

SUPPLEMENTAL INFORMATION CONCERNING
MWRD DISSOLVED OXYGEN AMENDED TLWQS PETITION

I. FOCUS ON CSOs

The pending MWRD amended petition for a time-limited water quality standard (TLWQS) relates only to discharges from the combined sewer overflow (CSO) outfalls that are owned and operated by MWRD. These CSO outfalls are listed in the NPDES permits for the O'Brien, Stickney and Calumet water reclamation facilities (WRFs). The MWRD CSOs discharge upstream of or directly to the North Shore Channel, North Branch of the Chicago River, Des Plaines River, South Fork of South Branch of the Chicago River, Chicago Sanitary and Ship Canal, Addison Creek, Little Calumet River, Calumet Sag Channel, Calumet River, and Deer Creek. The discharges from the WRFs themselves are not covered by the amended TLWQS petition. In the event that those discharges need a TLWQS at some future point, MWRD will then submit a petition covering those discharges. Discharges from CSO outfalls that are not owned and operated by MWRD, which are listed in NPDES permits issued to other entities, are not covered by the MWRD amended petition for TLWQS.

II. DOCUMENTATION OF NONATTAINMENT

Water quality data collected by MWRD during the years 2013 – 2017 (attached as Exhibit A, with Table 1 covering Use A waters and Table 2 covering Use B waters)) show that none of the reaches in the Chicago Area Waterways System (CAWS) are consistently attaining the newly adopted water quality standards or dissolved oxygen (DO). During and after wet-weather events, the DO levels can be significantly lower than the standards. DO data from an example rain event in August 2006 is presented in testimony of Samuel G. Dennison concerning DO issues that was filed in the CAWS UAA rulemaking proceeding on August 8, 2008, and Attachment 3 to that testimony. (The testimony and attachments are available at <http://www.ipcb.state.il.us/documents/dsweb/Get/Document-61995> .) More recent DO data for various reaches of the CAWS, from a series of wet-weather events in August and September of 2014, are attached in Exhibit B. It should be noted that the amount of water that the MWRD is allowed to divert from Lake Michigan into the CAWS has recently been reduced, and will be reduced further in the next several years. (See Exhibit C.) This reductions should only increase the frequency of DO nonattainment situations in the CAWS. But even if the diversion amount remains unchanged, modeling projections indicate that DO nonattainment episodes will continue to occur. See Charles S. Melching, Ph.D., P.E., "Impact of Annual Average Discretionary Diversion on Water Quality in the Chicago Area Waterways System" (May 1, 2014) (attached as Exhibit D).

III. JUSTIFICATION OF EXISTENCE OF HUMAN-CAUSED CONDITION

The existence of the CSO outfalls is a human-caused condition, and it cannot be remedied for the term of the TLWQS. Elimination of the outfalls is not possible, since water flow in the MWRD's combined system that is beyond the storage capacity of the system has to be

discharged. Massive flooding of streets and basements, plus severe damage to the sewer system, would result if the CSO outfalls did not exist.

As to the noncompliance with the DO criteria that results from CSO discharges, that is also a human-caused condition that cannot be remedied. Over the long term, MWRD will reduce CSO discharges through completion and implementation of the Tunnel and Reservoir Plan (TARP). TARP is expected to reduce (but may not eliminate) the occurrence of CSO discharges in the CAWS. However, the TARP system will not be complete until 2029, and its effectiveness will not be determined for several years after that point. (See the MWRD/USEPA/IEPA Consent Decree, which is Exhibit L to the Amended Petition.) During the 5 years that the currently requested TLWQS will be in effect, TARP will not be complete, so it cannot remedy the DO noncompliances caused by CSO discharges.

MWRD's TARP Status Report as of December 31, 2017 (attached as Exhibit E) demonstrates the value in flood damage reduction from early stages of TARP implementation. For example, the Gloria Alitto Majewski Reservoir, completed in 1998 as part of TARP Phase II with 0.35 billion gallons of storage, has yielded over \$401 million in flood damage reduction benefits to the three communities it serves. Ex D at page 1. The first stage of the Thornton Transitional Reservoir, completed in 2003, has so far captured 37 billion gallons of flood water. Ex D at page 2. The Thornton Composite Reservoir, completed December 31, 2015, with 4.8 billion gallons of storage, is anticipated to provide \$40 million per year in benefits; the McCook reservoir, with 10 billion gallons of storage, will provide \$143 million per year in benefits. Ex D at page 2. All MWRD CSOs historically discharged as follows:

Year	Estimated Volume
2011	61,710 MG
2012	12,038 MG
2013	69,455 MG
2014	42,036 MG
2015	22,045 MG
2016	20,869 MG
2017	44,518 MG

If those CSOs are immediately eliminated, before completion of the remaining TARP projects, flows will have nowhere to go, necessarily causing extensive flooding of streams and streets, sewage backups in buildings and homes, and potential damage and overflows throughout the combined sewer system. The extent of the potential damage to public infrastructure and other public and private property would substantially exceed the annual value of the benefits anticipated from the remaining phases of TARP projects. In addition to widespread property damage, the potential adverse health effects of having diluted sewage backing up into so many buildings and homes include risks of electrocution, disease, and mold.

It should be noted that one portion of TARP, the Thornton Composite Reservoir, which addresses the Calumet sewershed, was completed in December 2015. It is hoped that

Thornton will substantially reduce, and possibly even eliminate, the recurrence of CSO discharges in the Cal-Sag Channel and other reaches in the Calumet system. However, that will not be determined for some time. First, there is a one-year “shake-out” period, during which operational issues are addressed, so the Reservoir can be in full operation by December 2016. Then, there is a two-year period of study, lasting until December 2018, during which the effectiveness of the new system is assessed carefully. Then, a final report is prepared that will be submitted to IEPA by June 2019. Only at that point can the impacts of Thornton Reservoir, in terms of reducing CSO discharges in the Calumet system, be determined. That will allow for the results of that evaluation to be factored into the development of terms and conditions in the next permit for CSO outfalls in the Calumet system (which are included in the permit for the Calumet WRF). If the Thornton report indicates that changes in the TLWQS terms for those outfalls are appropriate, those changes can be reflected in the next TLWQS, and incorporated into that reissued permit. (If the assessment indicates that a TLWQS is no longer needed, then the permit can be reissued without a TLWQS.) The schedule for implementation of TARP projects is included in the Amended Petition for TLWQS from Dissolved Oxygen Standards, Section F.2, time schedule for the implementation of all phases of the control program from initiation of design to program completion.

MWRD has also assessed other possible methods to remedy DO noncompliances from CSO discharges. In the CAWS UAA proceeding, MWRD presented testimony by Dr. David R. Zenz, P.E. concerning compliance costs, which was based on a water quality modeling study performed by Dr. Charles S. Melching. Melching concluded that in order to address this issue, MWRD would need to install 18 new aeration stations in the CAWS, install 3 flow augmentation stations, and operate all existing aeration stations at full capacity. However, these new systems would not necessarily remedy all noncompliances with the DO criteria. Further, it would simply be impossible to design, install and make these stations operational during the term of the requested TLWQS. Dr. Zenz concluded that it would take at least 8.5 years until all of these new systems could be operational. Also, preliminary analyses indicate that sufficient vacant land for the stations may not be available at some of the locations. (<http://www.ipcb.state.il.us/documents/dsweb/Get/Document-62046>) Therefore, this method to address DO issues would not allow for remedying the noncompliances within the term of the TLWQS. (Note: In addition, the cost would be enormous (estimated at \$657 million in 2008 dollars), and this investment in new controls would be made unnecessary once TARP is complete. Those facts are not part of the MWRD’s “human-caused condition” demonstration, but are still important to note.)

IV. CONFIRMATION THAT TECHNOLOGY-BASED LIMITS INSUFFICIENT TO RESULT IN ATTAINMENT

For CSO discharges, the technology-based requirements that apply under Sections 301(b) and 306 of the CWA are, at a minimum, the Nine Minimum Controls (NMC), as specified in the CSO Policy. (<http://water.epa.gov/polwaste/npdes/cso/upload/owm0111.pdf>.) The permitting authority is required to include all such technology-based requirements in

permits for discharges from CSOs, which IEPA has done. MWRD is already required to meet all such requirements, including the NMC, under the terms of the O'Brien, Stickney and Calumet permits. Moreover, the Consent Decree between MWRD, USEPA and IEPA specifies additional NMC-related requirements, in addition to specifying requirements related to completion and operation of TARP. (See the Decree at <https://www.mwrld.org/irj/portal/anonymous/ConsentDecree> .) Although implementation of the technology-based requirements, including the NMC, and the Consent Decree will improve DO conditions in the waterways through elimination of CSO discharges, none of those requirements will result in attainment of the DO criteria – certainly not within the time period of the requested TLWQS. In addition, complete implementation of the Consent Decree requirements will take longer than the term of the TLWQS.

V. DOCUMENTATION TO JUSTIFY TERM OF TLWQS

The requested term of the TLWQS, as submitted to the Pollution Control Board on July 21, 2015, is five years, but no later than the expiration date of the permit. After further consideration, the MWRD has amended its petition to reflect a term of five years from the date of EPA approval. This time period is necessary, because consistent attainment of the DO criteria will not occur during that time period, for the reasons set forth above. MWRD believes that defining the term of the TLWQS in this way is simpler and clearer than the conditional term that was originally requested.

VI. DEMONSTRATION OF HIGHEST ATTAINABLE CONDITION

The amended TLWQS petition contains a series of conditions that will apply to MWRD during the terms of the TLWQS, which will help to minimize DO exceedances and to reduce any possible impacts from those exceedances. These conditions satisfy the requirements provided in 131.14(A)(3). No additional feasible pollution control technology can be identified, so these conditions reflect “the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the State adopts the WQS TLWQS, and the adoption of a Pollutant Minimization Program.” The specific conditions that MWRD would adhere to are the following:

O'Brien:

- As part of the plan to make progress toward attainment of the long-term designated use goals, the MWRD has been working with other stakeholders to assess possible habitat improvement projects. The MWRD provided funding of \$500,000 toward implementation of habitat improvement projects in the CAWS through the Chi-Cal Rivers Fund. This funding was leveraged with funding from other parties that contributed to these projects.
- Under this TLWQS, existing aeration stations at Devon and Webster will be operated in operable periods. For this purpose, “operable” periods shall not include occurrences of short-term equipment failure, weed control problems, mechanical problems and replacement of equipment for preventive maintenance purposes. Operation of those

stations will not be required during any particular time period if it is not needed in order for the CAWS to meet the new DO water quality standards.

- No other DO-related control requirements will apply to the CSOs covered in the O'Brien Plant permit during the term of the TLWQS. (This is not intended to refer to the control of any nutrients, including nitrogen and phosphorus, discharged from the plants.) Any water quality-related requirements applicable to CSO discharges in the permit that accompanies this TLWQS are subject to this condition.
- Continuous monitoring of DO will be done at the following continuous dissolved oxygen monitoring (CDOM) stations: Foster Avenue and Church Street on the North Shore Channel; and Addison Street and Division Street on the North Branch Chicago River.¹
- A report on DO results will be submitted by the MWRD each year, summarizing the prior year's data.
- In accordance with the Consent Decree concerning TARP between US EPA, IEPA and MWRD, Stage 1 and 2 of the McCook Reservoir are required to be completed by December 31, 2017 (this has been accomplished) and December 31, 2029, respectively.
- Pursuant to the Consent Decree, the MWRD will verify the operational plan and commence full operation of Stage 1 of the McCook reservoir no later than one year after Stage 1 is placed into operation. During the 24-month period after Stage 1 of the McCook reservoir has commenced full operation, the MWRD will evaluate the DO impacts of the McCook operation, and will submit a report to IEPA 6 months after the completion of that 24-month study period.
- The report will provide conclusions regarding the expected nonattainment rate of the new DO standard with Stage 1 of McCook in full operation, separately analyzing wet weather events and dry weather time periods (assuming continued operation of aeration stations whenever operable)
- The report will incorporate an assessment of the impacts on DO standards attainment due to reductions in the State's discretionary diversion allocation.
- The report will include an assessment of feasible options to further increase DO levels in the North Shore Channel and other relevant reaches of the CAWS. This assessment will include, as appropriate, consideration of non-TARP measures such as green infrastructure to reduce CSO discharges and DO violations resulting from CSO discharges.
- The results of the report will be considered in determining whether a TLWQS will be issued to accompany the next permit that is issued after submittal of the report, and will be included in any MWRD petition requesting a TLWQS for any subsequent permit. Such a TLWQS, if issued, would incorporate the results of the report, specifying the expected nonattainment rate of the new DO standard during the TLWQS term, requiring continued operation of the aeration stations whenever operable, consider the feasibility of taking other steps to address low DO in the North Shore Channel, and specifying that no other DO-

¹ A map of all active MWRD CDOM stations is included as Exhibit F.

related control requirements applicable to CSO discharges would be imposed during the term of the TLWQS except such steps as are found by the MWRD or the Board to be feasible and appropriate given the goals of the Clean Water Act.

- The same procedure will be followed for completion of Stage 2 of the McCook reservoir, but given its completion date, such issues will be addressed in a subsequent permit and TLWQS for the O'Brien Plant and related CSO Outfalls.

Stickney:

- As part of the plan to make progress toward attainment of the long-term designated use goals, the MWRD has been working with other stakeholders to assess possible habitat improvement projects. The MWRD provided funding of \$500,000 toward implementation of habitat improvement projects in the CAWS through the Chi-Cal Rivers Fund. This funding was leveraged with funding from other parties that contributed to these projects.
- No other DO-related control requirements will apply to the CSOs covered in the Stickney Plant permit during the term of the TLWQS. (This is not intended to refer to the control of any nutrients, including nitrogen and phosphorus, discharged from the Plants.) Any water quality-related requirements applicable to CSO discharges in the permit that accompanies this TLWQS are subject to this condition.
- Continuous monitoring of DO will be done at the following continuous dissolved oxygen monitoring (CDOM) stations: Cicero Avenue, B&O Railroad, and Lockport on the Chicago Sanitary and Ship Canal.
- A report on DO results will be submitted by the MWRD each year, summarizing the prior year's data.
- Stage 1 of the McCook reservoir is required to be completed by December 31, 2017. (This has been accomplished.)
- Stage 2 of the McCook reservoir is scheduled to be completed by December 31, 2029.
- Pursuant to the Consent Decree, the MWRD will verify the operational plan and commence full operation of Stage 1 of the McCook reservoir no later than one year after Stage 1 is placed into operation. During the 24-month period after Stage 1 of the McCook reservoir has commenced full operation, the MWRD will evaluate the DO impacts of the McCook operation, and will submit a report to IEPA 6 months after the completion of that 24-month study period.
- The report will provide conclusions regarding expected nonattainment rate of the new DO standard with Stage 1 of McCook in full operation, separately analyzing wet weather events and dry weather time periods
- The report will incorporate an assessment of the impacts on DO standards attainment due to reductions in the State's discretionary diversion allocation.
- The report will include an assessment of feasible options to further increase DO levels in the relevant reaches of the CAWS. This assessment will include, as appropriate,

consideration of non-TARP measures such as green infrastructure to reduce CSO discharges and DO violations resulting from CSO discharges.

- The results of the report will be considered in determining whether a TLWQS will be issued to accompany the next permit that is issued after submittal of the report, and will be included in any MWRD petition requesting a TLWQS for any subsequent permit. Such a TLWQS, if issued, would incorporate the results of the report, specifying the expected nonattainment rate of the new DO standard during the TLWQS term, and specifying that no other DO-related control requirements applicable to CSO discharges would be imposed during the term of the TLWQS except such steps as are found by the MWRD or the Board to be feasible and appropriate given the goals of the Clean Water Act.

- The same procedure will be followed for completion of Stage 2 of the McCook reservoir, but given its completion date, such issues will be addressed in a subsequent permit and TLWQS for the Stickney Plant and related CSO Outfalls.

Calumet:

- As part of the plan to make progress toward attainment of the long-term designated use goals, the MWRD has been working with other stakeholders to assess possible habitat improvement projects. The MWRD provided funding of \$500,000 toward implementation of habitat improvement projects in the CAWS through the Chi-Cal Rivers Fund. This funding was leveraged with funding from other parties that contributed to these projects.

- Under this TLWQS, existing SEPA stations 3, 4 and 5 will be operated in operable periods during. (Existing SEPA stations 1 and 2, which are located in areas with already high DO levels and/or are not effective in increasing DO levels, will continue to be operated with one pump in operable periods.) For this purpose, “operable” periods shall not include occurrences of short-term equipment failure, weed control problems, mechanical problems and replacement of equipment for preventive maintenance purposes. Operation of those stations will not be required during any particular time period if it is not needed in order for the CAWS to meet the new DO water quality standards.

- No other DO-related control requirements will apply to the CSOs covered in the Calumet Plant permit during the term of the TLWQS. (This is not intended to refer to the control of any nutrients, including nitrogen and phosphorus, discharged from the Plants.) Any water quality-related requirements applicable to CSO discharges in the permit that accompanies this TLWQS are subject to this condition.

- Continuous monitoring of DO will be done at the following continuous dissolved oxygen monitoring (CDOM) stations: C&W Indiana RR and Halsted Street on the Little Calumet River, and Route 83 on the Cal-Sag Channel.

- A report on DO results will be submitted by the MWRD each year, summarizing the prior year’s data.

- The Thornton Composite Reservoir came on-line December 31, 2015.

- Pursuant to the Consent Decree, the MWRD must verify the operational plan and commence full operation of the Thornton reservoir no later than one year after the reservoir is placed into operation. (This has been accomplished.) During the 24-month period after the Thornton reservoir has commenced full operation, the MWRD will evaluate the DO impacts of the Thornton operation, and will submit a report to IEPA 6 months after the completion of that 24-month study period.
- The report will provide conclusions regarding expected nonattainment rate of the new DO standard with Thornton in full operation, separately analyzing wet weather events and dry weather time periods (assuming continued operation of SEPA stations whenever operable)
- The report will incorporate an assessment of the impacts on DO standards attainment due to reductions in the State's discretionary diversion allocation.
- The report will include an assessment of feasible options to further increase DO levels in the relevant reaches of the CAWS. This assessment will include, as appropriate, consideration of non-TARP measures such as green infrastructure to reduce CSO discharges and DO violations resulting from CSO discharges.
- The results of the report will be considered in determining whether a TLWQS will be issued to accompany the next permit that is issued after submittal of the report, and will be included in any MWRD petition requesting a TLWQS for any subsequent permit. Such a TLWQS, if issued, would incorporate the results of the report, specifying the expected nonattainment rate of the new DO standard during the TLWQS term, requiring continued operation of the aeration stations whenever operable, and specifying that no other DO-related control requirements applicable to CSO discharges would be imposed during the term of the TLWQS except such steps as are found by the MWRD or the Board to be feasible and appropriate given the goals of the Clean Water Act.

VII. CONFIRMATION THAT REQUIREMENTS WILL BE ENFORCEABLE

As specified in the amended TLWQS petition, it is MWRD's understanding, and MWRD has agreed, that promptly after the TLWQS is issued, it will be incorporated into the O'Brien, Stickney and Calumet permits, through modifications of each of those permits. The requirements specified in the TLWQS will then be enforceable conditions of the permits.