

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF NORTHERN KENTUCKY WATER)	
DISTRICT FOR APPROVAL OF CONSTRUCTION OF)	
PRETREATMENT BUILDING IMPROVEMENTS AT)	CASE NO.
MEMORIAL PARKWAY TREATMENT PLANT AND)	2010-00038
ISSUANCE OF A CERTIFICATE OF CONVENIENCE)	
AND NECESSITY)	

O R D E R

Northern Kentucky Water District ("NKWD") has applied for a Certificate of Public Convenience and Necessity ("Certificate") to make improvements to its Memorial Parkway Treatment Plant ("MPTP") and to borrow \$8,000,000 from the Kentucky Infrastructure Authority ("KIA"). Having reviewed the application and being otherwise sufficiently advised, the Commission finds that:

1. NKWD, a water district organized pursuant to KRS Chapter 74, owns and operates facilities used to distribute water to approximately 80,383 customers in Boone, Campbell, and Kenton counties, Kentucky.¹

2. NKWD proposes to construct additional facilities at its MPTP. These facilities include a new concrete and masonry brick building to house six granular activated carbon ("GAC") contactors with ten feet of carbon media; a low lift pumping station with four vertical turbine pumps and variable speed drives plus two smaller vertical turbine pumps to provide slurry water for carbon loading and unloading; and two medium-pressure ultraviolet

¹ *Annual Report of Northern Kentucky Water District to the Public Service Commission of Kentucky for the Calendar Year Ended December 31, 2009* at 5, 27.

disinfection reactors. They further include replacement of two existing horizontal centrifugal pumps to provide backwash water for the existing filters and new carbon contactors and the installation of a diesel-driven, standby power generator; and ancillary facilities.

3. On January 6, 2006, the United States Environmental Protection Agency (“EPA”) promulgated the Stage 2 Disinfectants and Disinfection Byproducts (“D/DBP”) Rule, which establishes monitoring, reporting, and public notification requirements for public water systems related to total trihalomethanes (“TTHM”) and haloacetic acids (“HAA5”).²

4. EPA published its Stage 2 D/DBP Rule “to reduce the potential risks of cancer and reproductive and developmental health effects from DBPs [disinfectant byproducts].”³ EPA concluded that “[n]ew epidemiology and toxicology studies evaluating bladder, colon, and rectal cancers have increased the weight of evidence linking these health effects to DBP exposure.”⁴ It further concluded that “recent studies on both human epidemiology and animal toxicology have shown possible associations between chlorinated drinking water and reproductive and developmental endpoints such as spontaneous abortion, stillbirth, neural tube and other birth defects, intrauterine growth retardation, and low birth weight.”⁵

² Stage 2 Disinfectants and Disinfection Byproducts Rule, 71 Fed. Reg. 388 (2006).

³ *Id.* at 394.

⁴ *Id.* at 391.

⁵ *Id.*

5. The Stage 2 D/DBP Rule establishes maximum contaminant level ("MCL") goals at 0.08 mg/L for TTHM and 0.06 mg/L for HAA5.

6. NKWD is a community water system serving more than 100,000 individuals.

7. The Stage 2 D/DBP Rule requires community water systems serving more than 100,000 individuals to begin compliance monitoring no later than April 1, 2012.⁶

8. In 2006 testing samples from each of NKWD's sampling points resulted in a range from 0.056 to 0.178 mg/L for TTHM and 0.032 to 0.058 mg/L for HAA5. Of those samples, 14 of 16 points had locational running annual averages ("LRAA") in excess of the Stage 2 D/DBP Rule's standard for TTHM.⁷

9. In 2009, the LRAAs for testing samples from each of NKWD's seven sampling points exceeded the Stage 2 D/DBP Rule's standard for TTHM. Sample results ranged from 0.0838 mg/L to 0.14131 mg/L.⁸

10. TTHM formation potential of 0.08 mg/L would occur at a 1.4 mg/L total organic carbon ("TOC") target for the MPTP.⁹ Less than 50 percent of the filtered water TOC samples for MPTP met the 1.4 mg/L target for TOCs.¹⁰

11. NKWD's water treatment facilities are currently unable to meet the MCL goals in the Stage 2 D/DBP Rule.

⁶ *Id.* at 415, Table IV.E.1.

⁷ GRW, Inc., *Preliminary Design of GAC Systems* (March 2008) (hereinafter "*PD Report*") at 1-2.

⁸ Memorandum from Gerald Wuetcher, Public Service Commission Executive Advisor, to Case File, Attachment 5 (Apr. 21, 2010).

⁹ *PD Report* at Table 5-2.

¹⁰ CH2M HILL and HDR/Quest, *Basis of Design Report* at Exhibit 2-12.

12. To address the Stage 2 D/DBP Rule, NKWD examined the following technologies: riverbank infiltration,¹¹ powdered carbon, ACTIFLO,¹² enhanced coagulation, membranes, GAC, and MIEX.¹³

13. Of the options that NKWD examined, only GAC technology and membranes permit NKWD to meet or exceed the MCLs set in the Stage 2 D/DBP Rule.¹⁴

14. Membranes are significantly more costly than installing GAC technology.¹⁵

¹¹ Riverbank filtration is a purification process that uses the natural filtering processes of the riverbank to remove many of the particles and contaminants from raw river water. For a discussion of this process, see Wolfgang Kuehn and Uwe Mueller, *Riverbank Filtration: An Overview*, Journal AWWA, Dec. 2000 at 60.

¹² ACTIFLO is a proprietary treatment process that “includes rapid mix, flocculation, and sedimentation processes. It is a high rate process that uses polymer to attach floc particles to fine sand to accelerate settling.” *PD Report*, App. F at 4.

¹³ MIEX “is a proprietary advanced treatment process that removes dissolved organic matter from raw water prior to treatment by conventional treatment processes. A slurry of small ion exchange resin particles is mixed with raw water, allowed to react for a period of time, separated from the raw water, and then regenerated for reuse. The pretreated water is then treated using conventional treatment processes.” *PD Report*, App. F at 2-3.

¹⁴ *Id.* at Table 1-4.

¹⁵ On August 17, 2006, NKWD estimated the costs for compliance with the 2012 standards to be \$45 million for membranes and \$21 million for GAC. See Presentation to the NKWD Board of Directors (Aug. 17, 2006). During the conference call of April 19, 2010, NKWD informed Commission Staff that it estimated membrane technology to be three to four times greater than GAC technology for their facilities. See also Alan J. Roy, *Treatment Alternatives for Compliance with the Stage 2 D/DBPR: An Economic Update*, 102 Journal AWWA 44, 51 (Mar. 2010).

15. GAC is one of the best available technologies for the TTHM and HAA5 LRAA MCLs.¹⁶ EPA estimates that at least 70 percent of surface water suppliers using GAC technology could meet Stage 2 MCLs with a 20-percent safety factor.¹⁷

16. While nanofiltration membranes permit all water providers to achieve Stage 2 compliance with a 20-percent safety factor, cost benefit analysis weighs in favor of nanofiltration only for areas with high TOC ground water, such as Florida and the southwest United States.¹⁸

17. A recent review of the available technologies concluded that GAC “continues to be the most cost-effective method available” for addressing compliance with the Stage 2 D/DBP Rule.¹⁹

18. Metropolitan areas currently using GAC technology include Cincinnati, Ohio; San Diego, California; Centreville, Virginia; Scottsdale, Arizona; and Glendale, Arizona.

19. GAC technology offers additional advantages over other technologies. It requires no additional chemicals, addresses taste and odor issues, and is relatively simple to use, and its spent media can be reactivated and reused.

¹⁶ Stage 2 Disinfectants and Disinfection Byproducts Rule, 71 Fed. Reg. at 412-14.

¹⁷ *Id.* at 413.

¹⁸ *Id.*

¹⁹ Roy, *supra* note 15, at 51.

20. After narrowing its decision to GAC adsorption, NKWD determined GAC post-filter contactors²⁰ were a better option than GAC filter adsorbers primarily because the filter adsorbers²¹ have an increased likelihood to promote bacterial growth.²²

21. In considering GAC post-filter contactor options, NKWD considered three strategic approaches. A minimum approach was developed that would merely satisfy the Stage 2 D/DBP Rule goals. A moderate approach set goals 20 percent lower than the Stage 2 D/DBP goals. An aggressive approach was intended to maintain a TOC target so that the LRAA is 60 percent of the MCL.²³

22. In March 2008, NKWD estimated the capital costs associated with each approach using GAC technology as follows:²⁴

	Minimal Approach	Moderate Approach	Aggressive Approach
Total Capital Cost	\$23,110,000	\$28,810,000	\$35,050,000
20-Year Present Worth	\$58,100,000	\$71,300,000	\$83,460,000

²⁰ Post-filter contactors are steel vessels or concrete basins that are filled with GAC and are located downstream of existing filtration. After having been treated through the existing treatment system, the treated water sits in these basins for a period of time. The GAC captures any organic contaminants during this contact period. Post-filter contactors require the construction of new contact basins to supplement existing filters.

²¹ Filter adsorbers use existing structures and do not require the construction of additional structures. Some or all of the granular media in a treatment plant's existing conventional filters are replaced with GAC. The GAC serves both as a filter and as an adsorbent. Filter adsorbers generally have a limited bed depth since they are replacing existing filter media. (For example, in the case of MPTP, filter adsorbers would have a bed depth of approximately three feet.) In contrast, the post-filter contactors have a greater depth which allows for a longer contact period and greater adsorption.

²² *PD Report*, App. B at 9.

²³ *PD Report* at 1-4.

²⁴ *PD Report* at Figures 4-4 and 4-5. These summations reflect the total estimated cost for GAC upgrades to MPTP and FTTP.

23. NKWD adopted the moderate approach in addressing regulatory compliance.

24. NKWD's use of the moderate approach to assess and determine its compliance strategy was reasonable. That approach allowed for added protection against unusually high TOC samples and allows the water district to comply with stricter regulatory compliance standards without additional upgrades to its treatment facilities or significant changes to its operations.

25. NKWD proposes to construct six GAC contactor beds at MPTP. Five of these beds would be fully functional immediately. The sixth bed would be reserved for future expansion of MPTP's treatment capacity.

26. MPTP has a current treatment capacity of 10 million gallons per day ("MGD"), but is capable of expansion to 20 MGD.

27. Based upon current demand projections, NKWD expects to expand MPTP's capacity to 20 MGD no later than 2028.

28. With the projected increase in demand and addition of treatment capacity at the MPTP, NKWD would require six GAC contactor beds to meet Stage 2 D/DBP Rule goals at MPTP.

29. NKWD proposes to install two medium-pressure ultraviolet ("UV") disinfection reactors at MPTP that are designed to provide 2.5 log inactivation of *Cryptosporidium* and at least 2.5 log inactivation of *Giardia*.

30. NKWD considered two types of UV disinfection technology: low pressure/high output and medium pressure/high output.

31. NKWD estimates that a medium-pressure system has a lower net present value cost to acquire and operate than a low-pressure system.²⁵

32. Installation of UV disinfection system is not necessary for NKWD to comply with the Stage 2 D/DBP Rule.

33. The UV disinfection system provides “an additional disinfection barrier; increase[s] the degree of inactivation of *Cryptosporidium*, *Giardia*, and viruses; minimize[s] the formation of potential disinfection byproducts; and achieve[s] enhanced treatment goals in the future.”²⁶

34. UV disinfection is commonly used in the water treatment industry.²⁷

35. HDR/Quest Engineers prepared the drawings and specifications for the proposed pretreatment building improvements.

36. The Division of Water of the Kentucky Energy and Environment Cabinet has approved the plans and specifications for the proposed GAC contactor facility and UV treatment facility.

37. Total construction cost of the proposed improvements is \$12,227,000.

38. Total cost of the proposed improvements, including design and construction engineering, miscellaneous expenses and contingencies, is \$15,300,000.²⁸

39. NKWD had originally estimated total project cost to be \$23,004,184.

²⁵ See *Basis of Design Report* at Exhibits 5-13 and 5-14 (Jan. 2009).

²⁶ Case No. 2007-00052, *The Application of Northern Kentucky Water District for Approval of Construction of UV Disinfection Facilities and Issuance of a Certificate of Public Convenience and Necessity* at 2 (Ky. PSC Apr. 2, 2007).

²⁷ See Roy, *supra* note 15, at 45.

²⁸ Application, App. D at 1.

40. NKWD attributes the disparity between original estimates of total project cost and actual total cost to recent decline in economic conditions and its procurement practices.²⁹

41. The proposed improvements will allow NKWD to bring its MPTP into compliance with the requirements of the Stage 2 D/DBP Rule and to obtain overall compliance with the Stage 2 D/DBP Rule.

42. The proposed improvements will not compete with the facilities of other public utilities or conflict with the Certificate of other public utilities operating in the same area.

43. NKWD proposes to finance the proposed improvements with the proceeds of an \$8,000,000 loan from KIA; \$1,000,000 from the proceeds of the issuance of its 2009 Bond Anticipation Notes ("BAN"); and \$6,300,000 from the proceeds of the issuance of BANs in 2010.

44. KIA has approved a loan of \$8,000,000 to NKWD at an interest rate of two percent per annum payable over a 20-year period.

45. The proposed loan agreement with KIA is for a lawful object within NKWD corporate purposes, is necessary and appropriate for and consistent with NKWD's proper performance of its service to the public and will not impair NKWD's ability to perform that service, and is reasonably necessary and appropriate for such purpose.

²⁹ Memorandum, *supra* note 8, at 2, 5-6.

Based upon these findings, the Commission makes the following conclusions of law:

1. NKWD is a utility subject to Commission jurisdiction.³⁰
2. No utility may construct any facility to be used in providing utility service to the public without first obtaining a Certificate from the Commission.³¹
3. To obtain a Certificate, the utility must demonstrate a need for such facilities and an absence of wasteful duplication.³²
4. To demonstrate a need for such facilities, “the inadequacy must be due either to a substantial deficiency of service facilities, beyond what could be supplied by normal improvements in the ordinary course of business; or to indifference, poor management or disregard of the rights of consumers, persisting over such a period of time as to establish an inability or unwillingness to render adequate service.”³³
5. “Wasteful duplication” is “an excess of capacity over need” and “an excessive investment in relation to productivity or efficiency, and an unnecessary multiplicity of physical properties.”³⁴

³⁰ KRS 278.010(3)(d); KRS 278.015.

³¹ KRS 278.020(1).

³² *Kentucky Utils. Co. v. Pub. Serv. Comm’n*, 252 S.W.2d 885 (Ky. 1952).

³³ *Id.* at 890.

³⁴ *Id.*

6. To demonstrate that a proposed facility does not result in wasteful duplication, an applicant for a Certificate must demonstrate that a thorough review of all alternatives has been performed.³⁵

7. NKWD has demonstrated a need for the proposed facilities.

8. NKWD has demonstrated that the proposed facilities will not result in wasteful duplication.

9. The construction is in the public interest and is necessary to enable NKWD to continue to provide adequate service to its customers.

10. The public convenience and necessity require the construction of the proposed improvements to the MPTP.

IT IS THEREFORE ORDERED that:

1. NKWD is granted a Certificate to proceed with the proposed construction as set forth in its application.

2. NKWD is authorized to enter into a loan with KIA for \$8,000,000 with an interest rate not to exceed two percent per annum and a repayment period not to exceed 20 years.

3. NKWD shall notify the Commission prior to performing any additional construction not expressly authorized by this Order.

³⁵ See Case No. 2007-00134, *The Application of Kentucky American Water Company for a Certificate of Public Convenience and Necessity Authorizing the Construction of Kentucky River Station II, Associated Facilities, and Transmission Main* (Ky. PSC Apr. 25, 2008); Case No. 2005-00142, *The Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for the Construction of Transmission Facilities in Jefferson, Bullitt, Meade, and Hardin Counties, Kentucky* (Ky. PSC Sept. 8, 2005).

4. Any deviation from the construction approved shall be undertaken only with the prior approval of the Commission.

5. NKWD shall file a copy of the “as-built” drawings and a certified statement by a professional engineer that the construction has been satisfactorily completed in accordance with the contract plans and specifications within 60 days of the substantial completion of the construction certificated herein.

6. NKWD shall require construction to be inspected under the general supervision of a licensed professional engineer with a Kentucky registration in civil or mechanical engineering, to ensure that the construction work is done in accordance with the contract drawings and specifications and in conformance with the best practices of the construction trades involved in the project.

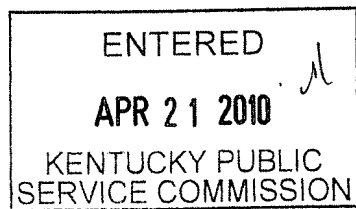
7. NKWD shall advise the Commission in writing of the final terms of the loan agreement within 30 days of the execution date.

8. NKWD shall use the proceeds from its proposed loan agreement with KIA only for the purposes set forth in its application.

9. Any documents filed in the future pursuant to Ordering Paragraphs 5, 6, and 7 shall reference this case number and shall be retained in the utility’s general correspondence file.

Nothing contained herein shall be deemed a warranty of the Commonwealth of Kentucky, or any agency thereof, of the financing approved in this Order.

By the Commission



ATTEST:


Executive Director

Case No. 2010-00038

Honorable John N Hughes
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