STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

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DIRECTOR

September 27, 2012

VIA E-MAIL AND U.S. MAIL

Ms. Tinka G. Hyde, Director
Water Division
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard (W-15J)
Chicago, Illinois 60604-3507

Dear Ms. Hyde:

SUBJECT: Vessel General Permit and Small Vessel General Permit
Clean Water Act, Section 401 Water Quality Certification

The following is in response to your December 28, 2011, letter to Ms. Sarah LeSage, Aquatic Invasive Species Program Coordinator, Water Resources Division, Michigan Department of Environmental Quality (MDEQ).

In that letter, the United States Environmental Protection Agency (USEPA) requested that the MDEQ make a determination regarding certification under Section 401 of the federal Clean Water Act (CWA) for the draft National Pollutant Discharge Elimination System Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (VGP) and the Small Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels Less than 79 Feet (sVGP). These draft permits were published in the *Federal Register* on December 8, 2011. The USEPA requested that Michigan include in its certification any condition(s) more stringent than those contained in the draft permits that are necessary to meet the requirements of state law.

As you are aware, the MDEQ provided comments on the draft VGP and sVGP to the USEPA on February 21, 2012 (enclosed), explaining the MDEQ's position that discharges authorized by the draft permit, as proposed, would not meet Michigan Water Quality Standards. If the USEPA issues the final permit with the conditions proposed in the draft permit, Michigan certifies the discharges authorized under such a permit meet Michigan Water Quality Standards only if the conditions outlined below are met. Should the USEPA make significant modifications from the draft VGP to the final VGP that would affect Michigan's water quality, we reserve the right to modify this certification.

The MDEQ certifies discharges from vessels covered by the USEPA's VGP and sVGP will comply with the applicable provisions of Title 33 of the United States Code, Sections 1311, 1312, 1313, 1316, 1317, and 1341 (CWA, Sections 208e, 301, 302, 303, 306, 307, and 401), and that permittees and their activities will not contravene applicable limitations, standards, and other appropriate requirements of state law, provided the conditions set forth in this letter, the VGP, and the sVGP (Docket I.D. Nos. EPA-HQ-OW-2011-0141 and EPA-HQ-OW-2011-0150, available at (*the link provided was broken and has been removed*)) are met.

Certification Conditions for the VGP

1. Oceangoing vessels (a vessel that operates on the Great Lakes or the St. Lawrence waterway after operating in waters outside the Great Lakes or the St. Lawrence waterway) covered by the VGP are prohibited from discharging ballast water in Michigan's waters unless the vessel has obtained a Certificate of Coverage under the Ballast Water Control General Permit (Permit No. MIG140000) or an Individual Permit from the MDEQ and is in full compliance with the discharge limitations, monitoring requirements, and other conditions set forth in that General Permit or Individual Permit. (Section 3112[6] of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended [NREPA])

2. Ballast Water Exchange and Saltwater Flushing:

   (A) All vessels covered by the VGP whose voyages originate from outside the exclusive economic zone (EEZ) and enter Michigan waters with ballast onboard, shall conduct ballast water exchange at least 200 nautical miles (nm) from any shore and in waters beyond the EEZ. Such vessels that carry only residual amounts of ballast water and/or sediments shall conduct saltwater flushing of their ballast tanks, at least 200 nm from any shore and in waters beyond the EEZ. (Section 3103a of Part 31 of the NREPA)

   Ballast water exchange is defined as at least 1 empty and refill cycle of each ballast tank that contains ballast water, resulting in a salinity level of at least 30 parts per thousand (ppt). If the master of the vessel determines that such exchange is impracticable, a sufficient number of flow-through exchanges of ballast water may be conducted to achieve replacement of at least 95 percent of ballast water in ballast tanks of the vessel, resulting in a salinity level of at least 30 ppt.

   Saltwater flushing is defined as the addition of ocean water to ballast water tanks, the mixing of the flushwater with residual water and sediment through the motion of the vessel, and the discharge of the mixed water, such that the resulting residual water has a salinity level of at least 30 ppt.

   All vessels entering Michigan waters must maintain the ability to measure salinity levels in each ballast tank onboard the vessel so that salinities of at least 30 ppt can be ensured.

   (B) Condition 2(A) does not apply to vessels that:

      (i) Carry only permanent ballast water, all of which is in sealed tanks that are not subject to discharge, or
      (ii) Use only water from a United States public water system or Canadian drinking water system as ballast water.

   (C) Condition 2(A) does not apply if the master of the vessel determines that compliance with this condition would threaten the safety or stability of the vessel, its crew, or its passengers because of adverse weather, equipment failure, or any other relevant condition. If a vessel is unable to conduct ballast water exchange or flushing due to

serious safety concerns as specified above, the operator of a vessel shall take reasonable measures to avoid discharge of organisms in ballast water and shall inform the MDEQ in writing of the measures taken.

3. Discharge limitations for living organisms for vessels whose voyage originates outside the EEZ (Sections 3103a and 3109 of Part 31 of the NREPA):

   (A) Ballast water discharges from vessels whose voyage originates outside the EEZ may contain biological pollutants in the form of aquatic invasive species. Ballast water discharges to Michigan waters must be controlled to a level sufficient to prevent aquatic invasive species. These pollutants must not be discharged at a level that is, or may become, injurious to any of the following: to the public health, safety, or welfare; to domestic, commercial, industrial, agricultural, recreational, or other uses that are being made, or may be made, of such waters; to the value or utility of riparian lands; to livestock, wild animals, birds, fish, aquatic life, or plants or to their growth or propagation; or to the value of fish and game.

   (B) Any vessel utilizing a ballast water treatment system by December 31, 2014, consistent with the technologies identified in Michigan's Ballast Water Control General Permit (Permit No. MIG140000) or an alternative technology approved by the MDEQ, will not be required to meet any future numeric water quality-based effluent limits (WQBEL) for living organisms that may be set forth in a subsequent Section 401 certification until the functional life of that ballast water treatment system has expired or the life of the vessel has expired, whichever is earlier. These vessels must continue ballast water exchange and saltwater flushing as described in Condition 2 unless it is demonstrated to the MDEQ that numeric WQBELs adopted after the date of this certification for living organisms are met.

4. Live Organism Monitoring (R 323.2154(2)(c) of the Part 21 Rules, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA):

   (A) The owner/operator of any vessel covered by the VGP whose voyages originate from outside the EEZ that discharges ballast water to Michigan waters, shall monitor ballast water discharged from their vessel at least once each year for living organisms greater than 50 micrometers in minimum dimension, and living organisms equal to or less than 50 micrometers in minimum dimension and equal to or greater than 10 micrometers in minimum dimension; and submit a report summarizing the discharge monitoring results collected for the above live organism size categories to the MDEQ no later than December 31 of each year. The ballast water discharge samples shall be collected and analyzed consistent with protocols established by the MDEQ. If the MDEQ fails to establish protocols, then the requirements set forth in this condition will be waived.

5. The owners/operators of vessels required to utilize a ballast water treatment system shall allow the MDEQ reasonable entry onto the vessel for inspection, access to records, and collection of a ballast water discharge sample(s) for determining compliance with this certification and applicable laws. (R 323.2149(1)(c) and R 323.2189 of the Part 21 Rules of the NREPA)

6. Nonoceangoing vessels covered by the VGP operating ballast water treatment systems are prohibited from discharging ballast water in Michigan waters with total residual chlorine concentrations above 38 micrograms per liter (µg/L) when the ballast water discharge duration exceeds 160 minutes, or above 200 µg/L when the ballast water discharge duration is less than or equal to 160 minutes. (R 323.1057 of the Part 4 Rules, Water Quality Standards, promulgated under Part 31 of the NREPA)

Certification Conditions for the VGP and sVGP

7. Discharges of blackwater and graywater from vessels covered by the VGP or sVGP are prohibited to Michigan waters. (Part 95, Watercraft Pollution Control, of the NREPA)

8. Vessel owners/operators shall immediately notify the MDEQ whenever they become aware that a discharge from their vessel causes or contributes to an exceedance of an applicable state water quality standard. (R 323.2189 of the Part 21 Rules of the NREPA)

9. Nothing in this Certification diminishes, negates, or precludes the State of Michigan from bringing civil and/or criminal actions for violations of state law and/or issued state permits. (Part 31 of the NREPA)

10. Each condition in the proposed VGP and sVGP cannot be made less stringent without potentially violating the requirements of state law, including water quality standards. (Part 31 of the NREPA)

11. If the MDEQ determines that vessel discharges covered by this certification can no longer comply with Section 401 of the CWA or state laws and regulations, then the MDEQ may revoke or modify this certification after appropriate public notice. (CWA, Section 401)

12. All discharges to Michigan waters from vessels covered by the USEPA's VGP are prohibited from causing or contributing to exceedances of the Michigan Water Quality Standards (Part 4 Rules, Water Quality Standards, promulgated under Part 31 of the NREPA).

The contact point for consultation, submittals, and approvals as referred to in this certification is:

Chief, Water Resources Division
Michigan Department of Environmental Quality
P.O. Box 30458
Lansing, Michigan 48909-7958
Phone: 517-335-4176

The MDEQ reserves the right to challenge the USEPA's VGP and sVGP.

Should you require further information regarding this certification, please contact Ms. LeSage at 517-241-7931; Mr. William Creal, Chief, Water Resources Division, at 517-335-4176; or you may contact me.

Sincerely,

Dan Wyant
Director
517-373-7917

Enclosure

cc/enc: Mr. Jim Sygo, Deputy Director, MDEQ
Ms. Madhu R. Anderson, Director of Policy, MDEQ
Mr. Jim Goodheart, Senior Policy Advisor, MDEQ
Mr. William Creal, MDEQ
Ms. Sarah LeSage, MDEQ
Mr. Chris Antieau, MDEQ

Michigan Department of Environmental Quality

Enclosure to September 27, 2012, Certification Letter to the
United States Environmental Protection Agency

This supplemental information is provided to the United States Environmental Protection Agency (USEPA) in addition to the Clean Water Act Section 401 Certification Letter dated September 27, 2012, issued by the Michigan Department of Environmental Quality (MDEQ). As described in the MDEQ's comment letter dated February 21, 2012, we recommend the USEPA develop protective numeric water quality-based effluent limits (WQBELs) to apply across the Great Lakes basin. Suggested approaches for WQBEL development are reiterated below.

The ballast water permitting strategy proposed by the USEPA in the draft Vessel General Permit (VGP2) and further described in the associated VGP2 Fact Sheet requires select covered existing vessels to treat their ballast water discharges with an EPA-ETV approved ballast water management system (BWMS) and meet the International Maritime Organization's (IMO) D-2 standard (IMO discharge standard for live organisms) by their first drydocking after 2014 or 2016, depending on size class. New vessels constructed after January 1, 2012, are required to treat their ballast water discharges with an EPA-ETV approved BWMS and meet the IMO D-2 standard upon delivery. Certain vessels entering the Great Lakes would be required to continue ballast water exchange/saltwater flushing in combination with an approved BWMS.

The IMO D-2 standard is considered a BPT/BAT treatment technology-based effluent limitation by the USEPA, not a WQBEL. According to the VGP2 Fact Sheet, the USEPA determined it is infeasible to calculate numeric WQBELs for ballast water because "at this time the lack of available data and information prevents a precise quantification of the invasion risk associated with ballast water discharges." Section 1.9.1 (Modification of the VGP) of the draft VGP2 indicates the USEPA will consider modifying the permit after the "scientific understanding of ... invasion biology has evolved such that new information would have justified the application of significantly more stringent effluent limitations ... had this been understood at the time of permit issuance..." The National Research Council (NRC) Committee's report indicates a 10-15 year time horizon will be required to obtain the experimental and field data needed to parameterize and ground-truth the risk/release models. This time period is too lengthy.

As presented in Lee et al. (2010[1]) it is possible to generate ballast water WQBELs that are "protective of the environment under most situations by making conservative assumptions, using safety factors similar to those used in ecological risk assessments for pollutants, and/or by setting the standards based on the upper confidence limits of predictions of invasions." Historically, the USEPA has applied such conservative approaches to derive water quality standards/limits for heavy metals and organic chemicals when perfect toxicological datasets were lacking.

Numeric WQBELs more stringent than IMO D-2 are justified when combined with a reasonable and fair compliance schedule, and provides the following two processes for the USEPA to consider to produce protective ballast water WQBELs for live organisms in the >50 micrometers (µm) size category:

[1] Lee II, H., et al., 2010. Density Matters: Review of Approaches to Setting Organism-Based Ballast Water Discharge Standards. U.S. EPA, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Western Ecological Division.

1. The first ballast water WQBEL derivation approach is based on the predicted probability of establishment (P(*E*upper,high)) determined by Bailey et al. (2009[2]) for the parthenogenetic water flea (*Daphnia retrocurva*) in enclosures given inoculum densities of 1-10 individuals/m^3. Probabilities of establishment based on the upper projection trajectories (P(*E*upper,low) for *D. retrocurva* were predicted by Bailey et al. (2009) to be slightly greater than 0.1 and 0.25 for inoculum densities of 1 individual/m^3 and 10 individuals/m^3, respectively. The MDEQ considers any ballast water discharge limitation predicted using upper projection trajectory data to result in probabilities of establishment >0.01 for high risk (for invasion) species such as *D. retrocurva* to be unacceptable and not adequately protective of United States waters. To ensure probabilities of establishment >0.01 for such high risk (for invasion), species introduced to United States waters via the ballast water vector under favorable physical, chemical, and biological conditions, an inoculum density (or ballast water WQBEL) of 0.1 individual/m^3 is needed.

2. The second ballast water WQBEL derivation procedure is based on the Per Capita Invasion Probabilities (PCIP) approach described in Chapter VIII of Lee et al. (2010). The PCIP is defined by the authors as the "per year probability that an individual nonnative propagule discharged from ballast water will become established as a new nonindigenous species in a specified waterbody." The PCIP is calculated as:

Equation 1. $PCIP = N_h/(D_h * C_h)$

Where:
PCIP = per capita invasion probability (new invading species * $organism^{-1}$)
N_h = historical annual invasion rate of potential ballast-associated invaders for a waterbody (new invading species * $year^{-1}$)
D_h = historic annual foreign ballast discharge rate into a waterbody (m^3 $year^{-1}$)
C_h = historic concentration of organisms in ballast water discharged into a waterbody (organisms * m^{-3})

After the PCIP is calculated, the number of new, unique invaders per year for a given ballast water organism concentration and ballast water volume can be predicted as:

Equation 2. $N_p = PCIP * D_p * C_p$

Where:
N_p = predicted annual invasion rate of potential ballast-associated invaders for a waterbody (new invading species * $year^{-1}$)
D_p = predicted annual foreign ballast discharge rate into a waterbody (m^3 $year^{-1}$)
C_p = predicted concentration of organisms in ballast water discharged into a waterbody (organisms * m^{-3})

Ballast water discharge limitations can be generated for an individual waterbody (or coasts) by rearranging the above equation to calculate the organism concentration in ballast water (C_p) associated with predicted ballast water volume (D_p), acceptable risk represented by the number of new invaders per year (N_p), the PCIP for the waterbody (or coast), and a safety factor:

Equation 3. $C_p = N_p/(D_p * PCIP * Safety\ Factor$

[2] Bailey, S.A., L.A. Velez-Espino, O.E. Johannsson, M.A. Koops, C.J. Wiley. 2009. Estimating establishment probabilities of Cladocera introduced at low density: an evaluation of the proposed ballast water discharge standards. Can. J. Fish. Aquat. Sci. 66:261-276.

Selection of the specific values to use for N_p, the PCIP and Safety Factor in the above equation are risk management decisions that need to be made by the permitting authority after consideration of stakeholder input. Michigan considers the following values appropriate for N_p, PCIP, and the Safety Factor:

$N_p = 1 \times 10^{-3}$ invaders/yr.
PCIP = Upper 95% Confidence Interval
Safety Factor = 10

Michigan also supports doubling the current foreign ballast discharge rate into a waterbody for use as D_p in the above equation.

Using information presented in Table 12, Chapter VIII, of Lee et al. (2010), ballast water discharge limitations calculated using Equation 3 for the East Coast, Gulf Coast, Pacific Coast, and Great Lakes are shown below:

East Coast C_p = $(1 \times 10^{-3}$ invaders/yr)/(14,815,664 m^3/yr * 4.64E-11 * 10)
= 0.145 organisms/m^3

Gulf Coast C_p = $(1 \times 10^{-3}$ invaders/yr)/(39,210,680 m^3/yr * 7.67E-12 * 10)
= 0.332 organisms/m^3

Pacific Coast C_p = $(1 \times 10^{-3}$ invaders/yr)/(29,576,738 m^3/yr * 3.83E-11 * 10)
= 0.088 organisms/m^3

Great Lakes C_p = $(1 \times 10^{-3}$ invaders/yr)/(2,790,922 m^3/yr * 9.10E-11 * 10)
= 0.39 organisms/m^3

The median PCIP (rather than the upper 95% confidence interval PCIP) was used above to calculate the ballast water discharge limitation for the Great Lakes because individual ship records were not available in 1991 to support the generation of PCIP distributions. Consequently, Lee et al. (2010) were forced to use the mean ballast water organism concentration from the IMO baseline study (4640/m^3, MEPC, 2003) to calculate the PCIP (median) for the Great Lakes. As explained in Lee et al. (2010), "because the distribution of organism concentrations in ballast water is highly skewed, the mean concentration may over or underestimate the true propagule pressure depending upon the concentrations in the specific set of ships discharging within the waterbody."

Michigan recognizes the need to include a single ballast water WQBEL for live organisms in the >50 µm size category in the VGP2 that is applicable to all waters of the United States. Based on the above ballast water discharge limitations generated using the PCIP approach for the East, Gulf, and Pacific Coasts and the Great Lakes, it is apparent that selection of 0.1 organisms/m^3 (0.088 organisms/m^3 for the Pacific Coast rounded to 0.1 organisms/m^3) as the ballast water WQBEL for live organisms in the >50 µm size category would protect all United States waters from aquatic invasive species.