

Appendix A

EVALUATION OF CAPTURING AND TREATING ADDITIONAL COMBINED SEWER OVERFLOW AT THE NEWPCP

And

PADEP Response

NORTHEAST WATER POLLUTION CONTROL PLANT (NEWPCP)

COMPLIANCE WITH NPDES PERMIT NO. PA0026689, PART C, NUMBER 28, III (B)(4)

EVALUATION OF CAPTURING AND TREATING ADDITIONAL COMBINED SEWER OVERFLOW AT THE NEWPCP

The City of Philadelphia's Northeast Water Pollution Control Plant (NEWPCP), pursuant to its NPDES permit, No. PA0026689, effective September 1, 2007, was required to investigate and determine the effectiveness and feasibility of capturing and treating an additional 100 million gallons of Combined Sewer Overflow at the plant by diverting this flow around its existing secondary treatment capacity.

Specifically, Part C, Number 28, III (B)(4) required the City to accomplish the following:

“By PID+18 months, the permittee shall explore increasing the preliminary treatment primary treatment and final effluent disinfection treatment capacities in excess of the existing secondary treatment capacity at the WPCP with the intention of making a showing for the diversion of a portion of the flow stream from (around) the secondary portions of the facility to increase capacity for the treatment of combined sewage during wet weather under EPA bypass 40 C.F.R. 122.41(m) regulations. The basis of the showing, as prescribed in the National CSO Control Policy, will be to demonstrate that the record shows that the secondary treatment system is properly operated and maintained; that the system has been designed to meet secondary limits for flows greater than the peak dry weather flow, plus an appropriate quantity of wet weather flow, and that it is either technically or financially infeasible to provide secondary treatment at the existing facilities for the greater amounts of wet weather flow.”

The City of Philadelphia is pleased to report that its evaluation has been completed and that capturing this additional one hundred million gallons of CSO flow at the plant by expanding the plant's preliminary/primary treatment and disinfection capacities is feasible and will comply with all appropriate regulations, specifically the bypass regulations at 40 CFR 122.41(m) and the National and State CSO Control Policy. Expansion of the plant's primary and disinfection capabilities will eliminate 100 million gallons of untreated combined sewage from being discharged into the Delaware. This can be achieved while fully complying with all discharge limits and conditions contained in our permit.

Pursuant to the permit conditions referenced above, the City needs to demonstrate the following:

- (1) the secondary treatment system is properly operated and maintained; and
- (2) that the system has been designed to meet secondary limits for flows greater than the peak dry weather flow, plus an appropriate quantity of wet weather flow; and

(3) it is either technically or financially infeasible to provide secondary treatment at the existing facilities for the greater amounts of wet weather flow.

We will address each item in the order presented in the permit.

First, there can be no doubt that the NEWPCP's secondary system is properly operated and maintained. Review of NEWPCP's Discharge Monitoring Reports (DMRs) and inspections conducted by DEP demonstrate that the plant proudly and consistently meets all effluent discharge standards contained in its permit. The NEWPCP has received both Gold and Platinum awards from the National Association of Clean Water Agencies for its consistent compliance with all terms and conditions set forth in its NPDES permit.

Secondly, again as demonstrated from our DMRs, the system was designed to meet secondary limits for flows greater than the peak dry weather flow plus an appropriate quantity of wet weather flow. The plant is now rated at a hydraulic design capacity of 210 million gallons per day (NPDES, Part A, Supplemental Information (1)) but is currently being operated to handle 420 MGD of flow during wet weather through its secondary treatment process—more than double its rated hydraulic design capacity. With the completion of the Capital Improvement Projects set forth in the permit at Part C, Number 28, IIIB, the plant will be able to handle an additional 15 MGD of flow, thus increasing its wet weather capacity to 435 MGD. Hence, we are utilizing the existing secondary system to its utmost capacity.

Lastly, we must demonstrate the technical or financial infeasibility of providing even greater amounts of secondary treatment during wet weather utilizing the existing facilities. We will soon be accepting through the secondary system 435 MGD during wet weather – more than double the hydraulic design capacity.

This 435 MGD will push the existing secondary infrastructure to its operational limit. The plant currently maintains a biomass capable of treating twice as much wet weather flow as dry weather flow and still must rely on a separate wet weather treatment regime to protect the existing biomass. Accepting flows above 435 MGD could result in the loss of significant amounts of biomass necessary to operate the plant and cause severe physical damage to plant infrastructure.

The City hired CH2M Hill to evaluate the ability of our Northeast Plant to handle an additional 100 MGD through our secondary treatment system. In a technical memorandum prepared by CH2M Hill for the City, they confirm that the plant would be unable to handle this flow without major capital investment. Aeration basins, secondary clarifiers, return activated sludge pumps, waste activated sludge pumps, as well as other capital improvements would need to be made in order for the plant to accept an additional 100MGD through its secondary treatment process. Total capital costs for such improvements would be approximately \$136,000,000 . This is compared to the cost of \$14,500,000 for building the 100MGD bypass—close to an order of magnitude difference. A copy of CH2M Hill's technical memorandum is available anytime for your review.

In addition to the enormous capital costs involved in expanding secondary treatment at the Northeast Plant, it would also create significant operational complexities and increased energy demand. The amount of biomass that must be maintained for periodic high flow events would require, in addition to the large capital investment, a constant (and unsustainable) elevated input of energy, and the development of a complex operational scheme, both in order to keep the biomass alive and to ensure its proper functioning in the treatment system. These considerations illustrate both the technical and operational infeasibility of expanding secondary treatment beyond the proposed 435 MGD.

In conclusion, the City is confident that utilizing a bypass will provide an additional 100 million gallons of CSO primary treatment and disinfection. Assuming the permit continues to include provisions for wet weather relief for TSS and BOD loadings, we are also confident that we will be able to operate the NEWPCP in full compliance with all permit terms and conditions.

At the same time, however, further refinement of the modeling and capital facilities plan may demonstrate that wet weather flows in excess of 100 MGD could just as feasibly be accommodated through the bypass without violating NPDES compliance. Therefore, in addition to requesting the 100 MGD bypass, we would also request approval for additional bypass flow in excess of 100 MGD if it can be demonstrated that the plant can safely handle the additional bypass flows and still achieve compliance with all NPDES terms and conditions.

Thank you for your time and attention to our request. If approved, we will begin capital facilities planning and the development of operating strategies for the effective handling and treatment of these additional flows.

Should you have any questions, please feel free to call me at 215-685-6118

Sincerely,

David A. Katz
Deputy Water Commissioner, Environmental Policy and Planning
1101 Market St., 5th floor
Philadelphia Pa. 19107
215-685-6118



Pennsylvania Department of Environmental Protection

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Norristown, PA 19401
April 1, 2009

Southeast Regional Office

Phone: 484-250-5970
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Mr. David A. Katz
Deputy Water Commissioner
Environmental Policy and Planning
Philadelphia Water Department
The ARAMARK Tower
1101 Market Street, 5th Floor
Philadelphia, PA 19107-2994

Re: Northeast Water Pollution Control Plant
Sewage NPDES Permit No. PA0026689
Capturing Additional Flow
City of Philadelphia
Philadelphia County

Dear Mr. Katz:

On March 2, 2009, Pennsylvania Department of Environmental Protection (Department) received your February 26, 2009, letter requesting an approval to capture additional wet weather flow at the subject facility.

The National Pollutant Discharge Elimination System (NPDES) Permit No. PA0026689 effective September 1, 2007, through August 31, 2012, allows the Northeast Water Pollution Control Plant (NEWPCP) to operate at the following permitted flows:

- (a) Annual average flow of 210 million gallons per day (MGD).
- (b) Hydraulic design capacity of 210 mgd. $210 \times 1.2 = 252$ MGD Maxi Daily Wet Weather Flow
- (c) Maximum daily average wet weather flow of 315 mgd without causing treatment plant upsets. $252 \times 1.25 = 315$ MGD
- (d) Peak wet weather flow of 420 mgd without causing treatment plant upsets.

A review of the February 26, 2009, letter indicates that the Philadelphia Water Department (PWD) is seeking an approval for the following flows:

1. Peak wet weather flow of 435 mgd through the secondary treatment units.
2. Diverting up to 100 mgd flow around the secondary treatment units during the events when influent flow exceeds 435 mgd. The increase in flow will be due to the flow from the combined sewer overflow (CSO) locations.

- 3. Bypass flow in excess of 100 mgd.

The Department has completed review of the submitted document and offers the following:

- 1. The Department is pleased to note that the PWD has completed its capacity evaluation of the existing NEWPCP. The purpose of the evaluation was to use the plant at its maximum capacity during wet weather flows resulting elimination of some of the CSO locations. The evaluation is required in accordance with the NPDES permit requirement Part C 28.III(B)(4) and EPA bypass 40 C.F.R. 122.41(m) regulations. Based on your determination, the Department grants permission to operate the NEWPCP at a peak flow of 435 mgd during a wet weather event with a condition that the flow shall not cause any treatment plant upsets, the flow shall receive full treatment, and the effluent shall meet NPDES permit requirements.
- 2. The Department also recognizes that the PWD intends to eliminate 100 mgd of untreated CSO from being discharged to the Delaware River by capturing the flow at the head of the plant and bypassing the secondary treatment units. This flow will get primary treatment and disinfection prior to discharge. The PWD will expand the primary and disinfection units to handle this additional flow at the NEWPCP. The concept of bypass 100 mgd is acceptable to the Department; however, a Water Quality Management (WQM) permit amendment is required to install bypass equipment and to modify the treatment units to handle flow in excess of 435 mgd. The amendment application shall include a design of bypass equipment and an engineering narrative. It shall also include supporting documentation of the capacities of both the primary and disinfection units and a detail of modifications required to handle allowable flow. Please contact Mr. Keith Dudley, Chief, Municipal Planning and Finance Section at 484-250-5190 for any questions related to the WQM permit amendment.

The approval to bypass a flow of 100 mgd is subject to the following condition:

- a. The treated wastewater discharge at Outfall 001 shall meet the effluent limitations contained in the NPDES permit consistently.
- b. The NPDES permit requires the following parameters to be monitored weekly. The Department is asking to monitor these parameters every day during the period of bypass:

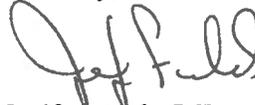
<u>Parameters</u>	<u>Monitoring Frequency</u>
CBOD20 (Load)	Daily
Ammonia Nitrogen	Daily
Nitrite Nitrogen	Daily
Nitrate Nitrogen	Daily
Phosphorus, Total	Daily

3. You indicated that a refinement of the modeling and capital facilities plan may demonstrate that wet weather flows in excess of 100 mgd could be accommodated through bypass without violating NPDES requirements. The PWD shall develop a demonstration project for bypass flow in excess of 100 mgd and submit a project report to the Department for evaluation of any higher flows.

In your letter, you mentioned that the city hired CH2M Hill to evaluate the ability of the NEWPCP to handle the 100 mgd flow through the secondary treatment system. You also disclose that the technical memorandum prepared by CH2M Hill confirms that the plant will not be able to handle 100 mgd flow through the secondary units without a major capital investment. The total capital cost for such improvements will be approximately \$136 million. If possible, please provide a copy of such document to the Department.

If you have any questions, please contact me or Mr. Sohan Garg, Chief, NPDES program at the above phone number.

Sincerely,



Jenifer Fields, P.E.
Regional Manager
Water Management

cc: Environmental Protection Agency - Region III
Delaware River Basin Commission
Operations Section
Data Systems and Analysis
Mr. Garg
Mr. Dudley
Major File
Re 30 (joh09wqm)085-31