be to dilute the concentration of MTB to a level that would not inhibit nitrification in the treatment plant. Since it is well known that the high MTB level is inhibiting nitrification, the permittee should study different ways to lower its concentration such as through treatment, housekeeping measures, production methods, and dilution.**

- (b) Does the Agency believe this approach under suggested condition H could be acceptable under 35 Ill. Adm. Code 304.102(b)?

**Agency Response: Since this would be an internal dilution in order to allow nitrification treatment to occur and is not to merely meet limits on its own, it would be allowable under 35 Ill. Adm. Code 304.102(b).**

- (c) Please also comment on including conditions in the requested adjusted standard

Potential Adjusted Standard Conditions:

Emerald stated, "Emerald has not had available capital to spend on additional projects that do not allow some return on investment or at least offset some operating expenses." Resp. to HOO at 9. From the perspective of incurring or avoiding potential future costs of complying with the adjusted standard conditions, please comment on the following conditions:

- (a) Please comment on including a condition in the adjusted standard that would sunset the requested relief in 7 years, coupled with conditions that would establish annually recurring requirements regarding investigations into new treatments and methods to continually demonstrate Emerald is providing “best degree of treatment” to be eligible for the dilution provision in 35 Ill. Adm. Code 304.102 along with the Agency recommended conditions D through I. See Rec. at 22-23.
  
- (b) Instead of a sunset provision, annually recurring requirements regarding investigations into new treatments and methods, and the Agency recommended conditions D through I; please comment on including conditions such as the following in the adjusted standard:
  - (1) until more stringent Illinois ammonia water quality standards are adopted, a condition that would impose the ammonia effluent limit requested by Emerald in its petition along with requirements to discharge through the diffuser and meet currently applicable water quality standards at the edge of the ZID and mixing zone; and
  
  - (2) if Emerald will continue to utilize the dilution provision under 35 Ill. Adm. Code 304.102, a condition to implement and maintain a nonpoint source best management practice (BMP) to provide an environmental benefit that also addresses ammonia (as noted below under “Best Degree of Treatment Determination”).

**Agency Response: The Agency does not believe any relief should be granted to Emerald. If the Board grants Emerald relief, a sunset provision and conditions that would establish annually recurring requirements regarding investigations into new treatments and methods to continually demonstrate Emerald is providing “best degree of treatment” to be eligible for the dilution provision in 35 Ill. Adm. Code 304.102 should be included. Emerald’s effluent has a high COD to BOD ratio (38.4 : 1), which suggests the presence of organics that are not amenable to biological degradation. Because of the masking effect that ammonia has, any potential problematic organic compounds would not be revealed by toxicity testing. The Agency thus requests that Emerald be required to identify organics in the effluent and to propose treatment technologies that may be used to reduce the organics in the effluent.**

**The Agency recommends new limits for ammonia based on DMR data from the last 5 years. Based on the data, the permittee has already met the limits listed below except during the 2011 strike which caused poor treatment performance:**

<b>Yearly Avg</b>	<b>Monthly Avg</b>	<b>Daily Max</b>	<b>Yearly Avg</b>	<b>Monthly Avg</b>	<b>Daily Max</b>
<b>lb/day</b>	<b>lb/d</b>	<b>lb/day</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>
<b>550</b>	<b>750</b>	<b>1000</b>	<b>80</b>	<b>100</b>	<b>130</b>

**Emerald should be required to comply with the water quality standards at the edge of the ZID and mixing zone because Emerald is not seeking relief from the water quality standard in this proceeding. Should the Board grant Emerald's requested relief, the Agency would not oppose a condition in Emerald's permit to implement and maintain a non-point source best management practices to provide an environmental benefit that also addresses ammonia. The Agency is unsure that Emerald will be able to find a sufficient number of nonpoint source to off-set the high levels of ammonia in Emerald's discharge.**

**CERTIFICATE OF SERVICE**

Joanne M. Olson, Assistant Counsel for the Illinois EPA, herein certifies that she has served a copy of the foregoing NOTICE OF FILING and ILLINOIS EPA'S RESPONSE TO THE BOARD'S QUESTIONS upon:

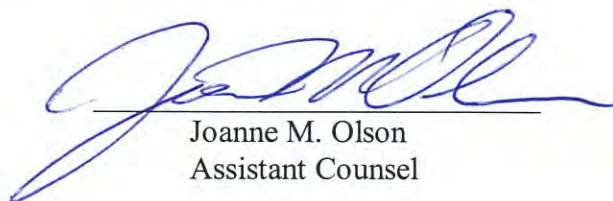
Roy M. Harsh  
Drinker Biddle & Reath LLP  
191 N. Wacker Drive – Suite 3700  
Chicago, Illinois 60606-1698  
312-569-1441

William Stone  
1550 County Road 1450 N  
Henry, IL 61537

Carol Webb  
Hearing Officer  
Illinois Pollution Control Board  
1021 North Grand Avenue East  
P.O. Box 19274  
Springfield, Illinois 62794-9274

Kellie Staab  
1550 County Road 1450 N  
Henry, IL 61537

by mailing a true copy thereof in an envelope duly addressed bearing proper first class postage and deposited in the United States mail at Springfield, Illinois on October 5, 2013.

  
Joanne M. Olson  
Assistant Counsel