BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	R04-25
PROPOSED AMENDMENTS TO	)	(Rulemaking – Water)
DISSOLVED OXYGEN STANDARD	)	
35 ILL. ADM. CODE 302.206	)	

NOTICE OF FILING

TO: SEE ATTACHED SERVICE LIST.

PLEASE TAKE NOTICE that on October 2, 2006, we filed the attached ***Pre-Filed Testimony of Louis Kollias On Behalf Of The Metropolitan Water Reclamation District of Greater Chicago In Support Of Proposed Amendments To Dissolved Oxygen Standard*** with the Clerk of the Pollution Control Board, a copy of which is herewith served upon you.

METROPOLITAN WATER RECLAMATION
DISTRICT OF GREATER CHICAGO

By: _____
Frederick M. Feldman, Its Attorney

MWRDGC
Frederick M. Feldman
Ronald M. Hill
Margaret T. Conway
100 East Erie
Chicago, IL 60611
(312) 751-6587 telephone
(312) 751-6598

CERTIFICATE OF SERVICE

I, Lynn DeLuca, being duly sworn on oath, certify that I caused a copy of the above ***Notice and*** attached ***Pre-Filed Testimony of Louis Kollias On Behalf Of The Metropolitan Water Reclamation District of Greater Chicago In Support Of Proposed Amendments To Dissolved Oxygen Standard*** to be sent via first-class U.S. Mail to the individuals identified on the attached service list, at their address as shown, with proper postage prepaid, from 100 East Erie Street, Chicago, Illinois, at or near the hour of 4:30 p.m. this 2nd day of October , 2006.

_____

Subscribed and Sworn to
Before me this 2nd day of
October, 2006.

OFFICIAL SEAL
MARGARET T CONWAY
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES: 12-07-06

_____
Notary Public

SERVICE LIST

Office of the Attorney General
Interested Party
188 W. Randolph, 20th Floor
Chicago, IL 60601

IEPA
Respondent
1021 N. Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Gardner, Carton & Douglas
Interested Party
191 N. Wacker Drive, Suite 3700
Chicago, IL 60606-1698

Hodge, Dwyer, Zeman
Interested Party
3150 Roland Avenue
P.O. Box 5776
Springfield, IL 62705-5776

Sonnenschein, Nath & Rosenthal
Interested Party
8000 Sears Tower
233 S. Wacker Drive
Chicago, IL 60606-6404

Ross & Hardies
Interested Party
150 N. Michigan Avenue, Suite 2500
Chicago, IL 60601-7567

Illinois Environmental Regulatory Group
Interested Party
3150 Roland Avenue
Springfield, IL 62703

Chemical Industry Council of Illinois
Interested Party
2250 E. Devon Avenue, Suite 239
Des Plaines, IL 60018-4509

Thorn Creek Basin Sanitary District
Interested Party
700 West End Avenue
Chicago Heights, IL 60411

American Water Company
Interested Party
727 Craig Road
St. Louis, MO 63141

Hedinger Law Office
Interested Party
2601 S. Fifth Street
Springfield, IL 62703

Vermillion Coal Company
Interested Party
1979 Johns Drive
Glenview, IL 60025

Fred L. Hubbard, Attorney at Law
Interested Party
16 West Madison, P.O. Box 12
Danville, IL 61834-0012

Blackwell, Sanders, Peper, Martin LLP
Interested Party
4801 Main Street, Suite 1000
Kansas City, MO 64112

Illinois Pollution Control Board
Interested Party
100 W. Randolph Street, Suite 11-500
Chicago, IL 60601

City of Joliet
Department of Public Works and Utilities
Interested Party
921 E. Washington Street
Joliet, IL 60431

Bloomington/Normal Water Reclamation District
Interested Party
P.O. Box 3307

Downers Grove Sanitary District
Interested Party
2710 Curtiss Street

Bloomington, IL 61702-3307
Fox Metro Water Reclamation District
Interested Party
682 State Route 31
Oswego, IL 60543

Dr. Thomas J. Murphy
Interested Party
2325 N. Clifton Street
Chicago, IL 60614

Environmental Law & Policy Center
Interested Party
35 E. Wacker, Suite 1300
Chicago, IL 60601

Office of Lt. Governor Pat Quinn
Interested Party
Room 214 State House
Springfield, IL 62706

City of Geneva
Interested Party
22 South First Street
Geneva, IL 60134-2203

Friends of the Chicago River
Interested Party
22 South First Street
Geneva, IL 60134-2203

Downers Grove, IL 60515
Illinois Department of Natural Resources
Interested Party
One Natural Resources Way
Springfield, IL 62702-1271

Barnes & Thornburg
Interested Party
1 N. Wacker, Suite 4400
Chicago, IL 60606

Evanston Environment Board
Interested Party
223 Grey Avenue
Evanston, IL 60202

Ecological Monitoring and Assessment
Interested Party
3206 Maple Leaf Drive
Glenview, IL 60025

Brown, Hay & Stephens LLP
Interested Party
700 First Mercantile Bank Building
205 South Fifth Street
P.O. Box 2459
Springfield, IL 62705-2459

Richard J. McGill, Jr., Hearing Officer
Illinois Pollution Control Board
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF	)	
	)	
PROPOSED AMENDMENTS TO R04-25	)	R04-25
DISSOLVED OXYGEN STANDARD	)	(Rulemaking – Water)
35 ILL. ADM. CODE 302.206		

PRE-FILED TESTIMONY OF LOUIS KOLLIAS ON BEHALF OF THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO IN SUPPORT OF PROPOSED AMENDMENTS TO DISSOLVED OXYGEN STANDARD

My name is Louis Kollias. I am the Director of Research and Development (R&D) for the Metropolitan Water Reclamation District of Greater Chicago ("District"). I am submitting the following testimony on behalf of the District in support of the subject proposed amendments to the dissolved oxygen standards for General Use waters in Illinois.

I have been the Director of R&D since June 2006. Prior to that, I had been Assistant Chief Engineer in the District's R&D Department since January 2003. As Director of R&D, I supervise the District's R&D Department, which has a staff of 317. I have been employed by the District since 1977.

I hold a Bachelor of Science Degree in Civil Engineering from the Illinois Institute of Technology. I am a Licensed Professional Engineer in the State of Illinois and a Board Certified Environmental Engineer in the American Academy of Environmental Engineers. I am also currently the President of the Illinois Water Environment Association.

My responsibilities as the District's Director of R&D include, but are not limited to, the following:

- Control of commercial and industrial waste discharges to the District's sewers and the waterways via the Sewage and Waste Control Ordinance;
- Recovery of certain District operating, maintenance, and replacement costs via administration of the User Charge Ordinance;
- Providing analytical laboratory support for the control of commercial and industrial wastes and for control of treatment and other operations;
- Monitoring the water quality of Lake Michigan, Chicago area waterways, and the Illinois Waterway; and
- Conducting basic and applied research on new wastewater and sludge treatment processes.

The District previously submitted comments in support of the proposed amendments to 35 Ill. Adm. Code 302.206. This testimony is being submitted to address certain other testimony that has been filed, and to provide information concerning continuous dissolved oxygen (DO) monitoring and how such monitoring results in Chicago area waterways would have complied with the proposed standards.

The District appreciates the opportunity to express its views on the pending rulemaking for a DO water quality standard. We will address three areas:

1. Comment on the testimony of Thomas J. Murphy.

2. Complexity and cost of conducting the District's continuous DO monitoring program.

3. Compliance with proposed DO standards in Chicago area waterways.

Comment on the Testimony of Thomas J. Murphy

The testimony of Thomas J. Murphy, Ph.D., is very critical of the USEPA (1986) National Criteria Document and at the same time does not properly acknowledge the current data and research that have been considered for this proposed amendment to the DO standard. The 1986 document is a foundation and guideline from which current data and research have been used to substantiate the proposed amendment.

The USEPA (1986) criteria document noted that a select committee of scientists, established by the Research Advisory Board of the International Joint Commission, reviewed DO criterion for the Great Lakes. The Commission concluded that a simple criterion based on dissolved oxygen concentration (an average criterion of 6.5 mg/L and a minimum criterion of 5.5 mg/L) was preferable to one based on percent saturation (or oxygen partial pressure) and was scientifically sound because the rate of oxygen transfer across fish gills is directly dependent on the mean difference in oxygen partial pressure across the gill and this is directly proportional to dissolved oxygen concentration. Also, the total amount of oxygen delivered to the gills is a more specific limiting factor than is oxygen partial pressure *per se*. The USEPA agreed with this conclusion.

In the article by Davis (1975, page 2298) that is cited by Dr. Murphy in his testimony, a statement is made that, "It is more conventional for water quality or oceanographic purposes to express water oxygen levels in terms of their concentration rather than partial pressure." Davis goes on to state that partial pressure, percent saturation, and concentration of dissolved oxygen are all interrelated.

DO concentration in mg/L is easier and more practical to measure, and the vast majority of monitoring data, and data in the scientific literature relating dissolved oxygen effects on fish communities are based on this unit of measure. Since the preponderance of current field data and research demonstrates DO concentration levels in mg/L can be correlated to fish population dynamics, then how is the use of this parameter not scientifically sound? Using DO saturation by itself could result in situations of 100 percent DO saturation at high temperatures with concentrations that are still harmful to fish and invertebrates. In low temperatures DO saturation could be very low yet waters could still have sufficient concentrations of DO to be nonlimiting to the aquatic ecosystem. Dr. Murphy does not take into account the metabolic rates of fish at different temperatures. Fish do not require as much DO in colder conditions. Davis (1975) states that it must be emphasized that fish require both the correct oxygen tension (pressure) gradient to move O_2 into the blood and sufficient oxygen concentration (amount per volume of water breathed) to fulfill the requirements of metabolism.

In addition to these points, DO concentration must be utilized in the standard because it is possible to control DO concentration through management practices by supplemental aeration and other mechanical means. It is much more difficult to control oxygen tension, and oxygen saturation can be extremely variable. A standard based on DO concentration in mg/L is practical, easily understandable, and scientifically defensible. Dr. Murphy does not make a convincing case for the use of dissolved oxygen saturation rather than dissolved oxygen concentration as the state standard.

Comments on Continuous Dissolved Oxygen Monitoring Technical and Cost Issues

Selection of DO Monitoring Locations

In order to obtain quality DO data, a monitoring station must be located at a point that is representative of the waterway DO throughout the station's cross-section. Many physical features such as mixing zones for wastewater treatment plant outfalls, tributary confluences, CSO outfalls, instream structures that disrupt flow, oxygen consuming sediment deposits, variability of phytoplankton oxygen production, and thermal discharges can influence DO uniformity at a waterway monitoring location.

- The first step in site location is to conduct grab sample DO surveys longitudinally throughout the waterway system to be monitored to identify reaches where DO is consistently at or below the applicable IPCB standard. Ideally, these surveys to identify low-DO reaches should continue for at least one year in order to account for seasonal variability. Once these reaches have been identified, cross-sectional (depth profile DO readings measured across a transect) are conducted at potential monitoring locations to verify that DO is uniform across the channel transect. To verify continued cross-sectional DO uniformity during the monitoring period these surveys must be repeated at least two and preferably three times per year at each monitoring location. Cost of each of the District's cross-sectional DO surveys is approximately $80 per monitoring location.

- In urban areas, DO monitors must be protected from vandalism while deployed in the field. This is accomplished by placing the monitors in protective steel housings, typically eight inch diameter vertical steel pipes with hinged lids secured by a lock. The submerged portions of these housings are perforated with numerous circular openings to allow water flow across the DO probe. Probes currently used to measure DO require water flow across the probe surface for accurate measurements. New optical DO probe technology has eliminated this flow requirement but these probes cost two to three times as much as the ones they replace. Because of the flow requirement by the DO probe, monitors currently deployed by the District frequently record inconsistent DO readings in waterway reaches that do not have continuous flow.

- Protective housings must also be placed in the waterway in such a way that they do not interfere with commercial or recreational navigation, further limiting monitoring location choices. Use of vertical protective housings limits DO monitoring locations to waterway locations with sufficient depth that have adjacent vertical steel or concrete walls (bridge supports) to which the housings can be attached. This limitation in locating the vertical protective housing may result in a DO monitoring location that may, under certain conditions, be subject to interference from CSO discharges and/or disruptions in flow patterns by instream structures. Attachment of these housings to structures owned by public agencies generally requires issuance of permits which can delay the installation process by months.

- An additional limitation on vertical protective housing location is that the housing must be placed in an area that is accessible for routine servicing by field personnel. While it is possible to install DO monitors in protective housings on the bottom of a waterway using short, horizontally-placed pipe sections secured to both banks by chains, this is a less than ideal monitoring location since it puts the DO probe closer to oxygen-demanding sediment deposits which can affect the accuracy of DO readings. Protective housings installed horizontally on the waterway bottom, due to their weight, can only be efficiently deployed and recovered by personnel on a boat using an electric winch. Horizontal monitor housings are not suitable for installation in small streams since equipment is accessible to vandals who can wade in the stream.

- Placement of vertical pipe protective housings in small streams presents problems with finding an area with sufficient water depth, greater than six inches at low-flow, to submerge the DO probe. The protective housings are also at risk of being dislodged from their mountings by impacts from large floating debris during high-flow events and from collisions with recreational or commercial vessel traffic in the waterway. Obstruction of the waterway by protective housings also can pose liability issues for the installing entity from recreational users who claim injury from the installations.

- Fabrication of the protective housings is done by skilled trades. Cost for labor and materials to fabricate a typical vertical protective housing is approximately $2,100. Vertical protective housings range between 15 and 30 feet in length and weigh between 350 and 650 pounds. Installation of these housings, therefore, requires heavy equipment and skilled-trades labor. Installation cost for a typical protective housing used in the District's monitoring program ranges between $1,500 and $2,100.

Water Quality Monitors

The District currently utilizes 78 monitors in its Continuous DO Monitoring Program. Each monitor, with water temperature probe, costs approximately $3,500. Each of these monitors must be equipped with a DO, specific conductivity, and water temperature probe since DO readings are derived from inputs from these three probes. Individual probe costs are DO (including water temperature), $450; specific conductivity, $250.

Monitors are subject to operating temperature limits, which are satisfied as long as the monitor is submerged in the waterway during field deployments. Problems arise when the waterway DO monitoring location selected is not deep enough to completely submerge the monitor. Incomplete submergence can expose the monitor to temperatures outside its factory specified operating range and may result in erroneous DO readings or electronics failure. At least two feet of depth in the waterway is required to submerge the monitor, and it is rare to find smaller creeks with this depth near places where protective housings can be mounted.

Field Deployment and Laboratory Operations

- In order to assure that the DO data collected meets data quality objectives, all field and laboratory operations must follow procedures outlined in a Quality Assurance Project Plan (QAPP) and Standard Operating Procedure (SOP). Development of these two documents cost the District approximately $6,000 to $7,000. The District's QAPP and SOP have been approved by IEPA.

- The manufacturer claims that monitors are capable of being deployed in the field for periods of up to two months. However, concerns with probe fouling, premature battery failure, data loss from electronics failure, and availability of DO data for reports and compliance monitoring usually limit deployment periods to one to two weeks.

- The District's monitoring program assigns two monitors to each waterway DO monitoring location. One monitor is deployed in the field for a period of one week while the second monitor is maintained in the laboratory.

- Calibration, data downloading, and maintenance can be done in the field, thereby requiring only one monitor per station but the field environment is poorly suited to the exacting procedures required to maintain this precision equipment and does not assure that data quality objectives will be met. The value of laboratory maintenance and calibration of the monitors is supported by the fact that less than 5 percent of the District's DO monitoring data has been lost during eight years of monitoring.

- Between deployments the monitors remaining in the laboratory must be maintained and calibrated daily to assure they are ready for deployment, and to minimize equipment failure in the field. Personnel cost to the District for these laboratory operations is approximately $5,000 per year per monitor based on one-week deployment intervals.

- In order to calibrate each monitor for deployment and download stored data following field deployment, a personal computer and proprietary software are required. Cost for these items and proprietary-connecting cables is approximately $1,000 to $1,500.

- To efficiently manage the downloaded DO data, an electronic database must be used. Development costs for a custom database to organize DO monitoring information range from $3,000 to $4,000.

- Consumable items, consisting of batteries to power the monitors and parts and supplies to clean and maintain the monitors, cost the District approximately $700 per monitor per year.

- In the District's DO monitoring program, field operations consist of exchanging monitors deployed in the field with laboratory calibrated monitors. Field operations are conducted on a weekly schedule at all monitoring locations.

- Additional duties of the field operations personnel consist of examining the protective housings for damage and removing debris accumulations that may impede water circulation through the housing. In some cases, large trees have become lodged on the protective housings during high flow events in the waterway. Equipment and personnel costs incurred during removal of this debris has not been tabulated but can involve the use of heavy equipment.

- Access to the monitoring locations requires a boat for deep-draft waterways or a vehicle for shallow-draft waterway sites.

- Annual cost to the District for field operations conducted by boat at each DO monitoring location is approximately $21,000. Cost for field operations at each shallow-draft waterway DO monitoring location serviced by vehicle is approximately $9,000 per year.

Data Review and Management

The District's DO monitoring QAPP requires that all DO data be reviewed before acceptance. Each week DO data from each monitor are evaluated against limits outlined in the QAPP before it is incorporated into the DO monitoring database. This database management and DO data review costs the District approximately $800 per monitoring location per year.

Overall Program Costs

The District currently maintains 32 monitoring locations in Chicago area waterways. A total of 78 monitors are available for use at these 32 locations. This includes two monitors per location for weekly retrieval and deployment and the reminder available to substitute for monitors being serviced or repaired and for those that fail the QA/QC procedures prior to deployment. Sixteen of these installations monitor land-accessible waterway monitoring locations, generally on the Des Plaines, Little Calumet, and Grand Calumet River Systems. Another 16 installations monitor boat-accessible waterway monitoring locations, including the commercially navigable portions of the Chicago and Calumet River Systems.

- Total cost to install equipment at 16 land-accessible waterway DO monitoring locations was $74,805. Total annual program cost during 2005 for these 16 land-accessible waterway DO monitoring locations was $243,469.

- Total cost to install equipment at 16 boat-accessible waterway DO monitoring locations was $64,833. Total annual program cost at these 16 boat-accessible DO monitoring locations during 2005 was $436,336.

- Total cost to install DO monitoring equipment at 32 DO monitoring locations which monitor approximately 225 river miles in District waterways was $139,638. Total annual monitoring cost at these 32 locations during 2005 was $679,805.

- Total cost for the 78 monitors purchased for the monitoring program is $327,600.

Comments on Compliance of Chicago Area Waterways with Proposed DO Standards

As was mentioned in previous District testimony, the proposed DO standards include two sets of standards, one for specific named rivers and streams referred to as "(d) Other Dissolved Oxygen Streams," and the other being all other waters in subsection (b). The latter, subsection (b), is divided into two time periods, (1) March through July and (2) August through February. The standards for the March through July period are similar to the current General Use DO standards, a minimum of (A) "5.0 mg/L at any time" and (B) "6.0 mg/L as a daily mean averaged over 7 days." The subsection (b) standards for August through February include a minimum of (A) "3.5 mg/L at any time," (B) "4.0 mg/L as a daily minimum averaged over 7 days," and (C) "5.5 mg/L as a daily mean averaged over 30 days."

In order to determine how Chicago area waterways would comply with the proposed standards, results of hourly DO measurements from the District's Continuous Dissolved Oxygen Monitoring (CDOM) Program are summarized in the following exhibits:

Exhibit 1A. Dissolved oxygen observations and summary at selected locations in shallow-draft reaches of General Use Waters for August 2005 through February 2006.

- Eight of the twelve shallow water CDOM locations were 100 percent compliant with the proposed DO standards. These included the North Branch of the Chicago River at Central Park Avenue, the Des Plaines River at Devon Avenue, Ogden Avenue, and Material Service Road, Salt Creek at Busse Lake Dam, J. F. Kennedy Boulevard, Thorndale Avenue, and Wolf Road.

- Locations not in 100 percent compliance were the Des Plaines River at Irving Park Road, the Little Calumet River at Ashland Avenue and Wentworth Avenue, and the Grand Calumet River at Hohman Avenue.

- It should be noted that no data were available during August and September 2005 for three of the stations that were 100 percent compliant.

Exhibit 1B. Dissolved oxygen observations and summary at selected locations in shallow-draft reaches of General Use Waters for March 2006 through July 2006.

- Two of the twelve shallow water CDOM locations were 100 percent compliant with the proposed DO standards. These included the Des Plaines River at Ogden Avenue and Salt Creek at J. F. Kennedy Boulevard.

- Three locations were not 100 percent compliant with the ≥ 5.0 mg/L standard, but were 100 percent compliant with the 6.0 mg/L 7-day Average of the Daily Mean standard. These were Salt Creek at Busse Lake and Thorndale Avenue, and the Des Plaines River at Material Service Road.

- Locations not in 100 percent compliance with either standard were the North Branch of the Chicago River at Central Park Avenue, the Des Plaines River at Devon Avenue and Irving Park Road, Salt Creek at Wolf Road, the Little Calumet River at Ashland Avenue and Wentworth Avenue, and the Grand Calumet River at Hohman Avenue.

Exhibit 2A. Dissolved oxygen observations and summary at selected locations in deep-draft reaches of Chicago area waterways for August 2005 through February 2006.

- Five of the twenty locations were in 100 percent compliance with the proposed DO standards. These included the North Shore Channel at Foster Avenue, the Chicago River at Clark Street, the South Branch of the Chicago River at Loomis Street, and the Little Calumet River at C&W Indiana Railroad and Halsted Street.

- The Chicago Sanitary and Ship Canal at the B&O Central Railroad had 100 percent of its DO observations ≥ 3.5 mg/L and 100 percent of the 7-day daily minima were ≥ 4.0 mg/L, but only 85.7 percent of the daily mean averages within the 30-day period were ≥ 5.5 mg/L.

- The Calumet-Sag Channel at Cicero Avenue had 100 percent of the 7-day daily minima ≥ 4.0 mg/L and 100 percent of the 30-day daily mean averages were ≥ 5.5 mg/L, but only 99.5 percent of the DO concentrations were ≥ 3.5 mg/L.

- The Calumet-Sag Channel at Route 83 had 100 percent of its 30-day daily mean averages ≥ 5.5 mg/L, but only 99.2 percent of its DO concentrations were ≥ 3.5 mg/L and 97.1 percent of the 7-day daily minima were ≥ 4.0 mg/L.

- Twelve locations were less than 100 percent compliance for all three requirements.

Exhibit 2B. Dissolved oxygen observations and summary at selected locations in deep-draft reaches of Chicago area waterways for March 2006 through July 2006.

- One of the twenty locations was in 100 percent compliance with the proposed DO standards. This was the Chicago River at Clark Street.

- Two locations were greater than the 6.0 mg/L 7-day Average of the Daily Mean standard 100 percent of the time, but had less than 100 percent of DO concentrations ≥ 5.0 mg/L. These included the North Shore Channel at Foster Avenue (99.8 percent) and the North Branch of the Chicago River at Addison Street (99.6 percent).

- Seventeen locations were less than 100 percent compliance for both requirements.

Calculation of 7-Day Average Daily Minimum or Daily Mean.

It was unclear as to what method to use to calculate both the 7-day daily minima during the August through February period, and the 7-day daily mean for the March through July period. Results were calculated for one month during each period using a running average method and a weekly calendar day

method for the shallow-draft locations and for the deep-draft locations. These are shown in the following exhibit for purposes of comparison of the two methods.

Exhibit 3A. Determination of compliance with proposed DO standards at selected locations in shallow-draft reaches of General Use Waters from September 1 through September 30, 2005, using two methods to calculate averages of 7-day daily minima.

- Results using both methods were very similar for nine shallow-draft stream locations during September 2005.

Exhibit 3B. Determination of compliance with proposed DO standards at selected locations in shallow-draft reaches of General Use Waters from July 1 through July 31, 2006, using two methods to calculate averages of 7-day daily means.

- Results using both methods were very similar for 12 shallow-draft stream locations during July 2006.

Exhibit 4A. Determination of compliance with proposed DO standards at selected locations in deep-draft reaches of Chicago area waterways from September 1 through September 30, 2005, using two methods to calculate averages of 7-day daily minima.

- Results using both methods were very similar for 20 deep-draft stream locations during September 2005.

Exhibit 4B. Determination of compliance with proposed DO standards at selected locations in deep-draft reaches of Chicago area waterways from July 1 through July 31, 2006, using two methods to calculate averages of 7-day daily means.

- Results using both methods were very similar for 20 deep-draft stream locations during July 2006.

Conclusion: Both the running average method and the calendar week method give very similar results for calculating a 7-day daily minimum or 7-day daily mean DO value. However, for consistency, one or the other method should be recommended if the standards are accepted by the IPCB. The same clarification should be made to determine the 30-day average of daily means for the August through February period.

The following comments should also be considered by the Pollution Control Board prior to promulgation of the final rule.

- This testimony focuses on use of continuous monitoring to determine compliance with the proposed standards. However, in all likelihood this will not be the predominant method utilized throughout the state to determine compliance. The draft rule as it is currently written does not specify a minimum frequency of monitoring requirement for either the sensitive period or the non-sensitive period. The final rule should address this.

- The draft rule as it is currently written does not specify or offer guidance as to how many sample points must be maintained to ensure compliance of a waterway segment, a river or stream, or an entire river system with the DO standards. The final rule should address this.

As was mentioned in the District's testimony at the April 25, 2006 hearing, actual monitoring using continuous monitors gives us critical insight into the impact of a water quality standard proposal. Before

adopting any proposal there must be a reasonable chance that compliance will occur. It is suggested that the Board give consideration to the following:

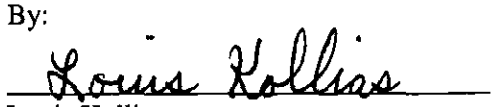
- For urban-impacted and CSO-impacted streams, a waiver provision should be allowed for time for further study of the affordability and feasibility of technology that must be installed for these streams to come into compliance.

- A separate wet weather standard applicable to the time following stormwater runoff that would allow reduced DO levels for a limited period needs to be investigated.

In closing, several areas have been identified where the IDNR/IEPA proposal requires clarification and scientific justification. The District supports the promulgation of a scientifically sound standard with clearly outlined requirements for compliance verification. The standard must acknowledge and address the unique nature of urban waterways and provide flexibility to accommodate the anthropogenic factors that impact DO and aquatic ecology in these systems.

Metropolitan Water Reclamation District
of Greater Chicago

By:



Louis Kollias
Director
Research and Development
October 2, 2006

Metropolitan Water Reclamation
District of Greater Chicago
100 East Erie St.
Chicago, Illinois 60611
312.751.5190

EXHIBIT 1A

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM AUGUST 2005 THROUGH FEBRUARY 2006

August 1, 2005 - February 28, 2006

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean	Percent of 30-Day Average ≥ 5.5 mg/L
North Branch Chicago River at Central Park Ave.	4,920	100.0	4.7-14.0	100.0	9.7	100.0
Des Plaines River at Devon Ave.	3,010	100.0	7.1-14.5	100.0	11.7	100.0
Des Plaines River at Irving Park Rd.	4,921	98.2	2.9-13.2	93.3	9.1	71.4
Des Plaines River at Ogden Ave.	4,947	100.0	6.0-14.4	100.0	10.6	100.0
Des Plaines River at Material Service Rd.	2,002	100.0	7.8-14.4	100.0	13.3	100.0
Salt Creek at Busse Lake Dam	2,963	100.0	8.8-15.0	100.0	12.4	100.0
Salt Creek at J. F. Kennedy Blvd.	4,860	100.0	4.6-11.4	100.0	8.6	100.0
Salt Creek at Thorndale Ave.	4,936	100.0	4.5-11.5	100.0	8.9	100.0
Salt Creek at Wolf Rd.	5,072	100.0	4.7-14.5	100.0	9.9	100.0
Grand Calumet River at Hohman Ave.	1,346	28.4	0.1-1.9	0.0	2.1	0.0
Little Calumet River at Ashland Ave.	5,087	82.6	2.1-12.6	65.3	7.6	71.4
Little Calumet River at Wentworth Ave.	4,248	84.3	1.0-12.3	58.5	7.3	66.7

EXHIBIT 1A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM AUGUST 2005 THROUGH FEBRUARY 2006

August 1 - August 31, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Branch Chicago River at Central Park Ave.	744	99.9	4.7-5.9	100.0	6.1
Des Plaines River at Devon Ave.	No Data				
Des Plaines River at Irving Park Rd.	578	84.9	2.9-4.9	42.1	4.6
Des Plaines River at Ogden Ave.	722	100.0	6.0-6.7	100.0	6.8
Des Plaines River at Material Service Rd.	No Data				
Salt Creek at Busse Lake Dam.	No Data				
Salt Creek at J. F. Kennedy Blvd.	712	100.0	4.7-5.6	100.0	7.0
Salt Creek at Thorndale Ave.	691	100.0	4.5-5.6	100.0	7.2
Salt Creek at Wolf Rd.	744	100.0	4.7-5.9	100.0	6.3
Grand Calumet River at Hohman Ave.	685	31.7	0.1-1.4	0.0	3.2
Little Calumet River at Ashland Ave.	743	41.3	2.1-3.1	0.0	3.4
Little Calumet River at Wentworth Ave.	744	57.3	1.0-3.4	0.0	3.8

EXHIBIT 1A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM AUGUST 2005 THROUGH FEBRUARY 2006

September 1 - September 30, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Branch Chicago River at Central Park Ave.	719	100.0	5.5-6.4	100.0	6.4
Des Plaines River at Devon Ave.	No Data				
Des Plaines River at Irving Park Rd.	720	100.0	4.4-5.6	100.0	5.4
Des Plaines River at Ogden Ave.	720	100.0	6.5-7.3	100.0	7.4
Des Plaines River at Material Service Rd.	No Data				
Salt Creek at Busse Lake Dam	No Data				
Salt Creek at J. F. Kennedy Blvd.	589	100.0	4.6-6.2	100.0	7.0
Salt Creek at Thorndale Ave.	631	100.0	4.6-6.1	100.0	7.4
Salt Creek at Wolf Rd.	719	100.0	5.2-6.7	100.0	6.8
Grand Calumet River at Hohman Ave.	553	29.8	0.5-1.9	0.0	2.5
Little Calumet River at Ashland Ave.	720	53.5	2.6-3.3	0.0	3.7
Little Calumet River at Wentworth Ave.	720	67.8	2.6-3.4	0.0	4.4

EXHIBIT 1A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM AUGUST 2005 THROUGH FEBRUARY 2006

October 1 – October 31, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Branch Chicago River at Central Park Ave.	744	100.0	5.8-8.3	100.0	7.8
Des Plaines River at Devon Ave.	130	100.0	9.3-9.3	100.0	9.5
Des Plaines River at Irving Park Rd.	743	100.0	5.8-8.7	100.0	7.7
Des Plaines River at Ogden Ave.	744	100.0	7.2-9.7	100.0	8.9
Des Plaines River at Material Service Rd.	107	100.0	10.5-10.5	100.0	12.6
Salt Creek at Busse Lake Dam	82	100.0	8.8-8.8	100.0	9.6
Salt Creek at J. F. Kennedy Blvd.	681	100.0	5.3-6.3	100.0	6.9
Salt Creek at Thorndale Ave.	735	100.0	5.7-6.5	100.0	7.4
Salt Creek at Wolf Rd.	743	100.0	6.4-8.4	100.0	8.0
Grand Calumet River at Hohman Ave.	108	0.0	0.3-0.3	0.0	0.5
Little Calumet River at Ashland Ave.	744	88.8	3.1-7.2	80.0	5.5
Little Calumet River at Wentworth Ave.	744	93.4	3.1-7.4	84.0	6.3

EXHIBIT 1A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM AUGUST 2005 THROUGH FEBRUARY 2006

November 1 - November 30, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Branch Chicago River at Central Park Ave.	722	100.0	5.6-11.8	100.0	9.4
Des Plaines River at Devon Ave.	720	100.0	7.1-11.4	100.0	9.5
Des Plaines River at Irving Park Rd.	721	100.0	6.7-10.4	100.0	9.1
Des Plaines River at Ogden Ave.	601	100.0	8.7-11.8	100.0	10.5
Des Plaines River at Material Service Rd.	720	100.0	7.8-12.2	100.0	11.8
Salt Creek at Busse Lake Dam	721	100.0	9.2-12.8	100.0	11.5
Salt Creek at J. F. Kennedy Blvd.	721	100.0	6.7-8.5	100.0	8.3
Salt Creek at Thorndale Ave.	721	100.0	6.2-8.4	100.0	8.3
Salt Creek at Wolf Rd.	716	100.0	7.4-10.3	100.0	9.7
Grand Calumet River at Hohman Ave.	No Data				
Little Calumet River at Ashland Ave.	720	96.0	3.8-8.2	79.2	6.5
Little Calumet River at Wentworth Ave.	708	90.1	2.6-7.7	75.0	6.3

EXHIBIT 1A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM AUGUST 2005 THROUGH FEBRUARY 2006

December 1 - December 31, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Branch Chicago River at Central Park Ave.	743	100.0	11.1-13.1	100.0	12.2
Des Plaines River at Devon Ave.	744	100.0	12.2-14.5	100.0	13.5
Des Plaines River at Irving Park Rd.	744	100.0	10.2-13.1	100.0	12.1
Des Plaines River at Ogden Ave.	744	100.0	12.9-14.4	100.0	14.2
Des Plaines River at Material Service Rd.	202	100.0	13.1-14.3	100.0	14.6
Salt Creek at Busse Lake Dam	744	100.0	12.1-13.2	100.0	13.1
Salt Creek at J. F. Kennedy Blvd.	741	100.0	7.7-9.4	100.0	9.0
Salt Creek at Thorndale Ave.	742	100.0	8.3-9.4	100.0	9.4
Salt Creek at Wolf Rd.	734	100.0	11.7-14.5	100.0	13.9
Grand Calumet River at Hohman Ave.	No Data				
Little Calumet River at Ashland Ave.	744	100.0	10.5-12.6	100.0	11.8
Little Calumet River at Wentworth Ave.	No Data				

EXHIBIT 1A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM AUGUST 2005 THROUGH FEBRUARY 2006

January 1 - January 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Branch Chicago River at Central Park Ave.	576	100.0	11.2-12.4	100.0	12.2
Des Plaines River at Devon Ave.	744	100.0	10.6-13.8	100.0	12.7
Des Plaines River at Irving Park Rd.	744	100.0	10.6-12.7	100.0	12.0
Des Plaines River at Ogden Ave.	744	100.0	12.3-13.1	100.0	12.9
Des Plaines River at Material Service Rd.	468	100.0	11.8-13.0	100.0	13.5
Salt Creek at Busse Lake Dam	744	100.0	13.0-13.5	100.0	13.4
Salt Creek at J. F. Kennedy Blvd.	744	100.0	9.4-10.2	100.0	10.6
Salt Creek at Thorndale Ave.	744	100.0	9.6-10.5	100.0	11.0
Salt Creek at Wolf Rd.	744	100.0	11.1-11.8	100.0	11.8
Grand Calumet River at Hohman Ave.	No Data				
Little Calumet River at Ashland Ave.	744	100.0	9.7-11.3	100.0	10.7
Little Calumet River at Wentworth Ave.	660	100.0	9.7-11.5	100.0	10.9

EXHIBIT 1A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM AUGUST 2005 THROUGH FEBRUARY 2006

February 1 - February 28, 2006

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Branch Chicago River at Central Park Ave.	672	100.0	12.5-14	100.0	13.9
Des Plaines River at Devon Ave.	672	100.0	12.0-13.6	100.0	13.4
Des Plaines River at Irving Park Rd.	671	100.0	12.3-13.2	100.0	13.1
Des Plaines River at Ogden Ave.	672	100.0	12.7-14.2	100.0	13.8
Des Plaines River at Material Service Rd.	505	100.0	12.3-14.4	100.0	14.0
Salt Creek at Busse Lake Dam	672	100.0	13.4-15	100.0	14.5
Salt Creek at J. F. Kennedy Blvd.	672	100.0	9.5-11.4	100.0	11.2
Salt Creek at Thorndale Ave.	672	100.0	9.6-11.5	100.0	11.7
Salt Creek at Wolf Rd.	672	100.0	11.8-12.5	100.0	12.7
Grand Calumet River at Hohman Ave.	No Data				
Little Calumet River at Ashland Ave.	672	100.0	10.8-12.4	100.0	11.9
Little Calumet River at Wentworth Ave.	672	100.0	10.7-12.3	100.0	11.9

EXHIBIT 1B

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM MARCH 2006 THROUGH JULY 2006

March 1, 2006 - July 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Branch Chicago River at Central Park Ave.	3,671	83.8	7.8	62.6
Des Plaines River at Devon Ave.	3,666	81.8	8.0	74.0
Des Plaines River at Irving Park Rd.	3,669	82.5	7.8	68.3
Des Plaines River at Ogden Ave.	3,671	100.0	9.0	100.0
Des Plaines River at Material Service Rd.	3,563	97.8	9.8	100.0
Salt Creek at Busse Lake Dam	3,670	99.4	9.7	100.0
Salt Creek at J. F. Kennedy Blvd.	3,670	100.0	8.7	100.0
Salt Creek at Thorndale Ave.	3,500	97.7	8.6	100.0
Salt Creek at Wolf Rd.	3,479	91.0	8.5	83.6
Grand Calumet River at Hohman Ave.	1,814	12.8	2.6	0.0
Little Calumet River at Ashland Ave.	3,672	62.0	6.8	55.3
Little Calumet River at Wentworth Ave.	3,502	63.3	6.9	53.8

EXHIBIT 1B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM MARCH 2006 THROUGH JULY 2006

March 1 - March 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Branch Chicago River at Central Park Ave.	744	91.7	11.2	100.0
Des Plaines River at Devon Ave.	743	100.0	11.6	100.0
Des Plaines River at Irving Park Rd.	744	100.0	11.4	100.0
Des Plaines River at Ogden Ave.	744	100.0	12.1	100.0
Des Plaines River at Material Service Rd.	744	100.0	12.2	100.0
Salt Creek at Busse Lake Dam	744	100.0	12.7	100.0
Salt Creek at J. F. Kennedy Blvd.	743	100.0	11.1	100.0
Salt Creek at Thorndale Ave.	575	100.0	11.2	100.0
Salt Creek at Wolf Rd.	744	100.0	11.5	100.0
Grand Calumet River at Hohman Ave.	No Data			
Little Calumet River at Ashland Ave.	744	99.9	10.9	100.0
Little Calumet River at Wentworth Ave.	743	100.0	10.9	100.0

EXHIBIT 1B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM MARCH 2006 THROUGH JULY 2006

April 1 - April 30, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Branch Chicago River at Central Park Ave.	719	100.0	9.9	100.0
Des Plaines River at Devon Ave.	719	100.0	9.4	100.0
Des Plaines River at Irving Park Rd.	719	99.9	9.0	100.0
Des Plaines River at Ogden Ave.	719	100.0	9.8	100.0
Des Plaines River at Material Service Rd.	720	100.0	10.5	100.0
Salt Creek at Busse Lake Dam	718	100.0	10.8	100.0
Salt Creek at J. F. Kennedy Blvd.	719	100.0	9.3	100.0
Salt Creek at Thorndale Ave.	719	100.0	9.4	100.0
Salt Creek at Wolf Rd.	719	10.0	9.4	100.0
Grand Calumet River at Hohman Ave.	No Data			
Little Calumet River at Ashland Ave.	720	97.9	7.9	100.0
Little Calumet River at Wentworth Ave.	610	100.0	8.4	100.0

EXHIBIT 1B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM MARCH 2006 THROUGH JULY 2006

May 1 - May 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Branch Chicago River at Central Park Ave.	744	81.7	6.8	80.0
Des Plaines River at Devon Ave.	742	95.7	8.7	100.0
Des Plaines River at Irving Park Rd.	744	95.0	8.3	96.0
Des Plaines River at Ogden Ave.	744	100.0	9.1	100.0
Des Plaines River at Material Service Rd.	744	100.0	10.1	100.0
Salt Creek at Busse Lake Dam	744	100.0	9.8	100.0
Salt Creek at J. F. Kennedy Blvd.	744	100.0	8.5	100.0
Salt Creek at Thorndale Ave.	743	100.0	8.3	100.0
Salt Creek at Wolf Rd.	744	98.9	8.4	100.0
Grand Calumet River at Hohman Ave.	504	8.9	2.5	0.0
Little Calumet River at Ashland Ave.	744	75.0	6.2	60.0
Little Calumet River at Wentworth Ave.	685	75.6	6.4	78.3

EXHIBIT 1B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM MARCH 2006 THROUGH JULY 2006

June 1 - June 30, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Branch Chicago River at Central Park Ave.	720	88.9	5.8	33.3
Des Plaines River at Devon Ave.	718	95.8	6.4	70.8
Des Plaines River at Irving Park Rd.	718	93.5	6.0	45.8
Des Plaines River at Ogden Ave.	720	100.0	7.4	100.0
Des Plaines River at Material Service Rd.	720	95.4	7.5	100.0
Salt Creek at Busse Lake Dam	720	100.0	7.9	100.0
Salt Creek at J. F. Kennedy Blvd.	720	100.0	7.7	100.0
Salt Creek at Thorndale Ave.	720	96.1	7.5	100.0
Salt Creek at Wolf Rd.	682	87.4	6.5	82.6
Grand Calumet River at Hohman Ave.	566	21.7	3.5	0.0
Little Calumet River at Ashland Ave.	720	28.2	4.8	16.7
Little Calumet River at Wentworth Ave.	720	28.3	4.8	0.0

EXHIBIT 1B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM MARCH 2006 THROUGH JULY 2006

July 1 - July 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Branch Chicago River at Central Park Ave.	744	57.7	5.1	0.0
Des Plaines River at Devon Ave.	744	18.8	3.9	0.0
Des Plaines River at Irving Park Rd.	744	25.3	4.3	0.0
Des Plaines River at Ogden Ave.	744	99.9	6.6	100.0
Des Plaines River at Material Service Rd.	635	92.6	8.1	100.0
Salt Creek at Busse Lake Dam	744	97.0	7.3	100.0
Salt Creek at J. F. Kennedy Blvd.	744	100.0	7.1	100.0
Salt Creek at Thorndale Ave.	743	92.7	6.9	100.0
Salt Creek at Wolf Rd.	590	62.7	5.6	21.1
Grand Calumet River at Hohman Ave.	744	8.6	2.1	0.0
Little Calumet River at Ashland Ave.	744	8.9	4.1	0.0
Little Calumet River at Wentworth Ave.	744	19.1	4.2	0.0

EXHIBIT 2A

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM AUGUST 2005 THROUGH FEBRUARY 2006

August 1, 2005 - February 28, 2006

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean	Percent of 30-Day Average ≥ 5.5 mg/L
North Shore Channel at Main St.	4,635	99.7	3.9-28.3	98.0	9.7	100.0
North Shore Channel at Foster Ave.	4,960	100.0	5.0-8.6	100.0	7.6	100.0
North Branch Chicago River at Addison St.	5,087	99.0	3.0-9.7	95.3	7.4	85.7
North Branch Chicago River at Fullerton Ave.	5,085	97.7	2.4-9.2	95.9	7.0	85.7
North Branch Chicago River at Kinzie St.	5,057	97.7	2.7-9.8	91.2	7.0	85.7
Chicago River at Clark St.	4,981	100.0	6.5-11.2	100.0	9.0	100.0
South Branch Chicago River at Loomis St.	5,086	100.0	5.4-10.8	100.0	8.0	100.0
Bubbly Creek at 36th St.	4,838	83.8	0.0-12.1	75.2	6.6	71.4
Bubbly Creek at Interstate Highway 55	4,716	98.7	2.8-9.5	94.9	7.3	85.7
Chicago Sanitary & Ship Canal at Cicero Ave.	4,870	98.7	3.4-9.4	92.6	6.7	85.7
Chicago Sanitary & Ship Canal at B&O Central R.R.	4,666	100.0	4.5-8.4	100.0	7.0	85.7
Chicago Sanitary & Ship Canal at Route 83	4,295	98.7	3.8-7.8	99.3	5.9	57.1
Chicago Sanitary & Ship Canal at Lockport Powerhouse	4,831	98.2	3.2-8.0	90.1	6.0	57.1
Des Plaines River at Jefferson St.	4,724	99.7	3.6-9.4	96.2	7.3	71.4
Calumet-Sag Channel at Cicero Ave.	5,088	99.5	4.1-10.2	100.0	7.6	100.0
Calumet-Sag Channel at 104th Ave.	3,994	99.3	3.7-9.5	97.7	7.2	85.7
Calumet-Sag Channel at Route 83	5,088	99.2	3.4-10.0	97.1	7.5	100.0
Grand Calumet River at Torrence Ave.	4,892	91.5	1.3-16.1	75.0	10.0	85.7
Little Calumet River at C&W Indiana R.R.	4,807	100.0	5.8-17.4	100.0	10.6	100.0
Little Calumet River at Halsted St.	4,832	100.0	5.4-8.9	100.0	7.6	100.0

EXHIBIT 2A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM AUGUST 2005 THROUGH FEBRUARY 2006

August 1 - August 31, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Shore Channel at Main St.	425	100.0	5.8-6.6	100.0	7.1
North Shore Channel at Foster Ave.	627	100.0	5.2-6.4	100.0	6.5
North Branch Chicago River at Addison St.	744	93.5	3.0-5.6	68.0	5.2
North Branch Chicago River at Fullerton Ave.	741	85.6	2.4-5.1	72.0	4.8
North Branch Chicago River at Kinzie St.	744	85.6	2.7-5.2	40.0	4.8
Chicago River at Clark St.	637	100.0	6.5-8.3	100.0	7.8
South Branch Chicago River at Loomis St.	744	100.0	5.4-6.4	100.0	6.4
Bubbly Creek at 36th St.	494	22.7	0.6-1.4	0.0	2.3
Bubbly Creek at Interstate Highway 55	542	90.8	2.8-5.2	52.9	5.4
Chicago Sanitary & Ship Canal at Cicero Ave.	744	91.7	3.4-5.5	52.0	5.1
Chicago Sanitary & Ship Canal at B&O Central R.R.	494	100.0	4.5-5.4	100.0	5.4
Chicago Sanitary & Ship Canal at Route 83	142	78.2	3.8-3.8	0.0	4.1
Chicago Sanitary & Ship Canal at Lockport Powerhouse	575	84.5	3.2-4.1	15.8	4.2
Des Plaines River at Jefferson St.	576	97.2	3.6-4.8	68.4	4.9
Calumet-Sag Channel at Cicero Ave.	744	98.5	4.1-5.8	100.0	6.2
Calumet-Sag Channel at 104th Ave.	325	91.7	3.7-5.2	66.7	5.1
Calumet-Sag Channel at Route 83	743	94.8	3.4-5.9	80.0	5.9
Grand Calumet River at Torrence Ave.	730	56.6	1.3-2.3	0.0	4.2
Little Calumet River at C&W Indiana R.R.	489	100.0	5.8-7	100.0	7.4
Little Calumet River at Halsted St.	489	100.0	5.4-6.3	100.0	6.8

EXHIBIT 2A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM AUGUST 2005 THROUGH FEBRUARY 2006

September 1 - September 30, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Shore Channel at Main St.	586	100.0	6.2-7.4	100.0	7.5
North Shore Channel at Foster Ave.	718	99.7	5-6.1	100.0	6.6
North Branch Chicago River at Addison St.	720	99.7	4.7-5.8	100.0	6.2
North Branch Chicago River at Fullerton Ave.	720	98.9	4.5-5.4	100.0	5.6
North Branch Chicago River at Kinzie St.	720	99.6	4.6-5.1	100.0	5.6
Chicago River at Clark St.	719	100.0	7.4-7.9	100.0	7.9
South Branch Chicago River at Loomis St.	720	100.0	6.2-6.9	100.0	6.9
Bubbly Creek at 36th St.	720	81.3	2.3-4.4	33.3	4.3
Bubbly Creek at Interstate Highway 55	720	100.0	5.2-6	100.0	6.1
Chicago Sanitary & Ship Canal at Cicero Ave.	720	100.0	5.4-6.1	100.0	6.1
Chicago Sanitary & Ship Canal at B&O Central R.R.	548	100.0	5.3-5.7	100.0	5.9
Chicago Sanitary & Ship Canal at Route 83	528	99.4	4-5.4	100.0	5.1
Chicago Sanitary & Ship Canal at Lockport Powerhouse	720	100.0	4.4-5.1	100.0	4.9
Des Plaines River at Jefferson St.	682	100.0	4.5-4.9	100.0	5.1
Calumet-Sag Channel at Cicero Ave.	719	100.0	5.5-6.2	100.0	6.5
Calumet-Sag Channel at 104th Ave.	719	100.0	4.7-6.4	100.0	6.1
Calumet-Sag Channel at Route 83	719	100.0	4.7-6.1	100.0	5.9
Grand Calumet River at Torrence Ave.	565	87.1	2.7-4.4	22.2	6.0
Little Calumet River at C&W Indiana R.R.	719	100.0	6.7-7.4	100.0	7.6
Little Calumet River at Halsted St.	720	100.0	6-6.6	100.0	7.0

EXHIBIT 2A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM AUGUST 2005 THROUGH FEBRUARY 2006

October 1 - October 31, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Shore Channel at Main St.	745	100.0	6.8-9.0	100.0	8.3
North Shore Channel at Foster Ave.	744	100.0	6.1-7.2	100.0	7.2
North Branch Chicago River at Addison St.	744	100.0	5.9-6.9	100.0	6.8
North Branch Chicago River at Fullerton Ave.	744	100.0	5.1-6.2	100.0	6.1
North Branch Chicago River at Kinzie St.	726	99.4	4.9-6.2	100.0	6.3
Chicago River at Clark St.	744	100.0	7.6-8.8	100.0	8.6
South Branch Chicago River at Loomis St.	741	100.0	6.2-7.9	100.0	7.3
Bubbly Creek at 36th St.	743	100.0	4.8-5.7	100.0	5.6
Bubbly Creek at Interstate Highway 55	744	100.0	5.8-6.8	100.0	6.7
Chicago Sanitary & Ship Canal at Cicero Ave.	744	100.0	4.9-5.7	100.0	5.7
Chicago Sanitary & Ship Canal at B&O Central R.R.	744	100.0	5.7-6.3	100.0	6.3
Chicago Sanitary & Ship Canal at Route 83	744	100.0	4.6-5.7	100.0	5.4
Chicago Sanitary & Ship Canal at Lockport Powerhouse	743	100.0	4.7-5.6	100.0	5.4
Des Plaines River at Jefferson St.	612	100.0	5.7-6.5	100.0	6.6
Calumet-Sag Channel at Cicero Ave.	744	100.0	5.7-6.9	100.0	6.9
Calumet-Sag Channel at 104th Ave.	743	100.0	5.3-6.8	100.0	6.5
Calumet-Sag Channel at Route 83	744	100.0	5.5-6.4	100.0	6.4
Grand Calumet River at Torrence Ave.	744	96.5	3.5-7.7	92.0	7.6
Little Calumet River at C&W Indiana R.R.	744	100.0	7.7-8.8	100.0	8.6
Little Calumet River at Halsted St.	744	100.0	6.4-7.2	100.0	7.1

EXHIBIT 2A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM AUGUST 2005 THROUGH FEBRUARY 2006

November 1 - November 30, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Shore Channel at Main St.	720	100.0	5.1-9.0	100.0	7.7
North Shore Channel at Foster Ave.	721	100.0	6.3-7.2	100.0	7.3
North Branch Chicago River at Addison St.	721	100.0	5.7-7	100.0	7.0
North Branch Chicago River at Fullerton Ave.	721	100.0	5.3-6.7	100.0	6.6
North Branch Chicago River at Kinzie St.	708	100.0	5.3-7.4	100.0	6.7
Chicago River at Clark St.	721	100.0	7.5-8.6	100.0	8.3
South Branch Chicago River at Loomis St.	721	100.0	5.9-8	100.0	7.4
Bubbly Creek at 36th St.	721	100.0	4.7-9.8	100.0	9.0
Bubbly Creek at Interstate Highway 55	549	100.0	5.5-7.8	100.0	7.1
Chicago Sanitary & Ship Canal at Cicero Ave.	515	100.0	5.4-6.6	100.0	6.1
Chicago Sanitary & Ship Canal at B&O Central R.R.	721	100.0	5.8-7.1	100.0	7.0
Chicago Sanitary & Ship Canal at Route 83	721	97.1	4.3-5.8	100.0	5.7
Chicago Sanitary & Ship Canal at Lockport Powerhouse	634	100.0	4.7-6.7	100.0	6.0
Des Plaines River at Jefferson St.	696	100.0	5.8-7.8	100.0	7.4
Calumet-Sag Channel at Cicero Ave.	721	97.9	5.0-8.0	100.0	7.1
Calumet-Sag Channel at 104th Ave.	707	100.0	5.7-8.4	100.0	7.5
Calumet-Sag Channel at Route 83	721	100.0	5.9-7.6	100.0	7.4
Grand Calumet River at Torrence Ave.	695	100.0	7.2-12.5	100.0	11.1
Little Calumet River at C&W Indiana R.R.	695	100.0	9.0-11.7	100.0	10.8
Little Calumet River at Halsted St.	721	100.0	5.9-8.2	100.0	7.4

EXHIBIT 2A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM AUGUST 2005 THROUGH FEBRUARY 2006

December 1 - December 31, 2005

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Shore Channel at Main St.	744	98.1	3.9-8.1	88.0	6.7
North Shore Channel at Foster Ave.	744	100.0	7.7-8.6	100.0	8.6
North Branch Chicago River at Addison St.	743	100.0	7.6-8.2	100.0	8.3
North Branch Chicago River at Fullerton Ave.	744	100.0	7.7-8.4	100.0	8.3
North Branch Chicago River at Kinzie St.	744	100.0	7.6-8.6	100.0	8.4
Chicago River at Clark St.	744	100.0	8.6-11.2	100.0	10.3
South Branch Chicago River at Loomis St.	744	100.0	8.1-9.8	100.0	9.2
Bubbly Creek at 36th St.	744	100.0	8.3-10.6	100.0	9.6
Bubbly Creek at Interstate Highway 55	744	100.0	8.0-9.5	100.0	9.1
Chicago Sanitary & Ship Canal at Cicero Ave.	731	100.0	6.5-8.2	100.0	7.7
Chicago Sanitary & Ship Canal at B&O Central R.R.	744	100.0	7.2-8.2	100.0	8.0
Chicago Sanitary & Ship Canal at Route 83	744	100.0	5.8-7.8	100.0	7.2
Chicago Sanitary & Ship Canal at Lockport Powerhouse	744	100.0	6.1-7.1	100.0	6.9
Des Plaines River at Jefferson St.	743	100.0	7.6-9.0	100.0	8.8
Calumet-Sag Channel at Cicero Ave.	744	100.0	7.9-9.4	100.0	8.6
Calumet-Sag Channel at 104th Ave.	84	100.0	7.2-7.2	100.0	7.4
Calumet-Sag Channel at Route 83	745	100.0	7.1-10.0	100.0	8.8
Grand Calumet River at Torrence Ave.	744	100.0	7.8-11.7	100.0	11.1
Little Calumet River at C&W Indiana R.R.	744	100.0	10.9-12.4	100.0	12.0
Little Calumet River at Halsted St.	744	100.0	7.4-8.6	100.0	8.3

EXHIBIT 2A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM AUGUST 2005 THROUGH FEBRUARY 2006

January 1 - January 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Shore Channel at Main St.	743	100.0	5.6-9.3	100.0	8.0
North Shore Channel at Foster Ave.	744	100.0	7.5-8.2	100.0	8.5
North Branch Chicago River at Addison St.	744	100.0	7.6-8.8	100.0	8.9
North Branch Chicago River at Fullerton Ave.	743	100.0	7.3-8.3	100.0	8.4
North Branch Chicago River at Kinzie St.	743	100.0	7.3-8.1	100.0	8.1
Chicago River at Clark St.	744	100.0	8.3-9.6	100.0	9.3
South Branch Chicago River at Loomis St.	744	100.0	8-8.8	100.0	8.7
Bubbly Creek at 36th St.	744	100.0	7.7-9.2	100.0	8.5
Bubbly Creek at Interstate Highway 55	744	100.0	7.8-8.5	100.0	8.4
Chicago Sanitary & Ship Canal at Cicero Ave.	744	100.0	6.3-7.6	100.0	7.3
Chicago Sanitary & Ship Canal at B&O Central R.R.	744	100.0	6.9-8.3	100.0	8.1
Chicago Sanitary & Ship Canal at Route 83	744	100.0	4.4-6.6	100.0	6.5
Chicago Sanitary & Ship Canal at Lockport Powerhouse	743	100.0	5.9-6.9	100.0	6.8
Des Plaines River at Jefferson St.	743	100.0	7.4-9.3	100.0	9.1
Calumet-Sag Channel at Cicero Ave.	744	100.0	7.7-8.9	100.0	8.4
Calumet-Sag Channel at 104th Ave.	744	100.0	7.8-9.1	100.0	8.6
Calumet-Sag Channel at Route 83	744	100.0	7.6-9.2	100.0	8.6
Grand Calumet River at Torrence Ave.	743	100.0	9.7-13.4	100.0	13.0
Little Calumet River at C&W Indiana R.R.	744	100.0	12.0-12.8	100.0	12.6
Little Calumet River at Halsted St.	742	100.0	6.7-7.7	100.0	7.6

EXHIBIT 2A (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM AUGUST 2005 THROUGH FEBRUARY 2006

February 1 - February 28, 2006

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Range of Daily Minima	Percent of 7-Day Minima ≥ 4.0 mg/L	30-Day Average of Daily Mean
North Shore Channel at Main St.	672	100.0	16.5-28.3	100.0	22.7
North Shore Channel at Foster Ave.	662	100.0	7.7-8.6	100.0	8.8
North Branch Chicago River at Addison St.	671	100.0	8.4-9.7	100.0	9.4
North Branch Chicago River at Fullerton Ave.	672	100.0	8.0-9.2	100.0	9.2
North Branch Chicago River at Kinzie St.	672	100.0	8.2-9.8	100.0	9.1
Chicago River at Clark St.	672	100.0	9.2-11.1	100.0	10.7
South Branch Chicago River at Loomis St.	672	100.0	8.7-10.8	100.0	9.9
Bubbly Creek at 36th St.	672	60.4	0.0-12.1	63.6	6.9
Bubbly Creek at Interstate Highway 55	673	98.5	4.6-9.4	100.0	8.6
Chicago Sanitary & Ship Canal at Cicero Ave.	672	100.0	7.4-9.4	100.0	8.6
Chicago Sanitary & Ship Canal at B&O Central R.R.	671	100.0	7.5-8.4	100.0	8.5
Chicago Sanitary & Ship Canal at Route 83	672	100.0	6.6-7.7	100.0	7.5
Chicago Sanitary & Ship Canal at Lockport Powerhouse	672	100.0	6.8-8.0	100.0	7.7
Des Plaines River at Jefferson St.	672	100.0	8.4-9.4	100.0	9.4
Calumet-Sag Channel at Cicero Ave.	672	100.0	8.2-10.2	100.0	9.3
Calumet-Sag Channel at 104th Ave.	672	99.9	8.2-9.5	100.0	9.4
Calumet-Sag Channel at Route 83	672	100.0	8.3-10.0	100.0	9.5
Grand Calumet River at Torrence Ave.	671	100.0	13.9-16.1	100.0	17.4
Little Calumet River at C&W Indiana R.R.	672	100.0	12.1-17.4	100.0	15.0
Little Calumet River at Halsted St.	672	100.0	7.7-8.9	100.0	8.6

EXHIBIT 2B

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM MARCH 2006 THROUGH JULY 2006

March 1, 2006 - July 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Shore Channel at Main St.	3,502	97.3	9.3	95.7
North Shore Channel at Foster Ave.	3,513	99.8	7.7	100.0
North Branch Chicago River at Addison St.	3,505	99.6	7.5	100.0
North Branch Chicago River at Fullerton Ave.	3,502	90.9	6.6	52.1
North Branch Chicago River at Kinzie St.	3,671	92.5	6.7	56.9
Chicago River at Clark St.	3,514	100.0	8.9	100.0
South Branch Chicago River at Loomis St.	3,670	98.2	7.2	93.5
Bubbly Creek at 36th St.	3,319	19.9	3.0	8.1
Bubbly Creek at Interstate Highway 55	3,124	63.6	5.4	26.9
Chicago Sanitary & Ship Canal at Cicero Ave.	3,502	79.9	6.1	47.9
Chicago Sanitary & Ship Canal at B&O Central R.R.	3,670	93.8	6.7	69.1
Chicago Sanitary & Ship Canal at Route 83	3,189	49.2	4.9	30.5
Chicago Sanitary & Ship Canal at Lockport Powerhouse	3,501	43.9	5.1	33.3
Des Plaines River at Jefferson St.	3,669	71.6	6.5	52.0
Calumet-Sag Channel at Cicero Ave.	3,669	84.3	6.6	59.3
Calumet-Sag Channel at 104th Ave.	3,033	76.2	6.3	44.0
Calumet-Sag Channel at Route 83	3,670	74.6	6.3	39.8
Grand Calumet River at Torrence Ave.	3,359	50.8	6.3	29.5
Little Calumet River at C&W Indiana R.R.	3,499	86.1	8.9	78.6
Little Calumet River at Halsted St.	3,669	97.5	6.7	79.7

EXHIBIT 2B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM MARCH 2006 THROUGH JULY 2006

March 1 – March 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Shore Channel at Main St.	743	100.0	14.8	100.0
North Shore Channel at Foster Ave.	586	100.0	8.2	100.0
North Branch Chicago River at Addison St.	744	100.0	9.2	100.0
North Branch Chicago River at Fullerton Ave.	744	98.7	8.4	100.0
North Branch Chicago River at Kinzie St.	744	100.0	8.5	100.0
Chicago River at Clark St.	744	100.0	9.8	100.0
South Branch Chicago River at Loomis St.	744	100.0	8.9	100.0
Bubbly Creek at 36th St.	744	44.4	4.5	36.0
Bubbly Creek at Interstate Highway 55	744	86.8	6.8	72.0
Chicago Sanitary & Ship Canal at Cicero Ave.	744	100.0	7.5	100.0
Chicago Sanitary & Ship Canal at B&O Central R.R.	744	100.0	8.3	100.0
Chicago Sanitary & Ship Canal at Route 83	406	100.0	7.1	100.0
Chicago Sanitary & Ship Canal at Lockport Powerhouse	744	100.0	7.3	100.0
Des Plaines River at Jefferson St.	744	100.0	9.1	100.0
Calumet-Sag Channel at Cicero Ave.	744	100.0	9.0	100.0
Calumet-Sag Channel at 104th Ave.	515	100.0	9.6	100.0
Calumet-Sag Channel at Route 83	744	100.0	9.1	100.0
Grand Calumet River at Torrence Ave.	575	100.0	13.3	100.0
Little Calumet River at C&W Indiana R.R.	744	100.0	16.2	100.0
Little Calumet River at Halsted St.	744	100.0	8.2	100.0

EXHIBIT 2B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM MARCH 2006 THROUGH JULY 2006

April 1 - April 30, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Shore Channel at Main St.	719	90.1	7.0	79.2
North Shore Channel at Foster Ave.	719	100.0	7.9	100.0
North Branch Chicago River at Addison St.	719	100.0	8.0	100.0
North Branch Chicago River at Fullerton Ave.	719	93.5	7.1	87.5
North Branch Chicago River at Kinzie St.	719	93.0	7.4	100.0
Chicago River at Clark St.	719	100.0	8.9	100.0
South Branch Chicago River at Loomis St.	719	97.2	7.9	100.0
Bubbly Creek at 36th St.	551	24.3	3.0	0.0
Bubbly Creek at Interstate Highway 55	377	56.2	4.5	0.0
Chicago Sanitary & Ship Canal at Cicero Ave.	719	80.0	6.4	58.3
Chicago Sanitary & Ship Canal at B&O Central R.R.	718	99.7	7.7	100.0
Chicago Sanitary & Ship Canal at Route 83	719	94.9	6.3	83.3
Chicago Sanitary & Ship Canal at Lockport Powerhouse	718	93.3	6.0	58.3
Des Plaines River at Jefferson St.	718	99.9	7.6	100.0
Calumet-Sag Channel at Cicero Ave.	719	99.9	6.7	100.0
Calumet-Sag Channel at 104th Ave.	609	99.7	6.6	95.0
Calumet-Sag Channel at Route 83	719	90.4	6.3	50.0
Grand Calumet River at Torrence Ave.	719	57.6	5.5	37.5
Little Calumet River at C&W Indiana R.R.	718	100.0	8.4	100.0
Little Calumet River at Halsted St.	718	100.0	6.6	100.0

EXHIBIT 2B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM MARCH 2006 THROUGH JULY 2006

May 1 - May 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Shore Channel at Main St.	743	100.0	9.1	100.0
North Shore Channel at Foster Ave.	744	99.2	7.6	100.0
North Branch Chicago River at Addison St.	577	99.0	7.3	100.0
North Branch Chicago River at Fullerton Ave.	576	92.2	6.4	78.9
North Branch Chicago River at Kinzie St.	744	99.6	6.3	84.0
Chicago River at Clark St.	744	100.0	8.7	100.0
South Branch Chicago River at Loomis St.	744	100.0	6.7	100.0
Bubbly Creek at 36th St.	703	5.7	2.2	0.0
Bubbly Creek at Interstate Highway 55	708	69.4	5.6	12.0
Chicago Sanitary & Ship Canal at Cicero Ave.	744	87.4	5.9	40.0
Chicago Sanitary & Ship Canal at B&O Central R.R.	744	99.9	6.4	96.0
Chicago Sanitary & Ship Canal at Route 83	744	36.8	4.8	0.0
Chicago Sanitary & Ship Canal at Lockport Powerhouse	576	6.8	4.4	0.0
Des Plaines River at Jefferson St.	744	83.7	6.0	60.0
Calumet-Sag Channel at Cicero Ave.	744	87.2	5.9	48.0
Calumet-Sag Channel at 104th Ave.	577	80.1	5.5	0.0
Calumet-Sag Channel at Route 83	743	75.1	5.5	16.0
Grand Calumet River at Torrence Ave.	744	16.1	3.6	0.0
Little Calumet River at C&W Indiana R.R.	744	89.9	7.2	96.0
Little Calumet River at Halsted St.	744	99.5	6.3	92.0

EXHIBIT 2B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM MARCH 2006 THROUGH JULY 2006

June 1 - June 30, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Shore Channel at Main St.	721	97.1	7.8	100.0
North Shore Channel at Foster Ave.	720	100.0	7.4	100.0
North Branch Chicago River at Addison St.	721	99.7	6.5	100.0
North Branch Chicago River at Fullerton Ave.	720	85.7	5.6	0.0
North Branch Chicago River at Kinzie St.	720	84.9	5.7	0.0
Chicago River at Clark St.	720	100.0	8.8	100.0
South Branch Chicago River at Loomis St.	719	97.5	6.3	95.8
Bubbly Creek at 36th St.	720	12.2	2.7	0.0
Bubbly Creek at Interstate Highway 55	552	38.8	4.6	0.0
Chicago Sanitary & Ship Canal at Cicero Ave.	720	42.4	5.0	20.8
Chicago Sanitary & Ship Canal at B&O Central R.R.	720	84.7	5.6	29.2
Chicago Sanitary & Ship Canal at Route 83	720	13.5	4.0	0.0
Chicago Sanitary & Ship Canal at Lockport Powerhouse	719	0.1	3.8	0.0
Des Plaines River at Jefferson St.	719	38.4	4.8	0.0
Calumet-Sag Channel at Cicero Ave.	718	59.3	5.3	0.0
Calumet-Sag Channel at 104th Ave.	720	44.9	5.0	0.0
Calumet-Sag Channel at Route 83	720	28.5	4.8	0.0
Grand Calumet River at Torrence Ave.	720	53.9	5.8	20.8
Little Calumet River at C&W Indiana R.R.	719	48.0	5.0	0.0
Little Calumet River at Halsted St.	720	90.1	5.8	29.2

EXHIBIT 2B (Continued)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DISSOLVED OXYGEN OBSERVATIONS AND SUMMARY AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM MARCH 2006 THROUGH JULY 2006

July 1 - July 31, 2006

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Average ≥ 6.0 mg/L
North Shore Channel at Main St.	576	99.8	7.3	100.0
North Shore Channel at Foster Ave.	744	100.0	7.3	100.0
North Branch Chicago River at Addison St.	744	99.2	6.5	100.0
North Branch Chicago River at Fullerton Ave.	743	84.9	5.6	0.0
North Branch Chicago River at Kinzie St.	744	84.8	5.6	0.0
Chicago River at Clark St.	587	100.0	8.3	100.0
South Branch Chicago River at Loomis St.	744	96.1	6.3	72.0
Bubbly Creek at 36th St.	601	11.1	2.3	0.0
Bubbly Creek at Interstate Highway 55	743	56.9	4.7	28.0
Chicago Sanitary & Ship Canal at Cicero Ave.	575	91.3	5.7	10.5
Chicago Sanitary & Ship Canal at B&O Central R.R.	744	84.5	5.5	20.0
Chicago Sanitary & Ship Canal at Route 83	600	18.3	3.4	0.0
Chicago Sanitary & Ship Canal at Lockport Powerhouse	744	11.0	3.7	0.0
Des Plaines River at Jefferson St.	744	36.0	4.7	0.0
Calumet-Sag Channel at Cicero Ave.	744	74.9	5.9	48.0
Calumet-Sag Channel at 104th Ave.	612	65.8	5.6	40.0
Calumet-Sag Channel at Route 83	744	78.2	5.7	32.0
Grand Calumet River at Torrence Ave.	601	34.9	4.5	0.0
Little Calumet River at C&W Indiana R.R.	574	93.4	6.7	100.0
Little Calumet River at Halsted St.	743	97.7	6.5	76.0

EXHIBIT 3A

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DETERMINATION OF COMPLIANCE WITH PROPOSED DO STANDARDS AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM SEPTEMBER 1 THROUGH SEPTEMBER 30, 2005 USING TWO METHODS TO CALCULATE AVERAGES OF 7-DAY DAILY MINIMA

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Running Averages of Daily Minima		Weekly Averages of Daily Minima		30-Day Average of Daily Mean
			Range of Daily Minima	Percent of 7-Day Daily Minima ≥ 4.0 mg/L	Range of Daily Minima	Percent of 7-Day Daily Minima ≥ 4.0 mg/L	
North Branch Chicago River at Central Park Ave.	719	100.0	5.5-6.4	100.0	5.8-6.8	100.0	6.4
Des Plaines River at Devon Ave.	No Data						
Des Plaines River at Irving Park Rd.	720	100.0	4.4-5.6	100.0	4.4-6.1	100.0	5.4
Des Plaines River at Ogden Ave.	720	100.0	6.5-7.3	100.0	6.6-7.7	100.0	7.4
Des Plaines River at Material Service Rd.	No Data						
Salt Creek at Busse Lake Dam	No Data						
Salt Creek at J. F. Kennedy Blvd.	589	100.0	4.6-6.2	100.0	4.6-6.4	100.0	7.0
Salt Creek at Thorndale Ave.	631	100.0	4.6-6.1	100.0	4.6-6.1	100.0	7.4
Salt Creek at Wolf Rd.	719	100.0	5.2-6.7	100.0	5.2-7.1	100.0	6.8
Grand Calumet River at Hohman Ave.	553	29.8	0.5-1.9	0.0	0.4-1.9	0.0	2.5
Little Calumet River at Ashland Ave.	720	53.5	2.6-3.3	0.0	2.7-3.3	0.0	3.7
Little Calumet River at Wentworth Ave.	720	67.8	2.6-3.4	0.0	2.7-3.5	0.0	4.4

EXHIBIT 3B

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DETERMINATION OF COMPLIANCE WITH PROPOSED DO STANDARDS AT SELECTED LOCATIONS IN SHALLOW-DRAFT REACHES OF GENERAL USE WATERS FROM JULY 1 THROUGH JULY 31, 2006 USING TWO METHODS TO CALCULATE AVERAGES OF 7-DAY DAILY MINIMA

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	Running Averages of Daily Means		Weekly Averages of Daily Means	
			7-Day Average of Daily Mean	Percent of 7-Day Daily Mean ≥ 6.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Daily Mean ≥ 6.0 mg/L
North Branch Chicago River at Central Park Ave.	744	57.7	5.1	0.0	5.2	0.0
Des Plaines River at Devon Ave.	744	18.8	3.9	0.0	3.9	0.0
Des Plaines River at Irving Park Rd.	744	25.3	4.3	0.0	4.2	0.0
Des Plaines River at Ogden Ave.	744	99.9	6.6	100.0	6.6	100.0
Des Plaines River at Material Service Rd.	635	92.6	8.1	100.0	7.9	100.0
Salt Creek at Busse Lake Dam	744	97.0	7.3	100.0	7.1	100.0
Salt Creek at J. F. Kennedy Blvd.	744	100.0	7.1	100.0	6.9	100.0
Salt Creek at Thorndale Ave.	743	92.7	6.9	100.0	6.8	100.0
Salt Creek at Wolf Rd.	590	62.7	5.6	21.1	5.6	25.0
Grand Calumet River at Hohman Ave.	744	8.6	2.1	0.0	1.9	0.0
Little Calumet River at Ashland Ave.	744	8.9	4.1	0.0	4.1	0.0
Little Calumet River at Wentworth Ave.	744	19.1	4.2	0.0	4.0	0.0

EXHIBIT 4A

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DETERMINATION OF COMPLIANCE WITH PROPOSED DO STANDARDS AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM SEPTEMBER 1 THROUGH SEPTEMBER 30, 2005 USING TWO METHODS TO CALCULATE AVERAGES OF 7-DAY DAILY MINIMA

Location	Number of Observations	Percent of Concentration ≥ 3.5 mg/L	Running Averages of Daily Minima		Weekly Averages of Daily Minima		30-Day Average of Daily Mean
			Range of Daily Minima	Percent of 7-Day Daily Minima ≥ 4.0 mg/L	Range of Daily Minima	Percent of 7-Day Daily Minima ≥ 4.0 mg/L	
North Shore Channel at Main St.	586	100.0	6.2-7.4	100.0	6.4-7.5	100.0	7.5
North Shore Channel at Foster Ave.	718	99.7	5.0-6.1	100.0	5.3-6.1	100.0	6.6
North Branch Chicago River at Addison St.	720	99.7	4.7-5.8	100.0	4.9-5.9	100.0	6.2
North Branch Chicago River at Fullerton Ave.	720	98.9	4.5-5.4	100.0	4.6-5.5	100.0	5.6
North Branch Chicago River at Kinzie St.	720	99.6	4.6-5.1	100.0	4.8-5.1	100.0	5.6
Chicago River at Clark St.	719	100.0	7.4-7.9	100.0	7.4-8.1	100.0	7.9
South Branch Chicago River at Loomis St.	720	100.0	6.2-6.9	100.0	6.4-7.0	100.0	6.9
Bubbly Creek at 36th St.	720	81.3	2.3-4.4	33.3	2.3-4.8	40.0	4.3
Bubbly Creek at Interstate Highway 55	720	100.0	5.2-6.0	100.0	5.2-6.4	100.0	6.1
Chicago Sanitary & Ship Canal at Cicero Ave.	720	100.0	5.4-6.1	100.0	5.5-6.41	100.0	6.1
Chicago Sanitary & Ship Canal at B&O Central R.R.	548	100.0	5.3-5.7	100.0	5.4-5.8	100.0	5.9
Chicago Sanitary & Ship Canal at Route 83	528	99.4	4.0-5.4	100.0	4.1-5.3	100.0	5.1
Chicago Sanitary & Ship Canal at Lockport Powerhouse	720	100.0	4.4-5.1	100.0	4.5-5.1	100.0	4.9
Des Plaines River at Jefferson St.	682	100.0	4.5-4.9	100.0	4.6-5.1	100.0	5.1
Calumet-Sag Channel at Cicero Ave.	719	100.0	5.5-6.2	100.0	5.5-6.7	100.0	6.5
Calumet-Sag Channel at 104th Ave.	719	100.0	4.7-6.4	100.0	4.7-63	100.0	6.1
Calumet-Sag Channel at Route 83	719	100.0	4.7-6.1	100.0	4.7-6.1	100.0	5.9
Grand Calumet River at Torrence Ave.	565	87.1	2.7-4.4	22.2	2.9-4.2	25.0	6.0
Little Calumet River at C&W Indiana R.R.	719	100.0	6.7-7.4	100.0	6.8-7.6	100.0	7.6
Little Calumet River at Halsted St.	720	100.0	6.0-6.6	100.0	6.1-7.0	100.0	7.0

EXHIBIT 4B

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

DETERMINATION OF COMPLIANCE WITH PROPOSED DO STANDARDS AT SELECTED LOCATIONS IN DEEP-DRAFT REACHES OF CHICAGO AREA WATERWAYS FROM JULY 1 THROUGH JULY 31, 2006 USING TWO METHODS TO CALCULATE AVERAGES OF 7-DAY DAILY MEANS

Location	Number of Observations	Percent of Concentration ≥ 5.0 mg/L	Running Averages of Daily Means		Weekly Averages of Daily Means	
			7-Day Average of Daily Mean	Percent of 7-Day Daily Mean ≥ 6.0 mg/L	7-Day Average of Daily Mean	Percent of 7-Day Daily Mean ≥ 6.0 mg/L
North Shore Channel at Main St.	576	99.8	7.3	100.0	7.4	100.0
North Shore Channel at Foster Ave.	744	100.0	7.3	100.0	7.2	100.0
North Branch Chicago River at Addison St.	744	99.2	6.5	100.0	6.3	100.0
North Branch Chicago River at Fullerton Ave.	743	84.9	5.6	0.0	5.5	0.0
North Branch Chicago River at Kinzie St.	744	84.8	5.6	0.0	5.6	0.0
Chicago River at Clark St.	587	100.0	8.3	100.0	8.2	100.0
South Branch Chicago River at Loomis St.	744	96.1	6.3	72.0	6.4	80.0
Bubbly Creek at 36th St.	601	11.1	2.3	0.0	2.4	0.0
Bubbly Creek at Interstate Highway 55	743	56.9	4.7	28.0	4.9	20.0
Chicago Sanitary & Ship Canal at Cicero Ave.	575	91.3	5.7	10.5	6.1	25.0
Chicago Sanitary & Ship Canal at B&O Central R.R.	744	84.5	5.5	20.0	5.6	20.0
Chicago Sanitary & Ship Canal at Route 83	600	18.3	3.4	0.0	3.6	0.0
Chicago Sanitary & Ship Canal at Lockport Powerhouse	744	11.0	3.7	0.0	3.9	0.0
Des Plaines River at Jefferson St.	744	36.0	4.7	0.0	4.8	0.0
Calumet-Sag Channel at Cicero Ave.	744	74.9	5.9	48.0	5.9	40.0
Calumet-Sag Channel at 104th Ave.	612	65.8	5.6	40.0	5.6	50.0
Calumet-Sag Channel at Route 83	744	78.2	5.7	32.0	5.8	20.0
Grand Calumet River at Torrence Ave.	601	34.9	4.5	0.0	4.7	0.0
Little Calumet River at C&W Indiana R.R.	574	93.4	6.7	100.0	7.0	100.0
Little Calumet River at Halsted St.	743	97.7	6.5	76.0	6.8	80.0