Illinois Department of Natural Resources
Office of Water Resources

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ILLINOIS' COMPLIANCE WITH THE U.S. SUPREME COURT DECREE AND LAKE MICHIGAN ALLOCATION

Compliance with the United States Supreme Court Decree

The good news continues concerning Illinois' ongoing efforts to return to full compliance with the U.S. Supreme Court Decree (Decree). The U.S. Army Corps of Engineers has recently certified flows of Illinois' diversion of water from Lake Michigan for Water Years 2002 and 2003. Diversion in Water Year 2002 was 2919 cubic feet per second (cfs), which is 281 cfs below the annual limit of 3200 cfs. In Water Year 2003, Illinois diversion was 2398 cfs, which is 802 cfs below the annual limit! Water Year 2003 set a record for the lowest recorded diversion. As a result, at the end of the 2003 accounting year Illinois' water debt has been reduced to just 776 cfs-years. This is great news, and continues our trend of reducing our water debt much faster than originally anticipated. Ten years ago Illinois' water debt stood at a whooping 3725 cfs-years. Illinois' commitment to the other Great Lakes states was that we would eliminate that water debt by the end of water year 2019. While unofficial, the preliminary estimates of Illinois' diversion for Water Years 2004, 2005 and 2006 are all well below the 3200 cfs limit. We expect that when the Corps of Engineers release the Diversion Accounting Report for Water Years 2004 and 2005 (sometime late next fall) they will certify that Illinois has fully repaid its water debt!

Eliminating our water debt is significant for several reasons. First, it means that we are in full compliance with the U.S. Supreme Court Decree, reducing the potential for conflict with our neighboring Great Lakes states. Second, since our diversion is strongly influenced by climatic conditions, such as rainfall and water levels on Lake Michigan, it is good policy to have a cushion, i.e., a positive water balance account, to enable us to weather those times when these climatic factors will cause our diversion to be higher. Lastly, and perhaps of most importance to those who depend on Lake Michigan as a water supply, it increases our confidence that we will be able to meet the water demands of the Lake Michigan water service area into the future while staying within the constraints of the Supreme Court Decree.

With the current interest in water supply issues in northeastern Illinois, a fundamental question is whether the State can accommodate new requests for Lake Michigan water and, if so, how much? This is a complicated question and requires a look back as well as forward. Largely as a result of the mediation process initiated in 1994 with the other Great Lakes states in response to the water debt Illinois was accumulating, the perception was that Illinois had reached, and in fact exceeded, its limit under the Decree, and therefore Lake Michigan water could not be counted on to meet growing demand for water supply in northeastern Illinois. It

is important to note that the Department of Natural Resources (IDNR) never issued such a finding.

Domestic Allocation Review

Since the IDNR's last comprehensive Lake Michigan water reallocation in 1999, the Department has issued nine new Lake Michigan water allocation permits with a combined WY2020 allocation of around 16 million gallons per day (mgd). Two of the new allocations (to the Village of Plainfield and Shorewood), represents a new geographic area of Lake Michigan water supply, while the others represent allocations to areas already within the established Lake Michigan water service area.

Offsetting that expected 16 mgd increase in demand are nine permittees who have not utilized their allocations, with a combined WY2020 allocation of around 14 mgd. These permittees will be contacted to determine whether they plan to utilize their allocation. Revocation hearings will be scheduled for those who no longer intend to use Lake Michigan water.

Over the last six years, actual total domestic use of Lake Michigan water has averaged 181 mgd below the amounts allocated. In WY2005 the difference was 206 mgd. The primary reason for this difference is water use in Chicago, which has averaged 120 mgd less than their allocation over the last six years. Chicago's use in 1991 was 800 mgd, in 2005 it was 583 mgd, a reduction of 217 mgd.

It is significant that actual Lake Michigan water use has been well below water allocations. Since total domestic use accounts for approximately 50% of Illinois' total allowable diversion (the other components are direct diversion into the Chicago Sanitary and Ship Canal and stormwater runoff from the diverted watershed), it is a major factor in determining Illinois' diversion and is a primary factor in helping Illinois to return to full compliance with the Decree.

A Look Ahead

In 2003 the Northeastern Illinois Planning Commission (NIPC) released their regional forecasts of population, households and employment for the year 2030. Over the years IDNR has relied on NIPC's forecasts as a primary component in the water demand forecasting methodology, which allows for long term water allocations. Table 5 was developed from NIPC data to show how much of the future projected population growth in the region will occur in areas currently served with Lake Michigan water. Table 5 provides a rough estimate, which will be refined in subsequent water demand studies by the Department.

Between 2000 and 2030 NIPC has forecasted that the six county N.E. Illinois area will be home to an additional 1.94 million people (from 8,091,720 in 2000 to 10,034,835 in 2030). Many people have assumed that the majority of this growth will be located in the far outlying, rapidly growing suburban fringe areas. But Table 5 reveals that around 1.16 million (60%) of the 1.94 million will be located in areas that currently receive Lake Michigan water.

IDNR's long standing water allocation policy has been to provide adequate allocations to meet the current and long term needs of existing permittees. However, the question remains whether this forecasted growth can be accommodated within the constraints of the Decree.

Although the diversion for Water Years 2004-2006 are still rough estimates, over the past nine years (1998-2006), Illinois' diversion has averaged around 2,739 cfs, which is 461 cfs less than the 3,200 cfs legal limit. 461 cfs equates to 298 mgd. The expected additional 1.16 million residents in the Lake Michigan service area will be added incrementally over the next 25 years, with an ending water demand of around 145 mgd, based on an expected per capita consumption of 125 gallons per capita per day (gpcd). On paper, at least, it appears that this additional growth can be accommodated, if diversion in the future is similar to what has occurred in the recent past. That however, is an assumption that has a fair degree of uncertainty, given the large variation that can occur with the components of Illinois' diversion known as direct diversion and stormwater runoff.

Direct Diversion

Direct diversion of Lake Michigan water into the Chicago Sanitary and Ship Canal occurs due to the operation of the Chicago River Lock and the O'Brien Lock on the Calumet River (lockage), to the operation of the Chicago waterway system for flood control (navigation make-up), to maintain the waterways in a reasonably satisfactory sanitary condition (discretionary diversion) and leakage that occurs through the structures (locks, sluice gates, retaining walls) that separate the Lake from the waterway.

In WY2000 IDNR revised the allocation to the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Their allocations for lockage and leakage were removed since these diversion components are no longer under their direct control, and their allocations for discretionary diversion and navigation make-up water were revised. Discretionary diversion was set at 270 cfs through WY2014 (prior to WY2000 it was set at 320 cfs), then is reduced to 101 cfs in WY2015 and thereafter. This reduction (from 270 cfs to 101 cfs, a reduction of 169 cfs, or 109 mgd) recognizes that TARP Phase II should be operational by then. The navigation make-up allocation was set at 35 cfs through 2020. MWRDGC is allowed to bank unused water from both categories over a five year running average to assist them in proper operation of the canal system. Currently their five year running average is 307 cfs, which is 2 cfs over the combined allocation limit of 305 cfs.

It is unclear whether TARP Phase II will be finished on schedule. The construction of this multi-billion dollar project is largely funded by the Federal government, and funding levels have been lagging behind requested amounts. The purpose of the discretionary diversion allocation is to allow the MWRDGC to divert Lake Michigan water directly into the Chicago Waterway system at the three lakefront locations during the summer months in order to improve water quality. The primary concern is to keep dissolved oxygen levels above standards and to assist in moving water down the system to the Des Plaines River. When completed, TARP is supposed to improve conditions by eliminating all combined sewer overflows, which would in turn, reduce the need to flush the waterway with Lake Michigan water.

Navigation make-up water is water diverted in the Chicago waterway system to maintain adequate depths required for safe navigation. During forecasted storm events, the water level in the canal system is drawn down as a flood control measure, and depending on whether the Chicago area receives the forecasted rainfall there may be a need for a navigation make-up diversion. Over the last several years the IDNR has been working with the Corps of Engineers to study ways of potentially reducing this component of diversion. This is a complicated issue, since minimum water levels in the canal system are specified in the Code of Federal Regulations. Any change in the Code that would allow a smaller diversion for this flow component must be supported by a detailed Environmental Impact Analysis. While this effort is being pursued, it is expected to be a lengthy process.

As mentioned earlier, MWRDGC no longer holds an allocation for lockage or leakage through lakefront controlling structures since both locks are managed and regulated by the Corps of Engineers. This diversion is dependant on the number of lockages in a given year and on Lake Michigan water levels. Federal navigation policy is that they operate the locks on demand, which means that a vessel is allowed to lock through even if they are the only vessel. The Chicago River lock is the second busiest lock in the country, and O'Brien lock is also in the top ten. Since lake levels have been well below average the last few years, this component of diversion has also been well below the long tern average estimate of 130 cfs. Estimating this component of diversion in the future is very difficult since it is very dependent on Lake Michigan water levels.

Historically, leakage flows have fluctuated considerably, based on lake levels and also on the conditions of structures (locks, sluice gates and retaining walls) that separate the lake from the river. Most of these structures are operated and maintained by the Corps, which is why MWRDGC no longer has an allocation for leakage. The structures that are not under Corps control include the new Chicago River Turning Basin Wall, which the State built in 1999, and the structures at Wilmette Harbor (one sluice gate and a pump house). Leakage was excessive in the early 1990's due to high water levels on Lake Michigan and bad seals on the Chicago River lock gates. At that time it was estimated that leakage through the Chicago River lock was in the range of 300 cfs, and was a significant contributor to Illinois excessive diversion. The Chicago River lock has exceeded its design life and is in need of a major rehabilitation. The Corps has prepared plans for this but has not been able to receive authority to begin this project from Congress. Fortunately with below average lake levels, this problem has been minimized; however it could again become a significant diversion management problem if lake levels rise. For the last several years the Illinois Governor's testimony on the Corps budget has supported an appropriation for this project.

Stormwater Runoff

The last component of Illinois' diversion is stormwater runoff from the 673 square mile diverted watershed. This component of diversion cannot be measured directly, and varies considerably depending on the frequency and magnitude of storm events in the Chicago metro region. The Corps uses complicated hydrologic simulation models to estimate this component of flow and, during the mediation in 1996, estimated the long term average stormwater runoff

to be 800 cfs. This is approximately 25% of Illinois' allowable diversion, and is another component of diversion over which the State has no control. It is a flow component which has increased dramatically over the century, due to continued urbanization in the watershed and to the documented increases in both frequency and magnitude of precipitation events. Based on Corps' Diversion Accounting Reports, from 1986-2003, an 18 year period, reported stormwater runoff has averaged 835 cfs. The Corps' technical committee has raised questions regarding whether 800 cfs is the best estimate to use for a long term average, and is one of the reasons why moving to lakefront diversion accounting has been resisted by the State. While it remains to be seen if future years will result in a running average stormwater runoff figure closer to the simulated long term average of 800 cfs, the current estimated 18 year average of 35 cfs over the long term average can account for 630 cfs-years of Illinois' accumulated water debt.

Additional Issues

Five years ago there was concern that there might be 10-12 proposals for new natural gas fired power plants within the Lake Michigan water service area, with the potential for significant water use. In November 2003, a new Lake Michigan water allocation was issued for a proposed natural gas power plant at the old U. S. Steel South Works site, but IDNR has recently been informed that the project has been cancelled. Given the current price of natural gas, it now appears that no new natural gas fired power plants will be constructed. Currently, proposals for ethanol plants are popping up throughout Illinois, but to date none have been proposed within the current Lake Michigan water service area.

Finally, there has been a growing interest in exploring the issues associated with the ecological separation of the Lake Michigan and Des Plaines watersheds to provide a 100% effective barrier against the exchange of aquatic invasive species. The Alliance for the Great Lakes has received funding from the Great Lakes Fisheries Commission, the Great Lakes Fisheries Trust and the International Joint Commission to conduct a preliminary scoping study. While ecological separation can imply a number of potential control options such as a chemical barrier or creating a dead zone in a portion of the Chicago waterway, in all probability this study will focus on hydrologic separation of the two watersheds. Depending on where in the waterway a separation control structure/s is/are proposed, this could impact on the measurement and determination of Illinois' diversion. While this study may be a catalyst for further action, it will not eliminate the need for Congress to fund much more detailed studies by a consortium of Federal agencies, which could easily take ten years and $20-30 million to complete.

Concluding Thoughts

Where five years ago there was significant uncertainty about Illinois' ability to return to full compliance with the Decree, today there is reason to be optimistic. It is likely that the Corps' Diversion Accounting Report for Water Year 2005 will show that Illinois has repaid its water debt and is now in full compliance with the Decree. Based on current conditions it is likely that Illinois will be able to remain in compliance with the Decree for the foreseeable future. The ongoing Lake Michigan water reallocation will extend Lake Michigan water allocations

for all current water supply permittees out to the year 2030, and the Department expects to have the ability to allocate sufficient Lake Michigan water to meet the future needs within the current Lake Michigan water service area.

Current Lake Michigan water allocation policy requires that new applicants for Lake Michigan water demonstrate that switching over to Lake Michigan water will be the most cost effective long-term water supply and/or that switching over to Lake Michigan water will reduce withdrawals from the deep bedrock aquifer. Looking back over the last 25 years, those criteria have served to provide Lake Michigan water to new areas that truly are in need of a long term reliable supply of water, in a careful and hopefully sustainable manner.