

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

|                                     |   |                     |
|-------------------------------------|---|---------------------|
| APPLICATION OF NORTHERN KENTUCKY    | ) |                     |
| WATER DISTRICT FOR A CERTIFICATE OF | ) |                     |
| CONVENIENCE AND NECESSITY FOR       | ) | CASE NO. 2011-00128 |
| PROPOSED IMPROVEMENTS TO ITS TAYLOR | ) |                     |
| MILL WATER TREATMENT PLANT          | ) |                     |

ORDER

Northern Kentucky Water District ("NKWD") has applied for a Certificate of Public Convenience and Necessity ("Certificate") to make improvements to its Taylor Mill Water Treatment Plant ("TMTP"). Having reviewed the record<sup>1</sup> 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 80,372 customers in Boone, Campbell, and Kenton counties, Kentucky.<sup>2</sup>

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<sup>1</sup> On April 15, 2011, NKWD filed its application for a Certificate with the Commission. On May 19, 2011, NKWD supplemented this application with the final project engineering report and final bid tabulations.

In addition to NKWD's application, the record of this proceeding consists of NKWD's responses to Commission Staff's Requests for Information and of documents regarding the proposed project that the Kentucky Division of Water provided in response to Commission Staff's written request made pursuant to KRS 61.872. On May 5, 2011, the Commission incorporated by reference the case records of Cases No. 2010-00038 and No. 2010-00093 into the record of this proceeding.

No persons have sought intervention in this proceeding. The Commission has not received any written comments regarding the NKWD's application.

<sup>2</sup> *Annual Report of Northern Kentucky Water District to the Public Service Commission of Kentucky for the Calendar Year Ended December 31, 2010* at 5, 27.

2. NKWD owns and operates three water treatment plants: Fort Thomas Water Treatment Plant (“FTTP”), Memorial Parkway Water Treatment Plant (“MPTP”), and TMTP.

3. TMTP is located in Kenton County and receives its source water from the Licking River, a tributary of the Ohio River.

4. TMTP is a conventional treatment facility with a capacity of 10 million gallons per day (“MGD”). Ultraviolet disinfection facilities were recently added to TMTP.<sup>3</sup>

5. NKWD proposes to construct a concrete and masonry brick structure to house a preliminary treatment facility and a granular activated carbon (“GAC”) facility. The treatment facility will contain a rapid-mix basin, four flocculation basins, and two sedimentation basins with plate settlers and a residuals collection system. The GAC building will house 14 granular activated carbon pressure vessels plus a smaller pump for backwashing the pressure vessels and the relocation of two existing medium-pressure ultraviolet disinfection reactors. The GAC Feed Pump Station will have three vertical turbine pumps with electrical gear for two diesel-driven standby power generators located adjacent to the GAC Feed Pump Station. These generators will operate the TMTP if a power loss occurs. The structure will also house several ancillary facilities, such as a relocated operator’s laboratory.

6. 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

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<sup>3</sup> See Case No. 2007-00052, *Northern Kentucky Water District* (Ky. PSC Apr. 2, 2007).

public water systems related to total trihalomethanes (“TTHM”) and haloacetic acids (“HAA5”).<sup>4</sup>

7. 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].”<sup>5</sup> 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.” 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.”<sup>6</sup>

8. 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.

9. NKWD is a community water system serving more than 100,000 individuals. 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.<sup>7</sup>

10. 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

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<sup>4</sup> Stage 2 Disinfectants and Disinfection Byproducts Rule, 71 Fed. Reg. 388 (2006).

<sup>5</sup> *Id.* at 394.

<sup>6</sup> *Id.* at 391.

<sup>7</sup> *Id.*

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.<sup>8</sup>

11. 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.<sup>9</sup>

12. NKWD's water treatment facilities are currently unable to meet the MCL goals in the Stage 2 D/DBP Rule.<sup>10</sup>

13. To address the Stage 2 D/DBP Rule, NKWD considered three strategic approaches: minimum, moderate, and aggressive. Under the minimum approach, NKWD would seek to merely satisfy the goals of the Stage 2 D/DBP Rule. The moderate approach set goals 20 percent lower than the Stage 2 D/DBP Rule's goals. The aggressive approach sought to maintain a total organic carbon ("TOC") target to ensure that LRAA is 60 percent of the MCL.<sup>11</sup>

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

15. NKWD's use of the moderate approach was reasonable. It allowed for added protection against unusually high TOC samples and allows the water district to

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<sup>8</sup> GRW, Inc., *Preliminary Design of GAC Systems* (Mar. 2008) (hereinafter "*PD Report*" at 1-2.

<sup>9</sup> Memorandum from Gerald Wuetcher, Executive Advisor, Public Service Commission, to Case File, Attachment 5 (Apr. 21, 2010) (filed in Case No. 2010-00093).

<sup>10</sup> NKWD has previously sought and been granted Certificates to construct improvements at its Fort Thomas Water Treatment Plant and its Memorial Parkway Water Treatment Plan to bring those plants into compliance with the Stage 2 D/DBP Rule. See Case No. 2010-00038, *Northern Kentucky Water District* (Ky. PSC Apr. 21, 2010); Case No. 2010-00093, *Northern Kentucky Water District* (Ky. PSC Apr. 21, 2010).

<sup>11</sup> *PD Report* at 1-4.

comply with stricter regulatory compliance standards without additional upgrades to its treatment facilities or significant changes to its operations.

16. To address the Stage 2 D/DBP Rule, NKWD examined the following technologies for the TMTP: MIEX, blending TMTP water with FTTP water, and GAC.<sup>12</sup>

17. 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.”<sup>13</sup>

18. In 2007, NKWD performed bench testing using MIEX. Testing occurred during a period when TOC concentrations were relatively low.<sup>14</sup> These tests indicated that the ion exchange process coupled with coagulation and settling reduced 14-day TTHM formation potential by 22 percent and 14-day HAA5 formation potential when compared to coagulation and settling alone.<sup>15</sup> They also indicated 14-day TTHM formation potential at 0.051 mg/L and a 14-day HAA5 formation potential of 0.034 mg/L.<sup>16</sup>

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<sup>12</sup> *Id.* at 2-2.

<sup>13</sup> *PD Report*, App. F at 2-3. Conventional treatment processes involve adding iron or aluminum salts, such as aluminum sulphate, ferric sulphate, ferric chloride or polymers, to the water. These chemicals are called coagulants and have a positive charge. The positive charge of the coagulant neutralizes the negative charge of dissolved and suspended particles in the water. When this reaction occurs, the particles bind together, or coagulate. The larger particles, or floc, are heavy and quickly settle to the bottom of the water supply.

<sup>14</sup> *Id.* at 3.

<sup>15</sup> *Id.* at 2-2.

<sup>16</sup> *Id.*, App. F at 3.

19. While the results indicate that the MIEX process met NKWD's compliance goals, NKWD chose against further consideration of the process. NKWD concluded that the MIEX process might not remove enough additional organic matter to meet target levels when TOC is normally high in summer months. It further concluded that, given MIEX's proprietary nature, constructing major improvements to TMTP based on a single supplier entailed cost risks.<sup>17</sup>

20. Under existing demand conditions, the FTTP has the capability of supplying 20 MGD of water to the TMTP. This water can either be pumped directly to the service level or diverted into TMTP's clearwell and blended with TMTP-treated water prior to pumping. FTTP water is treated with using a GAC process.

21. In April and September 2007, NKWD simulated a blending of FTTP GAC-treated water and TMTP effluent. Based upon tests conducted in April 2007, when a lower TOC in untreated water was prevalent, a blend consisting of 66 percent FTTP-treated water and 33 percent TMTP-treated water had TTHM and HAA5 levels consistent with the moderate treatment strategy. Tests conducted in September 2007, when TOC content level in untreated water is normally higher, showed that no blending scenario would enable TMTP to meet the Stage 2 D/DBP Rule requirements for TTHM.<sup>18</sup>

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<sup>17</sup> *Id.* at 2-2.

<sup>18</sup> *Id.* at 2-4. This analysis assumed that NKWD would use a moderate compliance strategy at its FTTP and would pursue a target TOC of 1.25 mg/L. If NKWD pursued a minimum treatment strategy and a TOC target of 1.0 mg/L at FTTP, a blending approach was possible. NKWD, however, has chosen the use of a moderate compliance strategy for its FTTP. Reviewers have also noted that the blending option is limited by FTTP's capacity to supply water to the TMTP. Based upon current demand projections, FTTP will be reaching its capacity to send the quantity of water needed for blending at the TMTP by 2012. As a result, reviewers concluded that "NKWD has the operational flexibility to aid in delaying the construction of a GAC facility at the TMTP; however, the construction of a GAC facility at the TMTP will ultimately be required to ensure regulatory compliance." *Id.* at 2-7.

22. Elimination of the MIEX and blending water strategies left GAC as the only remaining alternative to enable TMTTP to comply with Stage 2 D/DBP Rule requirements.

23. GAC is one of the best available technologies for the TTHM and HAA5 LRAA MCLs.<sup>19</sup>

24. 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.<sup>20</sup>

25. 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.<sup>21</sup>

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

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

28. NKWD is using GAC technology to achieve Stage 2 D/DBP Rule requirements at its FTTP and MPTP.<sup>22</sup>

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<sup>19</sup> Stage 2 Disinfectants and Disinfection Byproducts Rule, 71 Fed. Reg. at 412-14.

<sup>20</sup> *Id.* at 413.

<sup>21</sup> See Alan J. Roy, *Treatment Alternatives for Compliance with Stage 2 D/DBPR: An Economic Update*, 102 Journal AWWA 44, 51 (Mar. 2010).

<sup>22</sup> See Case No. 2010-00038, *Northern Kentucky Water District* (Ky. PSC Apr. 21, 2010); Case No. 2010-00093, *Northern Kentucky Water District* (Ky. PSC Apr. 21, 2010).

29. NKWD's decision to use GAC post-adsorbers<sup>23</sup> is not unreasonable. The use of GAC filter adsorbers<sup>24</sup> poses an increased likelihood of bacterial growth in treated water.<sup>25</sup>

30. In considering GAC post-filter contactor options, NKWD considered three strategic approaches: minimum, moderate, and aggressive.<sup>26</sup>

31. NKWD estimated the capital costs associated with each approach using GAC technology as follows:<sup>27</sup>

|                       | Minimal Approach | Moderate Approach | Aggressive Approach |
|-----------------------|------------------|-------------------|---------------------|
| Total Capital Cost    | \$ 7,770,000     | \$ 9,210,000      | \$10,820,000        |
| 20-Year Present Worth | \$17,670,000     | \$22,300,000      | \$26,870,000        |

32. NKWD's use of the moderate approach to assess and determine its GAC post-filter contactor selection was reasonable.

33. Malcolm Pirnie, Inc.; GRW, Inc.; CDP Engineers, Inc.; and Strand Associates, Inc. prepared the drawings and specifications for the proposed building.

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<sup>23</sup> 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.

<sup>24</sup> 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. In contrast, the post-filter contactors have a greater depth which allows for a longer contact period and greater adsorption.

<sup>25</sup> See *PD Report*, App. F at 10.

<sup>26</sup> See text accompanying note 11.

<sup>27</sup> *PD Report* at Figures 6-4 and 6-5.



34. The Division of Water of the Kentucky Energy and Environment Cabinet has approved the plans and specifications for the proposed facility.<sup>28</sup>

35. Total construction cost of the proposed improvements is \$22,790,000.<sup>29</sup>

36. Total cost of the proposed improvements, including design and construction, engineering, miscellaneous expenses and contingencies, is \$28,350,000.<sup>30</sup>

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

38. 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.

39. NKWD proposes to finance the proposed improvements with \$1,833,000 from the proceeds of the issuance of its 2009 Bond Anticipation Notes ("BAN") and \$26,517,000 from the proceeds of the issuance of future BANs.<sup>31</sup>

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

1. NKWD is a utility subject to Commission jurisdiction.<sup>32</sup>

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<sup>28</sup> Letter from Solitha Dharman, Professional Engineer, Drinking Water Branch, Division of Water, to Amy Kramer, Engineering Manager, NKWD (Feb. 18, 2011).

<sup>29</sup> NKWD's Supplemental Application, Revised Exhibit D.

<sup>30</sup> NKWD's Supplemental Application at 2.

<sup>31</sup> NKWD's Supplemental Application, Revised Exhibit D.

<sup>32</sup> KRS 278.010(3)(d); KRS 278.015.

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.<sup>33</sup>

3. To obtain a Certificate, the utility must demonstrate a need for such facilities and an absence of wasteful duplication.<sup>34</sup>

4. To demonstrate a need for such facilities, the utility must show a substantial inadequacy of its existing facilities and that this inadequacy cannot be remedied "by normal improvements in the ordinary course of business . . . ."<sup>35</sup>

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."<sup>36</sup>

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.<sup>37</sup>

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.

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<sup>33</sup> KRS 278.020(1).

<sup>34</sup> *Kentucky Utils. Co. v. Pub. Serv. Comm'n*, 252 S.W.2d 885 (Ky. 1952).

<sup>35</sup> *Id.* at 890.

<sup>36</sup> *Id.*

<sup>37</sup> See Case No. 2007-00134, *Kentucky-American Water Co.* (Ky. PSC Apr. 25, 2008); Case No. 2005-00142, *Louisville Gas and Electric Co.* (Ky. PSC Sept. 8, 2005).

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

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

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

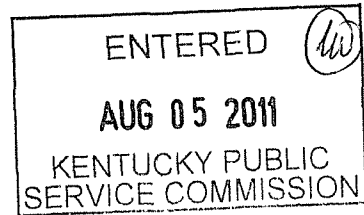
4. NKWD shall file a copy of the "as-built" drawings and a certified statement by a professional engineer that the construction has been satisfactorily completed in accordance with the contract plans and specifications within 60 days of the substantial completion of the construction certificated herein.

5. 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 accordance with the best practices of the construction trades involved in the project.

6. Within 30 days of its Board of Commissioners' final decision on the selection of a contractor for the proposed project, NKWD shall file with the Commission a certified copy of the board resolution or board minutes evidencing that decision. Should NKWD's Board of Commissioners select a contractor other than the contractor who submitted the lowest bid, NKWD shall also submit a written explanation for the Board of Commissioners' action.

7. Any documents filed in the future pursuant to ordering paragraphs 4 and 5 shall reference this case number and shall be retained in the utility's general correspondence file.

By the Commission



ATTEST:

*David D. Bunnell for*  
Executive Director

Case No. 2011-00128

Jack Bragg  
Northern Kentucky Water District  
2835 Crescent Springs Road  
P. O. Box 18640  
Erlanger, KY 41018-0640

Honorable John N Hughes  
Attorney at Law  
124 West Todd Street  
Frankfort, KENTUCKY 40601