

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:)
)
WATER QUALITY STANDARDS AND)
EFFLUENT LIMITATIONS FOR THE) R08-9
CHICAGO AREA WATERWAY SYSTEM) (Rulemaking - Water)
AND THE LOWER DES PLAINES RIVER:)
PROPOSED AMENDMENTS TO 35 Ill.)
Adm. Code Parts 301, 302, 303 and 304)

PRE-FILED TESTIMONY OF THOMAS E. KUNETZ, P. E.

Capital Improvements Program

Introduction

My name is Thomas E. Kunetz. I am the Assistant Chief Engineer in charge of the Process Facilities Division of the Engineering Department of the Metropolitan Water Reclamation District of Greater Chicago (District). I have been in my current position since 2005, and have been employed in various engineering positions with the District since 1992. I hold a BS degree in Environmental Engineering from the Pennsylvania State University, and an MS degree in Water Resources Engineering from Villanova University. I am a registered Professional Engineer in the states of Illinois, Pennsylvania, and New Jersey, and have 23 years of experience in the field of wastewater engineering. In my current position, I am in charge of the production of contract documents for the upgrade, rehabilitation, and expansion of the District's seven water reclamation plants and outlying facilities.

The purpose of this testimony is to briefly explain the program through which the District identifies, plans for, and allocates funds for the capital improvements projects necessary to repair, rehabilitate, replace, and expand the infrastructure of the District's water reclamation plants (WRP). The costs that are presented herein represent the baseline financial obligations of the District that are necessary to keep the water reclamation plants functioning under the current

regulatory framework through the year 2040 planning horizon. Costs for infrastructure that would be required to comply with new regulatory standards must be recognized to be above and beyond the baseline obligations. It should also be understood that the costs presented in this testimony are for capital projects, and as such, are in addition to costs incurred by the District on an annual basis to operate and maintain the water reclamation plants. The costs presented do not include engineering design fees, outlying District facilities, intercepting sewer projects, or TARP projects.

Capital Improvements Program

The District owns and operates seven water reclamation plants to serve the greater Chicago area. In order to provide continuous service, maintain water reclamation plant efficiency, and ensure that each water reclamation plant meets the requirements of the National Pollutant Discharge Elimination System (NPDES) operating permits and other regulatory requirements, the infrastructure within the water reclamation plants must be properly maintained. The District has a Capital Improvement Program (CIP) to identify and implement projects necessary to meet these needs. Projects are identified for inclusion in the CIP in one of two ways: through recommendations as a result of facility planning studies, or through requests by the Maintenance and Operations Department, based on internal investigations and inspections.

Beginning in the year 2000, the District initiated the Infrastructure and Process Needs Feasibility Study process. The purpose of the Infrastructure and Process Needs Feasibility Study is to identify, evaluate and prioritize capital improvements projects necessary to update processes to current technology, to improve treatment efficiency, reduce maintenance and operation costs, and reduce energy consumption at each water reclamation plant while continuing to produce exceptional quality effluent through the year 2040 planning horizon. The year 2040 was chosen as the planning horizon for the first three studies, as this year was 40 years into the future when

the process started for the first study. One of the significant products of the Infrastructure and Process Needs Feasibility Study is a Master Plan. The Master Plan is a “road map” to the future, a plan that identifies and prioritizes the major projects that need to be implemented to achieve the established goals for the plant through 2040.

The need for these studies was driven by the age of the District’s largest facilities. The Stickney, Calumet, and North Side WRPs are among the very first secondary treatment facilities in the country. Some of the infrastructure and processes at these plants were constructed in the 1920s and 1930s. Attachment 9 of the pre-filed testimony of Richard Lanyon presents a timeline depicting the very early commitment of the District to the construction and continuous upgrading of these water reclamation plants. Currently, Master Plans have been completed for Stickney, Calumet and North Side WRPs, while the Infrastructure and Process Needs Feasibility Study has just started for the Hanover Park WRP.

Objectives of the Infrastructure and Process Needs Feasibility Study

The main objectives of the Infrastructure and Process Needs Feasibility Study are as follows:

- Assess Future Flows and Pollutant Loadings
- Maintain Treatment Capacity through Year 2040
- Replace/Upgrade Undersized or Underperforming Unit Processes
- Evaluate Opportunities for Process Changes
- Prepare to Respond to Potential Changes in Regulations
- Standardization Between Plants Where Practical

The process proceeds in a systematic manner, starting with an initial assessment of the existing plant to identify areas of concern, focusing on process objectives, and aging infrastructure. Projections are made for anticipated future flows and loads to the treatment plant. These are based on population and industrial growth projections to the planning horizon, which

was chosen as the year 2040 for these studies. Next, a computer model of the plant is created to be used as a tool in evaluating current process efficiencies, and the impact of potential future modifications. Each of the process areas of the plant are evaluated on its ability to meet the demands of the year 2040 projected conditions. Recommended solutions are evaluated on a plant-wide basis to determine the impacts of interrelated process areas. Finally, a Master Plan is developed which establishes a prioritized list of projects which are necessary to implement in order for the water reclamation plants to continue to produce exceptional quality effluent through the year 2040 planning horizon.

Stickney WRP Master Plan

The Master Plan for the Stickney Water Reclamation Plant was completed in 2005. The Master Plan projects for the Stickney WRP are listed in Attachment 1. Significant recommended projects include:

- Construction of new sludge thickening tanks to take the place of existing, undersized, overloaded sludge concentration tanks, and replacement of the aging pre-digestion centrifuges (\$173,000,000)
- Elimination of the existing inefficient skimming tanks at the West Side area and replacement with new aerated grit tanks (\$130,000,000)
- Demolition of three existing batteries of outdated Imhoff tanks in the West Side area and replacement with two batteries of modern circular primary settling tanks (\$188,000,000)
- Construction of new circular primary settling tanks at the Southwest Area to replace aging rectangular preliminary settling tanks (\$130,000,000)

The total cost of the identified Master Plan projects for the Stickney WRP is \$890,700,000. Several of these projects are under design and will be awarded for construction starting in 2009.

Calumet WRP Master Plan

The Master Plan for Calumet WRP was completed in 2006. The Master Plan projects for the Calumet WRP are listed in Attachment 2. Significant projects include:

- New Influent Pumping Station to replace the existing pumping station to handle higher peak flows (\$120,890,000)
- New primary circular settling tanks replacing overloaded aging rectangular tanks, and grit separation and dewatering facilities replacing undersized grit tanks (\$244,600,000)
- New Aeration Battery D (\$100,000,000)

The total cost of the identified Master Plan projects for the Calumet WRP is \$530,490,000. One of these projects has already been completed (Site Improvements and Preparation for Construction Traffic), and several other projects are already under construction.

North Side WRP Master Plan

The Master Plan for Calumet WRP was completed in 2007. The Master Plan projects for the North Side WRP are listed in Attachment 3. Significant projects include:

- A new battery, Battery E, comprised of primary settling tanks, aeration tanks, and final settling tanks (\$315,000,000)
- New Aeration Battery F (\$179,000,000)
- Demolition of existing undersized final settling tanks and construction of new larger primary settling tanks for Batteries A, B, and C (\$219,000,000)

The total cost of the identified Master Plan projects for the North Side WRP is \$990,480,000. The design of new Battery E is currently underway.

Non-Master Plan Projects

The District's Maintenance and Operations Department and the Engineering Department meet on an annual basis to discuss capital projects that have been identified by either department as being necessary for the continued operation of all seven of the water reclamation plants. The Maintenance and Operations Department justifies and prioritizes the project needs. The

Engineering Department organizes the specific requests into projects, creates project numbers for each project and adds the project to the Engineering Department's project design schedule. Authority is requested from the Board of Commissioners to add new projects to the Capital Improvements Program under either the Corporate Fund, Construction Fund, or Capital Improvements Bond Fund. The projects remain on the design schedule until they are awarded for construction.

For financial planning purposes, the Engineering Department maintains a 10-year forecast of capital projects. The 10-year forecast varies throughout the year, as projects are awarded, new projects are added, and project schedules are adjusted. As of the date of this testimony, 34 capital improvements projects for the seven water reclamation plants, that are not considered "Master Plan Projects," have been awarded for construction in 2008 or are scheduled for award in 2008 or later. These projects are listed in Attachment 4 and total \$407,800,000.

Conclusion

The District maintains a Capital Improvements Program to identify, plan for, and allocate funds for the projects necessary to repair, rehabilitate, replace, and expand the infrastructure of the water reclamation plants. Project needs are identified through facility planning studies, which are put into a Master Plan, or on a routine basis by District staff. The total projected estimated capital cost for the Master Plan projects at the District's three largest plants is \$2,411,670,000. These costs do not include potential project costs for future Master Plan projects at the Egan, Kirie, and Hanover Park water reclamation plants for which Master Plans as of yet have not been developed. The total projected estimated capital cost for non-master plan capital projects at all seven water reclamation plants is \$407,800,000. The sum of the above costs is \$2,819,470,000. This represents the baseline financial obligations of the District necessary to keep the water reclamation plants functioning under the current regulatory framework through the year 2040

planning horizon. Costs for infrastructure that would be required to comply with new regulatory standards would be above and beyond this baseline.

Failure to accomplish these capital improvements projects will jeopardize the District's water reclamation plants' ability to continue to produce exceptional quality wastewater, will potentially impede the water reclamation plants' ability to meet the existing NPDES permit effluent discharge limitations as flows and loads increase, and will allow aging infrastructure to further degrade to the point that it is beyond reasonable repair or use.

Respectfully submitted,

Thomas E. Kunez

By: *Thomas E. Kunez*

Testimony Attachments

1. Master Plan Projects for Stickney Water Reclamation Plant (2008 dollars)
2. Master Plan Projects for Calumet Water Reclamation Plant (2008 dollars)
3. Master Plan Projects for North Side Water Reclamation Plant (2008 dollars)
4. Non-Master Plan Projects for All District Water Reclamation Plants (2008 dollars)

Attachment 1
Master Plan Projects for Stickney Water Reclamation Plant (2008 dollars)

<u>Project</u>	<u>Estimated Construction Cost</u>	<u>Estimated Contract Award</u>
Process Air and Central Blower Project	\$5,000,000	2006*
New Sludge Thickening Facilities	\$173,700,000	2009
Westside Imhoff Battery A and Skimming Tank Demolition	\$30,000,000	2009
Westside Primary Settling Tanks – Battery A Imhoff Replacement	\$150,000,000	2010
Westside Grit Handling Improvements	\$130,000,000	2010
Westside Primary Settling Tanks – Battery B Imhoff Replacement	\$108,000,000	2014
Low-pressure Gas Storage for Pressure Equalization	\$10,000,000	2010
Improvements to Gas Transmission Piping, Gas Conditioning, and Air Intake to Turbine	\$4,000,000	2010
Gas Drawoff Modifications & Collection Header Relief Line	\$3,000,000	2014
Southwest Screens Handling Equipment	\$5,000,000	2011
Digester Upgrades for Class A Biosolids	\$25,000,000	2014
West Side Fine Screen Replacement	\$15,000,000	2014
Westside Pump Meter Upgrades	\$2,000,000	2014
New Southwest Primary Tanks	\$130,000,000	2016
Westside Pump Station Replacement	\$100,000,000	2020
Total:	\$890,700,000	

*Project is under construction

Attachment 2
Master Plan Projects for Calumet Water Reclamation Plant (2008 dollars)

<u>Project</u>	<u>Estimated Construction Cost</u>	<u>Estimated Contract Award</u>
Site Improvements and Preparation for Construction Traffic	\$3,000,000	2004*
Central Heating Facility	\$23,000,000	2005*
New High Level Influent Pumping Station, and Low Level Pumping Station Modifications	\$120,890,000	2006*
Blowers Nos. 9 & 10 and Air Main Installation	\$15,000,000	2009
Sludge Thickening Improvements	\$9,000,000	2009
Primary Settling Tanks and Grit Removal Facilities	\$244,600,000	2008
Digester Upgrades for Class A Biosolids	\$30,000,000	2014
Selector Zones	\$9,000,000	2012
New Aeration Battery D	\$76,000,000	2020
Total:	\$530,490,000	

*Project is under construction or completed

Attachment 3
Master Plan Projects for North Side Water Reclamation Plant (2008 dollars)

<u>Project</u>	<u>Estimated Construction Cost</u>	<u>Estimated Contract Award</u>
Master Underground Piping Plan	\$980,000	2007*
Sludge Pipeline Condition Assessment	\$1,500,000	2008
Aeration Blower Upgrades and Raw Sewage Pump Upgrades	\$42,000,000	2010
Conduit to Battery E and Intermediate Pumping Station	\$64,000,000	2011
Battery E	\$318,000,000	2011
Sludge Concentration Tank Improvements	\$18,000,000	2012
Grit Dewatering Modification and Sodium Hypochlorite Feed System Modifications	\$5,000,000	2012
New Battery F	\$179,000,000	2014
Addition of New South Primary Settling Tanks and Primary Influent Distribution	\$44,000,000	2016
Demolition of Square Primary Settling Tanks; Addition of New North Primary Settling Tanks; and Plant Drain Improvements	\$30,000,000	2018
Battery C Final Settling Tank Replacement, Air Distribution and other Improvements	\$87,000,000	2019
Battery B Final Settling Tank Replacement, Air Distribution and other Improvements	\$87,000,000	2023
Battery A Final Settling Tank Replacement, Air Distribution and other Improvements,	\$87,000,000	2027
Battery D Air Distribution Improvements	\$17,000,000	2028
Coarse Screen Replacement	\$8,000,000	2028
Sub-metering and Electrical Needs	\$2,000,000	2028
Total:	\$990,480,000	

*Project is under design

Attachment 4

Non-Master Plan Projects for All District Water Reclamation Plants (2008 dollars)

<u>Project</u>	<u>Estimated Construction Cost</u>	<u>Estimated Contract Award</u>
Distributed Control System for Solids Processes at SWRP	\$20,000,000	2008
Electrical Distribution Improvements, NSA	\$2,550,000	2008*
Aeration Batteries A, B, C, E1, & E2 Improvements, CWRP	\$13,111,000	2008*
Diffuser Plate Replacement - Batteries C & D, SWRP	\$8,000,000	2008
R & D Building HVAC Improvements, SWRP	\$5,000,000	2008
4160 V Switchgear, Motor Control Centers, Raw Sewage Pumps, Motors & Drives Replacement, EWRP	\$9,000,000	2008
Drain Valves at Scum Concentration & Post Bldg. and Support Structures at Grit Tanks Replacement, SWRP	\$4,250,000	2008
E1/W1 Pump Modification at Calumet TARP Pump Station, CSA	\$19,000,000	2009
Electrical Distribution System and Conduit and Cable Replacement, SSA	\$8,750,000	2008
Demolition of Sludge Disposal Building, Rehabilitation of Pump & Blower House & Coarse Screen Building, SWRP	\$3,946,000	2008
Electrical Distribution System and Conduit and Cable Replacement, SSA	\$2,000,000	2008
HVAC Improvements, SWRP	\$5,000,000	2009
Underground Potable and Effluent Water Piping Upgrades, NSWRP	\$1,000,000	2009
C/D Service Tunnel and Connecting Tunnel Rehabilitation- Phase 2, SWRP	\$3,500,000	2009
C/D Service Tunnel Rehabilitation Phase 1, SWRP	\$5,200,000	2009

Attachment 4, continued

<u>Project</u>	<u>Estimated Construction Cost</u>	<u>Estimated Contract Award</u>
Aeration Tanks Rehabilitation & Diffuser Plates Replacement, EWRP, KWRP	\$8,000,000	2009
M&O Construction and Police Office Improvements, CWRP, SWRP	\$5,355,000	2009
Office, Shop & Storage Facility Service Tunnel Rehabilitation and Paving of B&F Streets, SWRP	\$5,000,000	2009
Centrifuge Building & Study & Loading System Upgrades, EWRP	\$4,000,000	2009
DCS and Electrical Work HPWRP, KWRP, EWRP	\$2,000,000	2009
Electrical Upgrades, CWRP, CSA	\$3,500,000	2009
A/B Service Tunnel Rehabilitation - Phase 3, SWRP	\$2,500,000	2010
Pumping Station, LWRP	\$81,000,000	2010
Storage Building, NSWRP	\$4,210,000	2010
Wet Weather Equalization Pond, EWRP	\$20,000,000	2010
Plant Process Computer - D, SWRP	\$17,500,000	2010
Final Clarifier Collectors Replacement at Batteries A, B & C, SWRP	\$13,900,000	2010
Digester Facility Improvements, HPWRP	\$4,000,000	2010
Lining of Lagoons 3 and 4, CWRP	\$10,028,000	2010
A/B & C/D Service Tunnels Rehabilitation - Phase 4, SWRP	\$3,500,000	2011
Battery D Air Diffuser System Replacement, NSWRP	\$6,000,000	2011

<u>Project</u>	<u>Estimated Construction Cost</u>	<u>Estimated Contract Award</u>
Retention Pond Deepening Lining Modification, HPWRP	\$19,000,000	2011
R & D Laboratory Facility, SWRP	\$80,000,000	2011
Lagoons 14 &15 Lining, CWRP	\$10,000,000	2012
Total:	\$407,800,000	

*Project is under construction