COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:
NORTHERN KENTUCKY WATER DISTRICT'S)
NOTICE OF INTENT TO FILE RATE, FINANCING) Case No. 2007-00135
& CONSTRUCTION APPLICATION BASED ON)
HISTROIC TEST PERIOD)

NORTHERN KENTUCKY WATER DISTRICT RESPONSES TO 1ST INFORMATION REQUEST FROM THE ATTORNEY GENERAL DATED JULY 13, 2007

Q1. NKWD's Application states, "It proposes to increase rates: (1) to fund improvements to existing facilities and related capital improvements and repair aging infrastructure, which are necessary to accommodate the current and future increased demand for service and to meet increasingly stringent state and federal water quality standards...etc." The Attorney General seeks an understanding of the primary driving forces of these projects and the costs resulting from those drivers.

a. Please identify and separate each of the capital improvements into the components required to accommodate current and future increased demand for services versus the components required to meet increasingly stringent state and federal water quality standards.

b. For the components necessary to meet increasingly stringent state and federal water quality standards, please identify and separate each of the capital improvements required to meet increasingly stringent state water quality standards and those required to meet increasingly stringent federal water quality standards.

c. Please identify individually, each of the increasingly stringent state and federal water quality standards.

d. For each state and federal water quality standard described above, please explain the impact the standard has upon NKWD's capital planning and its operating and maintenance expense planning. In other words, will NKWD be replacing more plant or incurring more expense or both, and why? Identify each plant account involved as well as each operating and/or maintenance expense account involved.

e. Please provide copies of any correspondence or communications with state and federal water quality regulators concerning the specific capital, operation and maintenance projects addressed in NKWD's filing.

Q1a. Please identify and separate each of the capital improvements into the components required to accommodate current and future increased demand for services versus the components required to meet increasingly stringent state and federal water quality standards.

A1a. Witness: Harrison. Two of the 27 capital improvements identified in Exhibit O of the District's rate application are required to meet increasingly stringent state and federal water quality standards. These include:

1. The TMTP (old FTTP) Ultraviolet Disinfection (Construction) with a cost included in the 2007 Rate Case of $1,150,000. This is PSC Ref No. 127 and Page Number 1 of Exhibit O.

2. The FTTP Post-Filtration GAC-Engineering with a cost included in the 2007 Rate Case of $821,966. This is PSC Ref No. 111 and Page Number 9 of Exhibit O.

All of the other projects are components required to accommodate current and future increased demand for services.

Q1b. For the components necessary to meet increasingly stringent state and federal water quality standards, please identify and separate each of the capital improvements required to meet increasingly stringent state water quality standards and those required to meet increasingly stringent federal water quality standards.

A1b. Witness: Harrison. Project 1 of exhibit O, which is the TMTP Ultraviolet Disinfection Project, is required to meet increasingly stringent state water quality standards.

Project 2 of exhibit O, which is the FTTP Post-Filtration GAC-Engineering, is required to meet increasingly stringent federal regulations.

Q1c. Please identify individually, each of the increasingly stringent state and federal water quality standards.

A1c. Witness: Harrison. The state regulation for the TMTP Ultraviolet Disinfection Project is "401 KAR 8:150. Disinfection, filtration, and recycling, Section 1. Disinfection".

The federal regulation that is the reason for the FTTP Post-Filtration GAC-Engineering is the Stage 2 Disinfectants and Disinfection By Products Rule and

was published in the Federal Register, Wednesday, January 4, 2006 Part 9, 141 & 142 for the National Primary Drinking Water Regulations.

Q1d. For each state and federal water quality standard described above, please explain the impact the standard has upon NKWD's capital planning and its operating and maintenance expense planning. In other words, will NKWD be replacing more plant or incurring more expense or both, and why? Identify each plant account involved as well as each operating and/or maintenance expense account involved.

A1d. Witness: Harrison. Any operating and maintenance expenses associated for these projects are not within the scope of this rate case since they are not known and measurable expenses for rate making purposes because the project was not in service during the test year. However, it is anticipated that operating and maintenance costs will increase once these facilities are operational. These increased costs will be reflected in future rate cases. The impact on capital planning to NKWD for the TMTP Ultraviolet disinfection Project is strictly related to the debt service including depreciation and coverage for the project construction costs. The impact on capital planning to NKWD for the FTTP Post-Filtration GAC-Engineering will be the debt service including depreciation and coverage for these engineering costs. The plant account for both projects will be 304-0002-000.

Q1e. Please provide copies of any correspondence or communications with state and federal water quality regulators concerning the specific capital, operation and maintenance projects addressed in NKWD's filing.

A1e. Witness: Harrison. See Tab 1e.

A1. Witness: Harrison.

Q2. The Applications states at paragraph 12.1: "Plant retirements are listed in the PSC Annual Report of 2006. No salvage values are included as booked."

Q2a. Does this mean that no net salvage was reported?

A2a. Witness: Bragg. Yes.

Q2b. If yes, to sub-part a, then is any net salvage actually being incurred, and if so is it being capitalized?

A2b. Witness: Bragg. In most cases there is no salvage value, however when ever there a salvage value the amount is posted to account 474 "Sale of Fixed Asset". The only item that may have a value is vehicles.

Q3. What is the status of the Depreciation Study, as discussed in Application paragraph 17?

A3. Witness: Bragg. The depreciation study is being reviewed and revised to resolve issues raised by the Attorney General and the Commission staff. The District is also looking at alternatives to the proposed study that will conform to the requirements of the staff, yet provide the District with the full amount of depreciation expense recoverable. The District is compiling additional data to support the proposed study and expects that the study will take several more months to complete It is expected to take several more months to develop the required data and analysis to complete the revisions

Q4. Re: Exhibit A, page 1

Q4a. Please explain and define "Transfers from Prior Issue CIF Funds."

A4a. Witness: Gabbert. "Prior Issue" - Northern Kentucky Water District Revenue Bond Anticipation Notes, Series 2007; Dated April 26, 2007

"CIF Funds" – Capitalized Interest Fund

On April 26, 2007 the District issued $27,165,000 in short-term Bond Anticipation Notes with the principal amount due in two years (i.e. April 1, 2009). Upon issuance of the Notes, $1,397,653.33 was placed into the Capitalized Interest Account to pay the semi-annual interest payments due on the Notes.

With direction from the District, refunding of the short-term Notes into long-term Bonds (Series 2008) was projected to occur on January 1, 2008. Therefore, the Capitalized Interest Account will have remaining approximately $495,125.61 that will transfer to the Series 2008 as a source of funds.

Q4b. Please explain and define "Deposit to Current Refunding Fund."

A4b. Witness: Gabbert. "Current Refunding" - The issuance of a new issue (Series 2008) to pay off an outstanding issue (Series 2007) after the first call date. This account will hold the funds, net of interest earnings, to pay off all of the principal and accrued interest on the Series 2007 Notes

Q4c. Please reconcile the individual figures on this page with the figures on "Master Distribution of Funds" which is the last page of Exhibit A.

A4c. Witness: Gabbert This form shows the Sources and Uses for the Series 2007 Notes with the Sources & Uses of the Refunding of those notes (Series 2008 Bonds).

Series 2007 Notes sold in April and not included in prior pages

Par Amount of Bonds

$27,165,000

Net Bid Premium

-$2,444.85 The purchaser of the Bonds, UBS Securities LLC took a discount

Total Sources $27,162,555.15

Total Amount of Funds for the District to Spend on Construction

$25,703,921.82

Capitalized Interest Fund - Total Amount of Funds set aside to pay the interest on the Notes until the Series 2008 Bonds are issued and refund the Series 2007 Notes

$1,397,653.33

Issuance Cost such as Bond Counsel, Financial Advisor and Bank Fees

$60,980

Total Uses $27,162,555.15

(----------)

Series 2008 Bonds (Refund the Series 2007 Notes) match the "Sources & Uses)

Par Amount of Bonds (same as on Sources and Uses)

$29,580,000

Transfer from Prior Capitalized Interest Fund - Estimated funds remaining in the Series 2007 Capitalized Interest Fund to be transferred to this issue

$495,125.61

Total Sources $30,075,125.61

Net Bid Premium

$591,600 The purchaser at current rates will take an Underwriter's Discount of 2.00% for their fee to sell the bonds

Deposit to Pay off Principal and Deposit to Pay off Interest

$27,365,781.61 (This is the Deposit to Current Refunding Fund and breaks out the amount to pay off the principal and the interest that has accrued on the Notes since the last payment date

Deposit to Debt Service Reserve Fund

$2,007,744 This fund sets aside one year of debt service payments to pay Principal and Interest if needed, this required by the Bond Indenture

Issuance Cost such as Financial Advisor, Bond Counsel, Trustee Fees, Rating

$110,000

Total Uses $30,075,125.61.

Q5. RE: Annual Report Attached as Exhibit c.

Q5a. RE: Page 6

Q5a1. Please explain the function of the Commissioners who are listed as Officers and Managers.

A5a1. Witness: Bragg. The six commissioners are appointed by the Judge-Executives of Campbell County and Kenton County. Four are appointed by Kenton County Judge-Executive and two from Campbell County Judge-Executive. Each is appointed for a four year appointment. They meet once a month and set policies for the District.

Q5a2. Please explain why Mr. Bragg's and Mr. Lovan's Salaries and Current Terms are shown as "XXXX."

A5a2. Witness: Bragg. This is the way it has always been shown, however their salaries (hourly rate) is shown in the response by the District to the PSC information request date 4-10-2007, Item 8a.

Q5b. Explain, in detail, the following items on the Balance Sheet at pages 7 to 8.

Q5b1. Utility Investments (Account 124, page 17). Explain each of the three accounts compromising this total account.

A5b1. Witness: Bragg. The "IRR Account" is our operating capital account that is funded by revenues minus expenses. This fund is used to purchase capital items such as trucks, meter, power tools, backhoes, etc. Debt Service Account-Amount transferred from O&M towards payment of principal and interest on debt service twice a year, invested in short term investments. "Debt Service Reserve Account" is a reserve fund required by our General Bond Resolution that requires that 10% or highest years' principle and interest be set aside as a reserve. These funds can not be used until the bond issue is retired.

Q5b2. Other Investments (Account 125, page 17.

A5b2 Witness: Bragg. This represents the balance remaining from the settlement between the District and Boone County Water District and Florence Water District as former wholesale customers. Per PSC order in Case 2003-00224, this fund was to be amortized over 10 years at $438,584 per year into general revenue. For details please refer to PSC Order dated June 14, 2004,

Q5b3. Misc Deferred Debits (Account 186, page 20). Include explanation of "Other Deferred Debits" of $6,905,257.

A5b3. Witness: Bragg.

Miscellaneous Deferred Charges:	2006
162-0003-000 Prepaid Water Tower Painting	$1,909,407
162-0006-000 Prepaid Reservoir Cleaning	986,365
186-0001-000 Def'd Debit - PSC Assessment	28,627
253-0002-000 Def'd LOSS on Refunding - 1997	282,403
253-0003-000 Loss on Defeasance of 1992 A Bonds	1,055,651
253-0005-000 Loss on Defeasance - 2002 B	604,443
253-0006-000 Loss on Refinance - 2003 C Refunding	2,038,361
	$6,905,257

Q5b4. Decrease in Notes Payable (Account 232, page 24.)

A5b4. Witness: Bragg. Notes payables decreased because of payoff of BAN2004 in the amount of $3,605,000 and BAN2005 in the amount of $17,980,000.

Q5c. Explain the $528,022 loss from disposition of utility property (Account 414) on page 10.

A5c. Witness: Bragg. The District is in the process of selling three of its properties that where eliminated with the construction of a new central facility. This amount is the value of property at Kenton Lands property and equipment disposed of during 2006 from all locations. The gain or loss of the other two facilities will be book when the properties are transferred to the new owner.

Q5d. Explain the $11,097,339 Appropriation of Retained Earnings (Account 436) one page 12.

A5d. Witness: Bragg. This reserve refers to the response in A5b1. This is the other side of the journal entry to show that these funds are not available for use and are restricted for purposes stated above. These funds are not available for general operating expenses.

Q6. Please provide a detailed description of NKWD's fund accounting process and the restrictions relating to various funds and accounts.

A6. Witness: Bragg. All activities of the Water District are accounted for within a single proprietary (enterprise) reporting entity. Proprietary entities are used to account for operations that are (a) financed and operated in a manner similar to private business enterprises where the intent of the governing body is that the cost basis to be financed or recovered primarily through user charges, or (b) where the governing body has decided that periodic determination of revenues earned,

expenses incurred, and/or net income is appropriate for capital maintenance, public policy, management control, accountability, or other purposes.

The accounting and financial reporting treatment applied to the District is determined by its measurement focus. The transactions of the District are accounted for on a flow of economic resources measurement focus. With this measurement focus, all assets and all liabilities associated with the operations are included on the balance sheet. Net assets (i.e. total assets net of total liabilities) are segregated into "invested capital assets, net of related liabilities", "restricted" and "unrestricted" components.

Fund Structure

The activities of the accounts included in the financial statements are as follows: General Revenue Account, Operations and Maintenance Account, Boone Florence Settlement, Bond Proceeds Fund, Debt Service Reserve Account, Debt Service Account, Improvement, Repair, and Replacement Account, and Plant Account. The General Revenue Fund is established for all monies received by the District as Pledged Receipts and income from the Debt Service Reserve. Transfers from this account to other designated accounts follow the requirements of the General Bond Resolution. The Operation and Maintenance Account is used to pay operating and maintenance costs of the District in accordance with the annual budget. The Boone Florence Settlement relates to the early termination of water contracts with the City of Florence, Kentucky and the Boone County Water District. By direction of the PSC, these funds are restricted and moves in the

amount of $438,589 to an unrestricted account each year. The Bond Proceeds Fund contains the bond proceeds plus the investment interest earned that are available for paying the cost of construction and acquisition contracts relating to the water system as provided by the various bond ordinances. The Debt Service Reserve Account holds an amount that will equal the aggregate debt service reserve requirement (defined as the maximum annual debt service requirement in any succeeding bond fiscal year). The Debt Service Account accumulates the funds necessary to pay interest on the bonds when due and payable as well as the principal when due and payable. The Improvement, Repair, and Replacement Account is available to make major repairs and replacements and to pay the cost of construction of additions, extensions, and improvements to the water system. The Plant Account records the utility plant, related accumulated depreciation, funds available for plant additions, and the long term indebtedness of the District.

Restricted Net Assets

Net assets comprise the various net earnings from the operating revenues, expenses, and contribution of capital. Net assets are classified in three components: invested in capital assets, net of related debt, restricted and unrestricted net assets. Invested in capital assets, net of related debt, consists of all capital assets, net of accumulated depreciation and reduced by outstanding debt that is attributable to the acquisition, construction, and improvement of those assets. Restricted net assets consists of net assets for which constraints are placed thereon by external parties such as lenders, grantors, contributors, laws, regulations and enabling legislation, including self imposed legal mandates.

Unrestricted net assets consist of all other net assets not included in the previous categories.

Q7. Has NKWD made any accounting changes relating to GASB 34? If yes, please explain those changes and when they took place. Also, explain the impact theses changes had upon the figures included in NKWD's Rate Application.

A7. Witness: Bragg. Yes, only minor ones. The District has always maintained an accounting system that has basically followed the regulations of GASB34, even before it was published. The District system has always used accrual method and recognized depreciation and the recording capital expenses as an asset.

Q8. Explain NKWD's primary set of books. Are the books maintained in accordance with the Kentucky USoA or are they maintained in accordance with GASB34. In other words, does NKWD adjust its USoA books to GASB34 basis, or vice versa?

A8. Witness: Bragg. NKWD books follow the USoA required by the Public Service Commission and also meet any regulations that are stated by GASB34.

Q9. RE: Exhibit E.

Q9a. Please provide a reconciliation and mapping of the financial statements in this report to the balance sheet and other financial statements in Exhibit C.

A9a. Witness: Bragg. There is no reconciliation of these two reports. They are two different reports. The documents found in Exhibit C as of December 31, 2006 and in the format required by the PSC annual report format. The documents found in exhibit E are internal Balance Sheet and Income Statements.

Q10. Refer to Exhibit F. What is the source of this Chart of Accounts? Please provide narrative explanations of what is included in each account.

A10. Witness: Bragg. The Chart of Accounts used by the District is National Association of Regulatory Utility Commissioners (NARUC USoA), Uniform System of Accounts For Class C Water Companies per Kentucky Public Service Commission, 211 Sower Boulevard, Frankfort, Kentucky 40602. This system was adopted by the PSC in 2002.

Q11. Refer to Exhibit N, O, and P.

Q11a. Please explain whether the projections and plans reflected in these Exhibits are consistent with the projections and plans reflected in the 2004 NKWD Asset Management Program provided to the AG during the course of 2006-000398.

A11a. Witness: Harrison. The only project listed in Exhibit O that was not identified in the 2004 Asset Management Program is PSC Reference No. 134, (Gravity Thickener) FTTP Residuals Handling – Engineering. The District was performing an assessment to determine if the existing gravity thickener was undersized concurrently with the Asset Management Program. The report recommending a second gravity thickener was not completed in time to incorporate the cost of the recommended improvements into the Asset Management Program.

Q11b. Identify and explain all changes to the 2004 NKWD Asset Management Plan that NKWD has incorporated into its revenue requirement filing in this proceeding.

A11b Witness: Harrison. See table below for a list of projects having project cost changes from the 2004 Asset Management Program with an explanation immediately below the project name. It should be noted that all costs in the 2004 Asset Management Program were reflective of engineering and construction costs

that were current at the time when the report was prepared and that adjustments for inflation and for additional information developed through more detailed design are expected.

PSC Ref. No.	AMP Designation	Project	AMP Moderate CIP Cost	2007 Rate Case Cost
127	10-06	184-0439, TMTP Ultraviolet Disinfection (Construction)	$950,000	$1,150,000
During detailed design, it was determined that the existing electrical service and transformer were not large enough to supply power to the ultraviolet disinfection equipment. The additional cost covers construction of a below-ground vault for the transformer, conduit, and cable, as well as an uninterruptible power supply to condition the quality of the power (this will avoid shut-down of the disinfecting lamps).				
86	5-07,6-13,6-15	184-0435, MPTP Chemical Building, Raw Water PS, Filter Rehabilitation, Clearwell Rehabilitation	$6,095,000	$2,365,000 ($6,865,000 total with $4,000,000 SRF and $500,000 previously funded)
The cost increase is attributed to a rise in construction costs (hurricanes, exportation of steel overseas, etc.) between planning and bidding. The design engineer reported a composite 16% market increase in cost of labor and materials between just the 10-month period from 30% design completion in October 2005 and taking bids in August 2006.				
84	5-09	184-0437, Standby Generator at ORPS1	$510,000	$1,705,000 ($1,800,000 total with $95,000 previously funded)
The generator cost prepared by the engineer during the 2003 Vulnerability Assessment and planning for the 2004 Asset Management Program was determined to be inaccurate.				
119	13-02	184-0441, TMTP Backwash Handling System	$980,000	$1,189,000 ($2,100,000 total with $200,000 previously funded plus $711,000 from existing funds)
Pilot testing indicated the process could not be placed outdoors as indicated by the manufacturer, plus additional chemicals and recirculation were needed to optimize the treatment process. A building was added to house the equipment along with recirculation and chemical feed pumps. Also, KDOW encouraged discharge of treated backwater to Banklick Creek instead of returning to the head of the treatment process as planned. This request prompted additional piping and controls, which also increased the project cost along with a rise in construction costs.				
8	6-10	184-0411.502, FTTP Pretreatment Imp. (SCADA Upgrade Phase 3) Engineering	$2,400,000	$250,000 for Engineering Only
The current total project cost for a pretreatment building is $2,400,000. The $250,000 requested in the rate case covers design fees only.				
91	7-08	184-0445, Standby Generator at Dudley	$275,000	$1,500,000
The generator cost prepared by the engineer during the 2003 Vulnerability Assessment and planning for the 2004 Asset Management Program was determined to be inaccurate.				
131	7-05	184-0450, Pump #4 at ORPS1	$345,000	$350,000
The project cost increased due to a rise in construction costs between planning and bidding.				
134	Not Included	184-0451, (Gravity Thickener)	Not Included	$200,000

PSC Ref. No.	AMP Designation	Project	AMP Moderate CIP Cost	2007 Rate Case Cost
		FTTP Residuals Handling – Engineering		
The gravity thickener improvements were not identified in time to incorporate costs into the 2004 Asset Management Program.				
111	9-05 10-05	184-0447, FTTP Post-Filtration GAC - Engineering	$10.5 M Part 1 $10.5 M Part 2	$821,966
The total estimated project cost for a GAC building was $21,000,000. The $821,966 requested in the rate case covers design fees only.				
37-a	6-07	184-0113, Four & Twelve Mile Road - Stonehouse	$670,000	$305,000 ($975,000 total with $670,000 previously funded)
The length of the project was increased significantly during design.				
Not Listed	Not Specifically Included	Subdistrict F		$276,653
The Asset Management Program provided for an annual contribution toward extension into unserved areas. The scope and final cost for this project was unknown at the time of the 2004 Asset Management Program.				
Not Listed	Not Specifically Included	Subdistrict G		$1,721,381
The Asset Management Program provided for an annual contribution toward extension into unserved areas. The scope and final cost for this project was unknown at the time of the 2004 Asset Management Program.				
40	6-01	184-0115, KY 9 (36" Moock Rd to Newport Steel Entrance)	$1,500,000	$1,611,000
The project cost increased due to a rise in construction costs between planning and bidding.				
55	6-18	Water Main Replacement Program 2006	$2,500,000	$2,100,000
The water main replacement program was scaled back to offset cost increases experienced in other projects.				
56	6-17	Mains into Unserved Areas 2006	$500,000	$250,000
The mains into unserved areas was scaled back to offset cost increases experienced in other projects.				
57-a	6-02	184-0133, U.S. 27 Phase 1 from Ripple Creek BPS to AA Hwy	$1,700,000	$575,000
This project is being constructed in phases so that the key redundancy portion under the AA Highway is constructed while the remaining section is under designed.				
20	4-01	U.S. 27 from SR 824 to Pendleton Co. Meter Pit	$770,000	$885,000
Construction of this project is tied to a road realignment project by the State. Increases in project cost reflect increases in construction costs between the 2004 planning and the 2007 rate case.				
57	6-02	U.S. 27 Phase 2 to from AA Highway to East Alexandria Pike	$1,700,000	$891,000
This project is being constructed in phases so that the key redundancy portion under the AA Highway is constructed while the remaining section is under design.				
140	5-01	184-0604, Lower Tug Fork 3" Water Main Replacement	$585,000	$328,000
The project cost was reduced because field investigation found the required length of the project was not as great as expected when using record drawings during planning.				
78	7-02	184-0147, Four Mile Pike (Poplar Ridge to Nine Mile)	$510,000	$996,000
A newer estimate was prepared by an engineer who conducted a field reconnaissance, after the 2004 Asset Management Program, that indicated the project cost should be increased.				

PSC Ref. No.	AMP Designation	Project	AMP Moderate CIP Cost	2007 Rate Case Cost
77	7-01	KY 547 from Washington to Nelson, Phase 1	$965,000	$570,000
This project is being bid in phases and the cost in the rate case is just the first phase.				
81	7-10	Main into Unserved Areas 2007	$500,000	$250,000
The mains into unserved areas was scaled back to offset cost increases experienced in other projects.				
105	7-09	Year 2007 Systematic Water Main Replacement Design	$1,000,000	$400,000
The $400,000 requested in the rate case is for engineering design fees only. The District received $3.5 M in grant monies from the State that will be used for construction.				
106	4-16	Radio Read Meters Kenton & Campbell Areas 2006	$1,300,000	$800,000
Deployment of this project may be completed over 12 months, 24 months, or 36 months and is expected to be under the original budget as the water meters are not going to be replaced when the radio read equipment is installed. The 2004 Asset Management Program showed the radio read meter program being funded over 108 months at a cost of $13,430,000.				
126	13-01	42" Transmission Main from FTTP to Moock Road Design	$4,290,000	$400,000
The $400,000 requested in the rate case is for engineering design fees only.				

Q11c. Provide the most recent update to the 2004 NKWS Asset Management Plan and any completely new NKWD Asset Management Plan that have been conducted since the 2004 NKWD Asset Management Plan was completed.

A11c. Witness: Harrison. The 2004 report of the NKWD's Asset Management Program is the most recent plan.

Q12. Refer to the "Audit Adjustments" in Tab 7 to NKWD response to Staff's April 10, 2007, Data Request. ADJ 1 includes a $700,000 decrease to Residential with a corresponding $700,000 decrease to Accounts Receivable-Unbilled Water KC. The explanation says, "To adjust unbilled water to a more reasonable amount."

Q12a. How did you establish "reasonable".

A12a. Witness: Bragg. The district performs an estimated calculation at year end, where it takes the last time each route was read prior to December 31, and figures the number of days from the last time it was read until December 31. Then it takes the monthly billing dollars for each route divided by 30.5 and takes that number

times the number of days unbilled prior to December 31. During the independent audit that number is recorded on the books as unbilled water and is adjusted each year by the new calculation. The term reasonable is used by the auditors meaning the same as best estimate.

Q12b. What impact does this adjustment have upon the requested revenue increase in this case? Please provide a complete explanation with citations to specific exhibits and work papers.

A12b. This calculation has no effect on rate revenue. It is simply a calculation that estimates water that had been sold as of December 31, but has not been billed. The purpose of this entry is to record estimated accounts receivable and revenue for water sold to its customers but not billed. This method follows the general accepted accounting standards of accrual accounting.

Q13. Please explain how the cash flow NKWD derives from depreciation expense relates to the financing of its construction program.

A13. There is no direct relationship. The depreciation expense built into the rates provides for capital replacements. The financing of construction projects is the amount that is needed to provide for capital replacement and improvement beyond what (depreciation) funds from operations can provide.

Q14. If NKWD did not depreciate its assets at all, what internal changes would that make to its revenue requirement request in order to stay at the same revenue increase proposal? In order words, would additional external financing be required, or would NKWD request a special specific cash flow stream to replace the depreciation?

A14. Witness: Bragg. The District has only two basic sources for funds to maintain and improve its capital system. One is the funds left over after revenues minus O&M and debt service is paid, which is posted to it IRR as discussed above. This number is basically the amount of depreciation expense built into the rate structure. Since this number is not near enough for the District to maintain and improve its capital system, the only other basic source is the issuance of long term financing. So if the annual depreciation was not built into the rate structure the District would have to raise general rates greatly to compensate for the loss of $4 to $5 million dollars annually. To replace the depreciation expense with borrowed funds, could not happen since the investment market requires that a company have deprecation built into it operations, which is reflected in each bond issuance. Also, the District would not be incompliance with GASB34.

Q15. What is the projected customer growth for the next 5 years? Will this growth occur in existing neighborhoods, or as result of future development?

A15. The District has no way of knowing what percentage will come from new developments or existing areas. What the District's records do show is that on an annual bases customer count increases about 800 to 1,000 additional customers a year. This estimate is based upon number of new services completed each year and number of bills mailed.

Q16. Have "no-dig" alternatives to replacement, such as relining, clean and lining, etc., of the unlined cast iron pipes been investigated? If yes, were these alternative rejected or are they reflected in the revenue requirement filing? If yes, where are they located?

A16. Witness: Harrison. The projects in the current revenue requirement filing do not utilize "no-dig" alternatives. The District has investigated and utilized epoxy cleaning and lining as a no-dig alternative in the past. This program has been put on hold due to the Kentucky Public Service Commission's ruling in the District's last rate case that this is not to be treated as an expense for rate making purposes and should be capitalized as an asset. This decision effectively removed the revenue necessary to fund this program from the District's rate base. Additionally, the District has used directional drilling on a limited basis to minimize restoration requirements.

AFFIDAVIT

COMMONWEALTH OF KENTUCKY

COUNTY OF KENTON

Affiant, Jack Bragg, appearing personally before me a notary public for and of the Commonwealth of Kentucky and after being first sworn, deposes, states, acknowledges, affirms and declares that he is Vice President - Finance, that he is authorized to submit this Response on behalf of Northern Kentucky Water District, and that the information contained in the Response is true and accurate to the best of his knowledge, information and belief, after a reasonable inquiry, and as to those matters that are based on information provided to him, he believes to be true and correct.

Jack Bragg

This instrument was produced, signed, acknowledged and declared by Jack Bragg to be his act and deed the 26 day of July, 2007.

J. Robinson
Notary Public

My Commission expires: 1-3-2010

Standard Monitoring Plan

VIII. ATTACHMENTS

☒ *Distribution System Schematic (**REQUIRED**).

☒ Additional sheets for the summary of data or site justifications (Sections III and IV).

Additional copies of Page 3 for Justification of IDSE Standard Monitoring Sites (Section IV).
☒ **REQUIRED** if you are subpart H system serving **more than 49,999 people** or a ground water system serving **more than 499,999 people**.

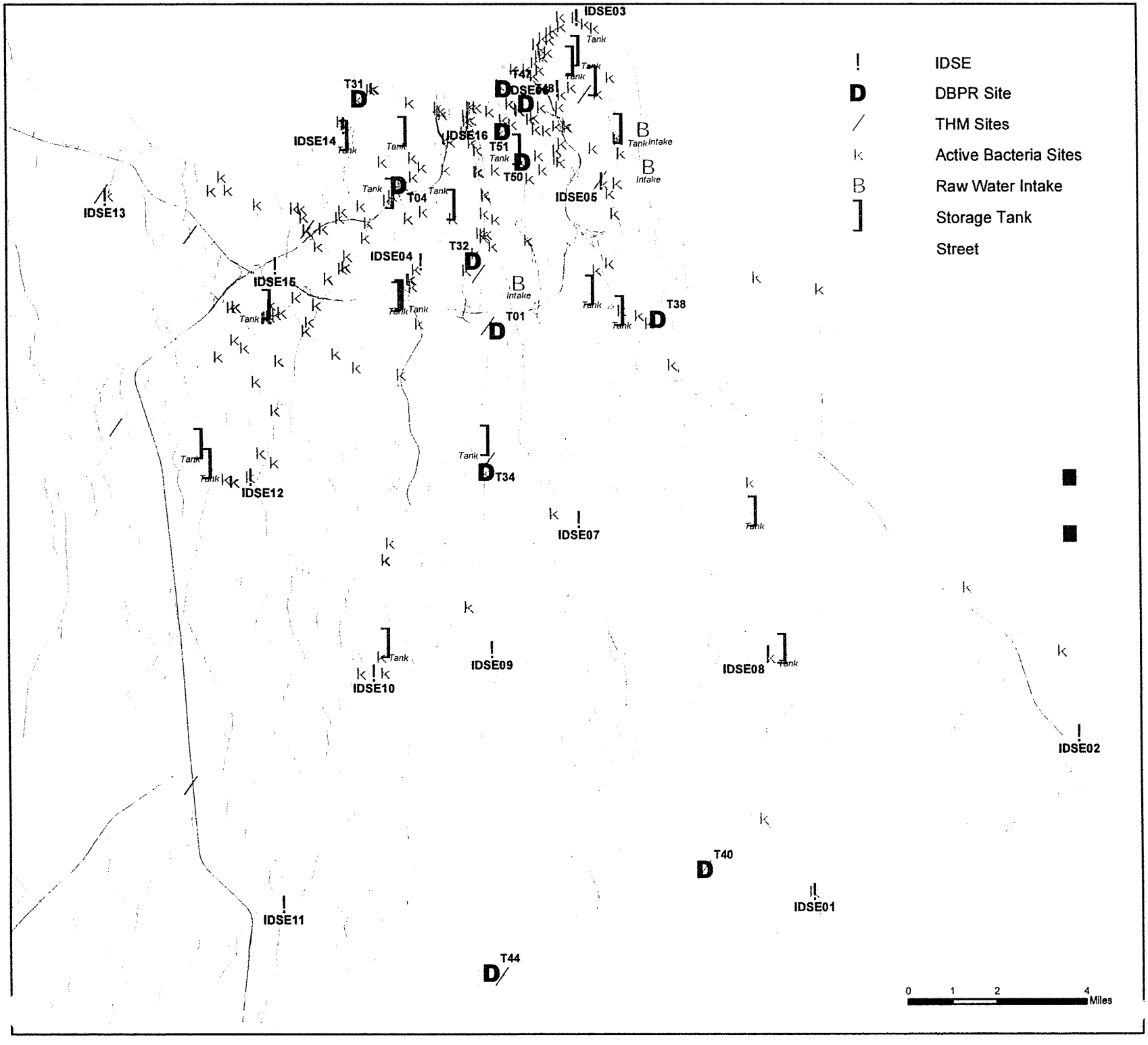
☒ Additional sheets for explaining how you used data other than TTHM, HAA5, and temperature data to select your peak historical month (Section V).

Additional copies of Page 4 for peak historical month and proposed monitoring dates (Section V).
☒ **REQUIRED** if you are a subpart H system serving **more than 49,999 people** or a ground water system serving **more than 499,999 people**.

☒ Additional sheets for planned Stage 1 DBPR compliance monitoring dates (Section VI).

Total Number of Pages in Your Plan: 19

Print Form Submit by Email


IDSE03
T31
T47
T48
IDSE14
IDSE16
T51
T50
IDSE05
IDSE13
T04
T32
IDSE04
IDSE15
T01
T38
IDSE12
T34
IDSE07
IDSE10
IDSE09
IDSE08
IDSE02
T40
IDSE01
IDSE11
T44
Tank
Intake
IDSE
DBPR Site
THM Sites
Active Bacteria Sites
Raw Water Intake
Storage Tank
Street
0
1
2
4
Miles

Northern Kentucky Water District Compliance Locations 2003
PWSID KY0590220

STATE COMPLIANCE TTHM 2003

SAMPLE LOCATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	SITE AVG.	COMPLIANCE AVG.
T01	14.72	16.73	23.59	33.26	42.84	56.42	77.18	113.17	121.93	52.6	67.59		56.37	48.19
T04	13.07	12.04	24.98	30.75	46.86	61.55	65.4	88.17	78.63	43.95	42.55		46.18	37.94
T31	14.45	15.87	22.16	29.28	49.73	61.36	77.37	91.98	81.87	36.75	38.91		47.25	40.00
T32	13.84	13.13	16.05	33.11	51.28	73.06	68.36	111.33	92.46	44.83	44.83		51.10	39.98
T38	16.08	9.71	15.82	29.85	45.56	62.93	75.05	91.48	87.5	50.29	34.27		47.14	38.81
T40	21.02	16.69	26.08	40	83.12	79.78	103.44	137.63	117.61	75.25	68.87		69.95	58.33
T44	22.27	20.39	27.62	46.48	97.08	92.79	118.22	180.45	158.97	82.31	61.26		84.35	67.06
T47	16.23	12.33	22.38	39.25	60.21	44.01	59.33	53.4	48.28	26.56	29.62		36.87	34.61
T48	14.99	11.76	20.61	31.13	57.71	38.33	53.59	55.65	45.92	24.22	25.15		34.46	31.22
T51	19.73	13.53	24.02	33.41	83.28	50.91	63.82	56.66	56.84	36.57	33.03		42.86	37.42
T50	18.03	12.39	26.87	35.36	65.6	65.15	80.98	84.72	55.58	27.14	45.08		45.26	40.11
T34				36.98	79.8	80.59	96.12	125.21	123.43	63.17	72.9		84.78	68.67
MONTHLY THM AVG.	16.84	14.05	22.74	34.38	63.59	63.91	76.57	98.85	89.09	45.50	48.67	#DIV/0!	51.07	44.11
Number of results >=80	0	0	0	0	3	2	3	9	7	1	1	0	2	0

STATE COMPLIANCE HAA 2003

SAMPLE LOCATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	SITE AVG.	COMPLIANCE AVG.
T01	10.9			29.95	35.41		59.84		74.32		65.37	27.22	43.29	41.52
T04	12.8			24.25	40.09		53.36		46.43		42.85	28.00	35.40	33.32
T31	12.9			26.62	37.38		67.61	58.23	50.93		39.96	21.36		36.52
T32	12.1			23.04	34.78		35.02	53.85	64.23		59.78	25.24		32.49
T38	14.9			30.74	35.01		90.83	85.62	72.81		45.79	33.73	51.18	45.57
T40	17.84			33.01	53.42		9.92	92	96.72		79.22	44.57		34.81
T44	17.2			42.12	56.77		115	89.03	159.32		86.05	79.46		65.09
T47	14.6			31.45	37.81		52.38	28.98	29.79		22.55	28.49		30.25
T48	14			31.94	37.96		44.08	26.22	27.64		28.8	30.18		29.71
T51	18.2			32.31	53.31		46.79	31.69	32.89		32.73	31.27		32.51
T50	16.7			28.96	34.07		47.01	42.83	35.08		25.53	35.66		30.05
T34				46.2	46.2		81.9	70.51	102.12		85.06	51.59		71.02
MONTHLY HAA AVG.	14.85	#DIV/0!	#DIV/0!	31.6325	41.46	#DIV/0!	58.84	57.90	66.02	#DIV/0!	51.1408333	36.40	43.29	39.07
Number of results >=60	0	0	0	0	0	0	4	4	6	0	1	0	0	0

Compliance Months are shaded in Blue

Northern Kentucky Water District Compliance Locations 2004
PWSID KY0590220

STATE COMPLIANCE TTHM 2004

SAMPLE LOCATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	SITE AVG.	COMPLIANCE AVG.
T01	18.08	17.13	37.01	53.5	85.35	55.06	74.47	84.58	100.69	48.38	35.16	26.67	53.01	48.61
T04	15.86	15.58	27.28	39.5	58.33	52.76	73.09	74	104.37	67.38	34.14	44.38	49.72	46.46
T31	12.79	16.07	30.71	46.09	58.74	61.02	78.48	93.64	106.73	85.83	43.34	28.86	53.52	50.79
T32	12.67	15.94	30.16	48.77	57.52	67.67	70.97	83.94	104.84	70.12	43.74	30.7	53.17	50.88
T38	12.27	16.74	25.41	44.66	59.59	53.08	71.95	91.66	63.16	71.66	38.11	28.28	48.05	50.14
T40	18.72	26.21	33.42	84.63	79.88	72.43	106.19	120.54	93.38	77.94	55.94	40.86	65.93	67.12
T44	27.09	28.12	38.91	73.56	97.6	102.62	141.65	140.07	117.61	100.18	79.03	71.75	84.85	85.62
T47	16.73	13.46	17.75	27.95	55.81	45.12	51.06	51.07	49	37.42	27.47	22.3	34.60	33.29
T48	14.16	12.44	3.42	27.45	53.69	39.67	48.41	48.44	45.63	37.09	25.9	20.15	31.37	31.77
T51	16.08	15.93	26.75	31.94	57.57	46.82	58.63	56.19	53.66	45.15	30.58	25.15	38.54	37.45
T50	21.68	14.82	18.9	44.68	77.31	55.57	59.28	72.96	67.35	57.88	35.76	32.18	46.53	45.88
T34	19.39	20.9	25.15	45.43	53.54	51.31	68.45	67.25	58.76	52.70	33.57	25.9	43.61	46.74
MONTHLY THM AVG.	17.21	17.78	26.24	45.76	66.24	58.59	75.13	82.03	80.43	80.14	40.23	33.75	50.84	49.56
Number of results >=80	0	0	0	0	2	1	2	6	6	1	0	0	1	1

STATE COMPLIANCE HAA 2004

SAMPLE LOCATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	SITE AVG.	COMPLIANCE AVG.
T01	26.74	24.26	40.12	38.85	66.64	48.71	38.37	58.56	67.65	48.17	48.42	43.8	46.01	38.48
T04	28.84	23.26	22.64	32.66	42.76	40.87	47.56	54.32	77.39	54.41	51.17	54.74	43.40	38.42
T31	24.48	24.44	38.64	42.35	45.52	47.36	40.93	59.74	82.41	53.21	47.69	35.56	45.19	40.24
T32	23.55	24.74	39.03	43.68	39.21	50.81	32.07	56.19	65.72	57.31	47.73	32.56	42.72	39.15
T38	23.7	36.69	38.29	37.43	49.11	50.96	39.81	69.77	69.06	80.92	53.15	37.31	47.18	40.44
T40	31.51	34.01	46.12	49.86	59.68	68.94	49.91	63.26	85.63	66.11	64.18	38.85	54.82	49.30
T44	31.87	34.85	57.32	59.53	76.28	93.88	43.52	42.63	35.43	44.98	67.77	63.54	54.30	44.98
T47	18.96	25.38	21.01	25.72	40.85	38.48	24.22	30.8	37.26	38.50	39.66	29.61	30.95	27.10
T48	20.15	25.28	23.71	26.87	65.78	39.5	26.81	22.81	34.07	33.15	37.56	28.73	32.04	26.75
T51	18.58	24.89	23.23	30.79	47.81	44.13	26.39	27.17	41.07	33.84	39.68	31.08	32.37	27.35
T50	31.6	27.6	29.92	41.89	38.03	43.55	32.51	*	47.35	41.96	39.49	43.14	37.91	36.99
T34	28.79	30.03	42.04	43.48	44.2	47.68	41.54	49.96	56.4	45.44	43.75	29.63	41.91	39.81
MONTHLY HAA AVG.	25.96	27.76	34.55	39.05	51.97	51.56	38.14	48.66	58.29	48.15	48.35	39.05	42.40	37.32
Number of results >=60	0	0	0	0	3	2	0	2	6	1	0	0	0	0

Compliance Months are shaded in Blue

Northern Kentucky Water District Compliance Locations 2005
PWSID KY0590220

STATE COMPLIANCE TTHM 2005

SAMPLE LOCATION CODE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	SITE AVG.	COMPLIANCE AVG.
T01	19.06	21.55	43.1	60.75	56.74	85	97.62	131.78	77.8	75.32	58.67	53.79	65.06	71.60
T04	18.08	20.59	27.45	66.62	44.01	76.2	77.89	63.54	73.77	53.56	47.07	57.55	53.94	55.70
T31	14.75	20.4	19.01	25.96	43.39	81.62	63.93	83.82	68.61	77.82	58.86	41.35	49.96	50.59
T32	17.87	20.99	17.53	22.25	42.34	79.19	60.49	80.95	72.16	79.78	65.69	42.43	50.07	50.01
T38	15.22 *	18.04	16.69	29.00	44.93	78.80	64.39	91.01	72.40	77.50	42.02	42.70	49.39	53.18
T40	12.86	32.81	27.42	43.29	56.96	92.42	89.91	128.45	105.3	129.09	87.14	72.3	73.17	78.45
T44	39.24	46.64	34.74	76.90	57.88	119.7	129.73	177.6	132.03	97.51	101.55	102.31	93.16	98.34
T47	*12.16	15.97	18.35	27.93	27.71	48.14	43.88	50.87	53.37	54.02	38.93	23.14	34.54	36.25
T48	10.19	15.89	14.01	23.7	24.64	42.09	40.24	46.47	48.33	51.89	37.01	21.8	31.36	33.06
T51	12.91	17.47	22.48	29.47	36.52	51.78	*	59.61	71.53	56.41	42.58	25.78	38.79	39.65
T50	16.87	26.29	16.99	73.49	27.64	59.21	66.07	60.67	56.38	69.92	64.37	41.14	48.25	55.24
T34	15.22 *	20.5	15.6	52.82	42.97	75.31	92.74	84.14	64.23	57.71	46.02	37.84	50.41	52.42
MONTHLY THM AVG.	17.10	23.10	22.78	44.42	42.14	74.12	75.17	89.93	74.66	73.38	57.49	46.84	53.43	56.21
Number of results >=80	0	0	0	0	0	4	4	8	2	2	2	1	1	1

Compliance Months are shaded in Blue
*business was closed

STATE COMPLIANCE HAA 2005

SAMPLE LOCATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	SITE AVG.	COMPLIANCE AVG.
T01	23.76	25.47		21.36				57.5		31.45	34.08	29.86	31.92	33.52
T04	26.69	23.34		23.1				39.70		25.72	27.91	30.02	28.05	28.78
T31	24.47	22.93		30.49				42.9		29.71	33.65	25.12	29.90	31.89
T32	10.88	25.82		34.57				34.5		28.04	29.92	24.42	29.73	31.99
T38	24.35	19.85		68				42.4		32.16	27.94	38.27	34.42	38.73
T40	25.79	28.24		43.3				42.9		41.03	42.52	35.32	37.01	38.26
T44	32.28	48.53		13.28				41.8		38.62	49.23	44.34	38.30	31.50
T47	33.15	17.17		18.69				32.8		21.17	20.96	22.26	23.74	26.45
T48	24.45	7.43		22.77				29.4		19.95	19.50	22.48	20.85	24.14
T51	35.92	17.08		28.98				25.2		20.58	23.88	21.88	24.50	27.17
T50	30.74	22.97		31.05				28.4		22.44	20.26	22.32	26.74	30.41
T34	28.88	20.6		57.92				39.1		22.48	30.63	23.58	31.77	36.90
MONTHLY THM AVG.	27.50	23.29		33.23				38.06		27.78	30.04	23.22	29.02	31.64
Number of results >=60	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Northern Kentucky Water District Compliance Locations 2006
PWSID KY0590220

STATE COMPLIANCE TTHM 2006

SAMPLE LOCATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	SITE AVG.	COMPLIANCE AVG.
T01	47.23	[illegible]	33.1	[illegible]	84.68	135.64	107.97	179.54					83.82	63.46
T04	31.47	[illegible]	24.11	[illegible]	62.1	91.48	52.41	113.14					54.18	37.04
T31	28.74	[illegible]	30.92	[illegible]	54.26	102.53	81.59	155.45					64.64	48.40
T32	*	[illegible]	25.58	[illegible]	47.02	95.41	91.84	143.31					66.12	50.50
T38	*	[illegible]	26.7	[illegible]	39.86	74.55	59.04	100.79					51.92	40.50
T40	*	[illegible]	41.74	[illegible]	66.85	134.92	104.37	155.81					84.56	64.20
T44	*	[illegible]	51.91	[illegible]	62.93	137.96	114.33	167.62					91.53	73.44
T47	*	[illegible]	25.53	[illegible]	34.63	73.08	80.13	94.78					52.89	47.40
T48	*	[illegible]	23.1	[illegible]	30.36	68.39	70.38	93.81					48.50	41.27
T51	*	[illegible]	26.47	[illegible]	35.84	79.91	73.18	109.1					55.92	46.72
T50	*	[illegible]	33.01	[illegible]	41.72	88.26	75.52	93.03					58.36	50.84
T34	*	[illegible]	24.18	[illegible]	50.84	75.68	85.51	116.17					57.35	44.87
MONTHLY THM AVG.	35.81	[illegible]	30.53	[illegible]	50.92	96.48	83.01	126.88	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	64.77	#DIV/0!
Number of results >=80	0	[illegible]	0	[illegible]	1	7	7	12	0	0	0	0	3	0

STATE COMPLIANCE HAA 2006

SAMPLE LOCATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	SITE AVG.	COMPLIANCE AVG.
T01	42.69	[illegible]	31.56	[illegible]	53.69	77.44	81.88	77.89					53.58	48.45
T04	37.75	[illegible]	25.30	[illegible]	44.14	60.30	51.61	49.89					40.14	34.57
T31	31.57	[illegible]	26.68	[illegible]	47.02	61.80	65.09	53.90					41.75	37.69
T32	30.39	[illegible]	30.64	[illegible]	35.11	67.85	52.08	82.31					43.10	32.82
T38	28.43	[illegible]	24.43	[illegible]	32.80	65.92	52.16	64.04					39.43	33.27
T40	39.05	[illegible]	36.97	[illegible]	54.22	107.66	72.60	83.69					57.11	45.11
T44	49.60	[illegible]	37.61	[illegible]	48.79	111.57	58.73	68.94					56.86	46.11
T47	28.90	[illegible]	18.63	[illegible]	24.83	61.73	46.02	48.06					34.84	32.19
T48	23.91	[illegible]	18.98	[illegible]	22.14	55.93	45.91	41.94					32.37	32.02
T51	25.08	[illegible]	20.19	[illegible]	20.11	47.62	43.61	44.90					31.47	31.29
T50	29.24	[illegible]	20.96	[illegible]	22.20	62.68	46.95	40.79					35.17	35.16
T34	35.91	[illegible]	33.93	[illegible]	38.18	68.54	50.18	51.45					41.26	34.03
MONTHLY HAA5 AVG.	33.54	[illegible]	27.16	[illegible]	36.94	70.75	55.66	58.98	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	42.26	#DIV/0!
Number of results >=60	0	[illegible]	0	[illegible]	0	10	3	5	0	0	0	0	0	0

Compliance Months are shaded in Blue

NORTHERN KENTUCKY WATER DISTRICT PWSID KY0590220
CHLORINE RESIDUALS FOR IDSE SITE LOCATIONS

All results are reported in mg/l.

Distribution Chlorine Average for 2005 was 1.48

IDSE Location	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05	Average Chlorine for IDSE Site Area
IDSE01													
399 *	1.7	1.7	1.8	1.9	1.4	1.1	1.1	1.0		1.0	1.3	1.8	1.34
393	0.6	1.7	2.0	1.7	1.5	1.2	0.9	0.9	0.9	1.1	1.2	1.3	
IDSE03													
365 *	1.6	1.6	1.5	1.4	0.3	1.3	0.5	0.5	0.3	0.4	0.3	0.6	1.18
368	1.6	1.8	1.8	1.7	1.3	1.7	1.3	1.1		1.5	1.4	1.3	
364	1.5	1.6	1.4	1.2	1.1	0.9	0.4	0.4	0.4		1.0	1.1	
373	1.7	1.8	1.8	1.7		1.2	1.3	1.1	1.1		1.2	1.3	
IDSE04													
98 *	1.6	1.6	1.8	1.9	1.7	1.5	1.4	1.6	1.2	1.6	1.3	1.7	1.60
111	1.8	1.8	1.8		1.7	1.7	1.5	1.3	1.5	1.6	1.7	1.6	
IDSE05													
268 *	2.1	1.7	2.0	1.7	1.8	1.7	2.0	1.7	1.8	1.7	2.0	1.8	1.89
328	1.9	2.0	1.9	2.0	1.6	2.1	2.1	1.6		1.8	2.2	1.9	
327	2.0	2.0	2.0	2.0	1.6	1.6	2.2	1.8	1.7	1.8	2.2	2.0	
IDSE08													
396 *	1.4	1.4	1.8	1.5	1.2	1.2	0.6	1.1	0.3	0.5	1.3	1.3	1.19
393	0.6	1.7	2.0	1.7	1.5		0.9	0.9	0.9	1.1	1.2	1.3	
IDSE10													
14	1.8	2.2	2	2.2	1.6	1.8	0.9	1.6	1.4	2.0	1.8	1.9	1.51
35	1.7	2.2	1.2	1.6	1.7	0.6	0.6	0.7	0.8	0.8	1.5	1.7	
IDSE12													
323 *	1.7	1.8	1.7	1.4	1.5	1.2	1.3	1.0	0.9	1.4	0.9	1.1	1.44
107	1.7	1.7	1.8	1.4	1.6	1.2	1.3	1.3	0.9	1.2	1.3	1.5	
116	1.8	1.8	1.8	1.8	1.8	1.6	1.6	1.4	1.1	1.1	1.7	1.7	
IDSE13													
94 *	1.2	1.6	1.6	1.3	1.3		0.8	0.9	0.5	0.8	1.1	0.9	1.09
IDSE14													
458 *	0.8	1.2	1.3	0.5		1.4	1.6	0.9	1.0	1.3	1.2	1.7	1.17
IDSE15													
1	0.9	1.5	1.5	1.1	0.9	1.5	1.6	0.7	1.3	0.4	0.3	1.3	1.37
101	1.5	1.8	1.6	1.8	2.2	1.5	1.1	1.7	1.7	1.4	1.7	1.9	
IDSE16													
307 *	1.6	1.6	1.7	1.5	1.4	0.9	1.4	1.0	1.3	1.6	1.5	1.7	1.44
303	1.6	1.7	1.9	1.6	1.7	1.7	1.9	1.7	1.3	1.5	1.7	1.8	
44	1.1	1.5	1.1	1.4	1.4	1.3	1.4	1.4	1.2	0.2	0.7	1.7	

2005 Chlorine FTTP-TMTP-MPTP Taken from total coliform samples from Distribution (D) only.

2004	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Avg	1.34	1.46	1.43	1.34	1.27	1.21	1.24	1.28	1.25	1.39	1.43	1.64
Quarterly Avg	1.41			1.27			1.26			1.49		

2005	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Avg	1.53	1.59	1.58	1.43	1.46	1.46	1.44	1.47	1.46	1.43	1.42	1.49
Quarterly Avg	1.57			1.45			1.46			1.45		

Chlorine	2nd ¼ 2004	3rd ¼ 2004	4th ¼ 2004	1st ¼ 2005	2nd ¼ 2005	3rd ¼ 2005	4th ¼ 2005
Annual Average	1.27	1.26	1.49	1.57	1.45	1.46	1.45
Running Annual Average				1.40	1.44	1.49	1.48

Average 1.48

REPORT IN CCR: Highest Annual Average	1.49		1.42 - 1.59	Monthly Range

NORTHERN KENTUCKY WATER DISTRICT PWSID KY 0590220
WATER TEMPERATURE AVERAGES FOR THE DISTRIBUTION SYSTEM

All Temperatures are in Degrees C

Year:	2005	2006
January	12.68	10.89
February	10.4	12.53
March	11.78	11.31
April	14.21	14.41
May	18.81	18.08
June	23.29	21.71
July	25.97	25.7
August	26.21	26.5
September	25.68	
October	23.14	
November	18.17	
December	12.34	

Amy Kramer

From: "Roney, Julie (EPPC DEP DOW)" <Julie.Roney@ky.gov>
To: "Amy Kramer" <akramer@nkywater.org>
Sent: Thursday, October 19, 2006 11:38 AM
Subject: RE: Taylor Mill Treatment Plant UV Design

Amy, I doubt that I will make the Monday meeting. As long as the final plans are submitted to DWB for approval, I see no need in a separate meeting. Thanks for the information though.

Julie W. Roney, Supervisor
Technical Assistance and Outreach
Drinking Water Branch
502/564-3410, extension 535
502/564-9899 (fax)

From: Amy Kramer [mailto:akramer@nkywater.org]
Sent: Thursday, October 19, 2006 11:23 AM
To: Roney, Julie (EPPC DEP DOW)
Subject: Taylor Mill Treatment Plant UV Design

Julie,

We have a review meeting scheduled with Black & Veatch for Monday, October 23rd at 9:30 a.m. at TMTP to finalize the UV disinfection design. You are welcome to attend the meeting or to request a separate meeting, if you are unable to attend next week.

We are meeting Solitha tomorrow at the plant to discuss the project. The project was submitted for plan review last week.

Please advise of your interest in attending the meeting Monday or requesting a meeting at another date.

Thanks,
Amy Kramer

ERNIE FLETCHER
GOVERNOR

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

TERESA J. HILL
SECRETARY

October 23, 2006

Amy Kramer, P.E., Design Engineering Manager
Northern Kentucky Water District
2835 Crescent Springs Road
P. O. Box 18640
Erlanger, Kentucky 41018

RE: DW # 0590220-06-042
AI #: 2485
APE #: 20060042
Water Treatment Plant Improvements
Taylor Mill WTP UV Disinfection

Dear Ms. Kramer:

We have completed the review of the plans and specifications for the above referenced project. The plans proposed the Installation of two Ultraviolet (UV) light disinfection reactors (dosage of 40 mJ/cm^2 at plant's peak flow of 12 mgd) between the existing filters and clearwell with appropriate instrumentation. Also, it consists of modification to the existing chemical feed piping and installation of a new combine filter effluent entrance to the clearwell to accommodate the second UV reactor unit. This is to advise that plans and specifications for the above referenced project are APPROVED with respect to sanitary features of design, as of the date of this approval letter, with the following stipulations:

1. The rated capacity of the water treatment plant shall remain at 12.0 MGD. This facility is required to keep the chlorine as the primary disinfectant after filtration and UV system is to be used as a supplemental disinfection only.

2. No bypass line shall be installed for the UV reactor if this facility is approved for Cryptosporidium removal credit.

3. In the 2003 edition of Recommended Standards for Water Works, there is a policy statement on UV light for treatment of public water supplies. UV water treatment devices shall comply with criteria approved by class A criteria under ANSI/NSF Standard 55 – Ultraviolet Microbial Water Treatment Systems. Each UV water treatment device shall meet the following standards:

    a. Ultraviolet radiation at a wavelength of 253.7 nanometers shall be applied at a minimum dose of 40 milijoules per square centimeter (mJ/cm^2) at the failsafe set point at the end of lamp life.

    b. The UV device shall be fitted with a light sensor to safely verify that UV light is being delivered into the reactor.

c. The UV light assembly shall be insulated from direct contact with water by a quartz (or high silica glass with similar optical and strength characteristics) lamp jacket to maintain proper operating lamp temperature.

d. The design and installation of the UV reactor shall ensure that the manufacture's maximum rated flow and pressure cannot be exceeded.

e. The UV assemblies shall be accessible for visual observation, cleaning and replacement of the lamp, lamp jackets and sensor window/lens.

f. A narrow band UV monitoring device shall be provided that is sensitive to germicidal UV light. It shall be accurately calibrated so that it indicates the true irradiance (mJ/cm^2) at 253.7 nanometers and be installed at the location critical for that unit. The device shall trigger an audible alarm in the event the sensor or lamp fails or if insufficient dosage is detected.

g. An automated shutdown valve shall be installed in the water supply line ahead of the UV treatment system that will be activated whenever the water treatment system loses power or is tripped by a monitoring device when the dosage is below its alarm point of 40 mJ/cm^2. When power is not being supplied to the UV unit the valve shall be in a closed (fail safe) position.

h. The UV housing shall be stainless steel 304 or 316L.

3. Adequate supply of UV bulbs shall be kept at the facility site for maintenance purposes.

4. Adequate ventilation and humidity control shall be provided for the UV system control unit.

5. Prior to put into operation, UV system shall be disinfected according to the Kentucky Division of Water's regulations.

6. When this project is completed, the owner shall submit a written certification to the Division of Water that the above referenced water supply facilities have been constructed and tested in accordance with the approved plans and specifications and the above stipulations. Such certification shall be signed by a licensed professional engineer.

This approval has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this approval does not relieve the applicant from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal and local agencies.

Unless construction on this project commences within one year from the date of this approval letter, Northern Kentucky Water District shall request an official extension from the Division of Water prior to the first anniversary of this approval letter, or re-submit the original plans and specifications for a new comprehensive review.

If you have any questions concerning this project, please contact Solitha W.Dharman, PE, at (502) 564-2225, extension 572.

Sincerely,

Donna S. Marlin

Donna S. Marlin, Manager
Drinking Water Branch
Division of Water

DSM: SWD
Enclosures

C: Donnie Ginn, P.E., Project Manager, Black & Veatch
Marissa Albright, P.E., Project Engineer, Black & Veatch
Bari Joslyn, NKWD
Kenton county Health Department
Julie Roney, Supervisor, Technical Assistance Section
Florence Field Office

Mary Carol Wagner

From: "Roney, Julie (EPPC DEP DOW)" <Julie.Roney@ky.gov>
To: "Mary Carol Wagner" <wagner@nkywater.org>
Cc: "Dharman, Solitha (EPPC DEP DOW)" <Solitha.Dharman@ky.gov>
Sent: Tuesday, November 07, 2006 8:08 AM
Subject: RE: Disinfection

We miss her too!

For the UV Crypto credit, make sure you meet and follow the criteria in the reg (141.720 Inactivation Toolbox Components (d) UV Light). I would also look at the UV Guidance Manual, even though it is still in draft format. 10 States Standards also has some criteria for UV and since we have incorporated that into our regulations, we would look to it as well.s

Julie W. Roney, Supervisor
Technical Assistance and Outreach
Drinking Water Branch
502/564-3410, extension 535
502/564-9899 (fax)

From: Mary Carol Wagner [mailto:wagner@nkywater.org]
Sent: Monday, November 06, 2006 3:24 PM
To: Roney, Julie (EPPC DEP DOW)
Subject: Disinfection

Hi Julie, I was very surprised to hear that Lora Gowins is moving positions. We are going to miss her.
We are working on our UV project at our Taylor Mill Plant and the question came up about how do we apply for the disinfection credit for UV? Any information that you could provide us with would be greatly appreciated.

Thanks,
Mary Carol

ERNIE FLETCHER
GOVERNOR

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

TERESA J. HILL
SECRETARY

November 16, 2006

Ms. Bari Joslyn
Northern Kentucky Water District
700 Alexandria Pike
Fort Thomas, Kentucky 41075

RE: PWSID# KY0590220
Stage 2 DBP Monitoring Plan

Dear Ms. Joslyn:

Northern Kentucky Water District has submitted a Standard Monitoring Plan (SMP) required for the Initial Distribution System Evaluation (IDSE) under the Stage 2 Disinfection By-Product Rule. The SMP was provided to the federal EPA and is available through the Data Collection and Tracking System database. The Kentucky Drinking Water Branch has reviewed Northern Kentucky's SMP and has approved the Plan in the database as submitted.

If you have any questions, I can be reached at 502/564-2225, extension 535.

Sincerely,

Julie W. Roney

Julie W. Roney, Supervisor
Technical Assistance and Outreach
Drinking Water Branch
Division of Water

C: Florence Regional Office
Drinking Water Files

Standard Monitoring Plan

I. GENERAL INFORMATION

Sections or fields marked with an * are required

A. PWS Information*

B. Date Sumitted* Sep 26, 2006

PWSID KY 0590220

PWS Name Northern Kentucky Water District

PWS Address 700 Alexandria Pike

State Kentucky

Zip/Postal Code 41075

City Ft. Thomas

Population Served 248064

Enter numbers only

System Type CWS | Source Water Type Surface/GWUDI | Buy/Sell Wholesale

C. PWS Operations

Residual Disinfectant Type: ☒ Chlorine ☐ Chloramines ☐ Other

Number of Disinfected Sources: Surface 3 GWUDI Ground Purchased

D. Contact Person*

Contact Name: Mary Carol Wagner

Title: Water Quality Manager

Phone +1 (859) 441-0482 Ext. 3293 Fax: +1 (859) 441-1863

E-mail: wagner@nkywater.org

II. IDSE REQUIREMENTS*

A. Number of Required IDSE Standard Monitoring Sites:

High TTHM 5 Near Entry Point Sites 3 Total 16

High HAA5 4 Average Residence Time Sites 4

B. IDSE Schedule

Select Schedule Schedule 1

C. Required Standard Monitoring Frequency

- ○ During peak historical month (1 monitoring period)
- ○ Every 90 days (4 monitoring periods)
- ◉ Every 60 days (6 monitoring periods)

Standard Monitoring Plan

III. SELECTING STANDARD MONITORING SITES

A. Data Evaluated. Check each box corresponding to the data that you used to select each type of standard monitoring site. Check all that apply.

Data Type	Type of Sites			
	Near Entry Pt.	Avg. Residence Time	High TTHM	High HAA5
System Configuration				
Pipe layout, locations of storage facilities	☐	☒	☒	☒
Locations of sources and consecutive system entry points	☐	☒	☒	☒
Pressure zones	☐	☒	☒	☒
Information on population density	☐	☒	☒	☒
Locations of large customers	☐	☒	☐	☐
Water Quality and Operational Data				
Disinfectant residual data	☐	☒	☒	☒
Stage 1 DBP data	☐	☒	☒	☒
Other DBP data	☐	☐	☐	☐
Microbiological monitoring data (e.g., HPC)	☐	☐	☐	☒
Tank level data, pump run times	☐	☐	☐	☐
Customer billing records	☐	☐	☐	☐
Advanced Tools:				
Water distribution system model	☐	☒	☒	☒
Tracer study	☐	☒	☒	☒

B. Summary of Data.* Provide a summary of data you relied on to justify standard monitoring site selection. (attach additional sheets if needed)

We used our Water Quality Model that incorporates pipe size and flow. We used a fluoride tracer study to compare results with the Water Quality Model. With the use of model and the tracer study we were able to determine the water age throughout our system. With the water age, the historic THM and HAA data, chlorine residual data, population density and geographic representation, we set the locations that would be the good areas for the IDSE locations. After we set our possible locations, we collected THM and HAA from all the locations in July and August to make sure that the location results were comparing to the model results.

Standard Monitoring Plan

IV. JUSTIFICATION OF STANDARD MONITORING SITES*

Standard Monitoring Site ID (from map)1	Site Type	Justification

**If you require additional site entry fields, access the 'SMP Section IV.pdf' file located in the Additional Sheets folder on the CD.

IDSE05	Near Entry Pt	This distribution sample location is close to the entry point into the distribution from the Ft. Thomas Treatment Plant.
IDSE04	Near Entry Pt.	This distribution sample location is close to the entry point into the distribution from the Taylor Mill Treatment Plant.
IDSE06	Near Entry Pt.	This distribution sample location is close to the entry point into the distribution from the Memorial Parkway Treatment Plant.
IDSE10	Avg. Res. Time	This site is close to a consecutive system. This area has higher flow with average chlorine levels. An average residence time was indicated on our Water Quality Model for this area.

1 Verifty that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 4 standard monitoring locations or need more room.

Standard Monitoring Plan

IV. JUSTIFICATION OF STANDARD MONITORING SITES*

Standard Monitoring Site ID (from map)1	Site Type	Justification
IDSE12	Ave Res. Time	The Water Quality Model indicated an average residence time for this area. The area has a higher flow with average chlorine. Population density and geographic representation also make it a good location.
IDSE15	Avg. Res. Time	The Water Quality Model indicated an average residence time for this area. Population density and geographic representation also make it a good location. This area has average chlorine residuals.
IDSE16	Avg. Res. Time	This site is a good location because of the population density and geographic representation. The Water Quality Model indicates an average residence time. This area has average chlorine residuals.
IDSE02	High TTHM	This site is a good location because of the geographic location at the outer end of the system. Historic data also indicates higher THM's. The Water Quality Model and the tracer study indicates longer residence time.

1 Verifty that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 4 standard monitoring locations or need more room.

IDSE07	High TTHM	This site is a good location because of the geographic location. Historic data also indicates higher THM's. The Water Quality Model and the tracer study indicates longer residence time.
IDSE09	High TTHM	This site is a good location because of the geographic location at the outer end of the system. Historic data also indicates higher THM's. The Water Quality Model and the tracer study indicates longer residence time.
IDSE11	High TTHM	This site is a good location because of the geographic location at the outer end of the system. Historic data also indicates higher THM's. The Water Quality Model and the tracer study indicates longer residence time.
IDSE13	High TTHM	This site is a good location because of the geographic location at the outer end of the system. Historic data also indicates higher THM's. The Water Quality Model and the tracer study indicates longer residence time.
IDSE01	High HAA5	This site is a good location because of the historic data for high HAA. It is a good location because it is close to a consecutive system. The Water Quality Model indicated longer residence time.

1 Verifty that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 4 standard monitoring locations or need more room.

IDSE08	High HAA5	This site is a good location because it is close to a storage tank. Historic data indicates higher HAA's in the area. It also increases geographic representation.
IDSE03	High HAA5	This site is a good location because it increases geographic representation. Special THM and HAA sampling in this area indicated an area of concern for higher HAA's.
IDSE14	High HAA5	This site is a good location because it is close to a storage tank. Historic data indicates higher HAA's in the area. It also increases geographic representation.

1 Verifty that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 4 standard monitoring locations or need more room.

Standard Monitoring Plan

V. PEAK HISTORICAL MONTH AND PROPOSED STANDARD MONITORING SCHEDULE

A. *Peak Historical Month August

B. If Multiple Sources, Source Used to Determine Peak Historical Month (write "N/A" if only one source in your system):

Historical data, warmest water temperature

C. Peak Historical Month Based On:* (check all that apply)

☒ High TTHM

☒ High HAA5

☒ Warmest water temperature

If you used other information to select your peak historical month, explain here (attach additional sheets if needed.

D. Proposed Standard Monitoring Dates:*

Caution: If you intent to send a hard copy version of this plan you should not enter period information that expands past the size of the text box on the form. Anything that appears past the right side of the text box will not show up on the printed document.
**If you require additional site entry fields, access the 'SMP Section V.Dpdf' file located in the Additional Sheets folder on the CD.

Standard Monitoring Site ID (from map)1	Projected Sampling Date (date or week)2					
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6

1 Verify that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 4 standard monitoring locations.
2 period = monitoring period. Complete for the number of periods from Section II.C. Can list exact date or week (e.g., week of 7/9/07)

Standard Monitoring Plan

V. PEAK HISTORICAL MONTH AND PROPOSED STANDARD MONITORING SCHEDULE

D. Proposed Standard Monitoring Dates:*

Caution: If you intent to send a hard copy version of this plan you should not enter period information that expands past the size of the text box on the form. Anything that appears past the right side of the text box will not show up on the printed document.

Standard Monitoring Site ID (from map)[1]	Projected Sampling Date (date or week)[2]					
	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
IDSE01	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE02	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE03	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE04	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE05	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE06	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE07	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE08	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE09	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE10	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE11	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE12	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE13	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE14	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE15	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3
IDSE16	12/2006, wk 3	2/2007, wk 3	4/2007, wk 3	6/2007, wk 3	8/2007, wk 3	10/2007, wk 3

1 Verify that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 4 standard monitoring locations.

2 period = monitoring period. Complete for the number of periods from Section II.C. Can list exact date or week (e.g., week of 7/9/07)

Standard Monitoring Plan

VI. PLANNED STAGE 1 DBPR COMPLIANCE MONITORING SCHEDULE*

Caution: If you intent to send a hard copy version of this plan you should not enter period information that expands past the size of the text box on the form. Anything that appears past the right side of the text box will not show up on the printed document.

Stage 1 DBPR Monitoring Site ID (from map)1	Projected Sampling Date (date or week)2			
	Period 1	Period 2	Period 3	Period 4
T01	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T04	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T31	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T32	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T34	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T38	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T40	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T44	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T47	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T48	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T51	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4
T50	1/2007, wk 4	4/2007, wk 4	7/2007, wk 4	10/2007, wk 4

1 Verify that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 8 Stage 1 DBPR sites..

2 period = monitoring period. Complete for the number of periods in which you must conduct Stage 1 DBPR monitoring from Section II.C. Can list exact date or week (e.g., week of 7/9/07)

Standard Monitoring Plan

VI. PLANNED STAGE 1 DBPR COMPLIANCE MONITORING SCHEDULE*

Caution: If you intent to send a hard copy version of this plan you should not enter period information that expands past the size of the text box on the form. Anything that appears past the right side of the text box will not show up on the printed document.
**If you require additional site entry fields, access the 'SMP Section VI.pdf' file located in the Additional Sheets folder on the CD.

Stage 1 DBPR Monitoring Site ID (from map)1	Projected Sampling Date (date or week)2			
	Period 1	Period 2	Period 3	Period 4

1 Verify that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 8 Stage 1 DBPR sites..
2 period = monitoring period. Complete for the number of periods in which you must conduct Stage 1 DBPR monitoring from Section II.C. Can list exact date or week (e.g., week of 7/9/07)

VII. DISTRIBUTION SYSTEM SCHEMATIC*

ATTACH a schematic of your distribution system.

Distribution system schematics are not confidential and should not contain information that poses a security risk to your system. EPA recommends that you use one of two options:

Option 1: Distribution system schematic with no landmarks or addresses indicated. Show locations of sources, entry points, storage facilities, standard monitoring locations, and Stage 1 compliance monitoring locations (required). Also include pressure zone boundaries and locations of pump stations. Provide map scale.

Option 2: City map without locations of pipes indicated. Show locations of sources, entry points, storage facilities, standard monitoring locations, and Stage 1 compliance monitoring locations (required). Also include boundaries of the distribution system, pressure zone boundaries and locations of pump stations. Provide map scale.

Kentucky Division of Water

Northern Kentucky Water District
Taylor Mill Treatment Plant UV Disinfection
Meeting Agenda
January 13, 2006

1. Introduction
   - Kentucky Division of Water (KDOW)
   - Northern Kentucky Water District (NKWD)
   - Black & Veatch (B&V)

2. Meeting Purpose

3. UV Disinfection Overview

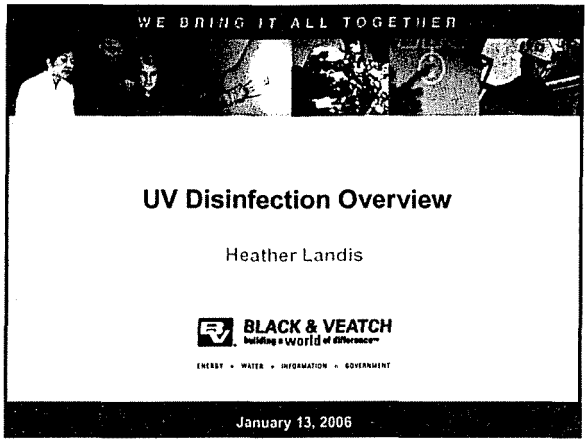
4. Taylor Mill Treatment Plant UV Demonstration Study

5. Taylor Mill Treatment Plant UV Improvements Project Objectives and Goals
   - Additional disinfection barrier
   - Increase degree of inactivation under all conditions
   - Minimize formation of disinfection byproducts (DBPs)
   - Achieve enhanced treatment goals in the future

6. Preliminary Project Schedule – TMTP UV Improvements
   - Notice to Proceed – January 2006
   - Draft Design Memorandum – March 2006
   - 50% Completion Milestone – April 2006
   - 90% Completion Milestone – May 2006
   - Design Complete – July 2006
   - Start Construction – December 2006
   - Construction Complete – December 2007

7. KDOW Requirements
   - Applicable standards
     - New LT2ESWTR regulation interpretation issues
     - Dosage requirements
   - Validation issues

8. Questions



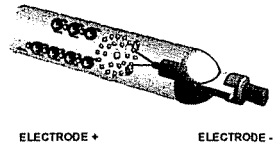
Presentation Outline

- What is UV?
- UV Dose Requirements – What does it mean?
- *Validation of UV Reactors - Why and How*
  - Biodosimetry options
  - On vs. off-site validation
- LT2ESWTR
- UV Manufacturers

WE BRING IT ALL TOGETHER

Generation of UV Light

- Electron transition from higher to lower energy state
- Each element emits unique spectrum
- Energy input is needed to "excite" electrons into a higher energy state



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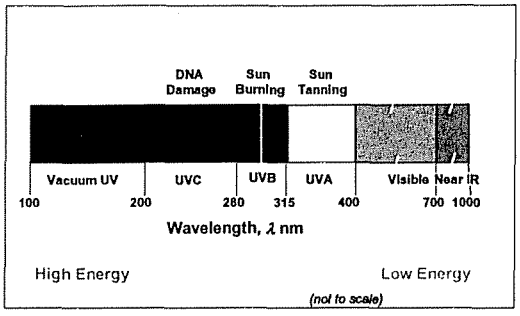
Electromagnetic Spectrum



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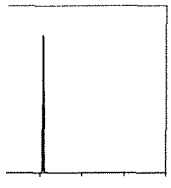
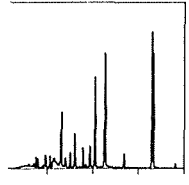
Spectra of LP and MP Hg lamps

Low Pressure Hg



Medium Pressure Hg



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Principles of UV Photobiology

- Absorption of Light
  - Only light that is absorbed can produce a *photobiological effect*
  - Need to know the absorbance spectrum of the target
- Energy of Light
  - Enough energy needs to be transmitted to cause a lasting photobiological effect
  - Need to know the amount of energy (UV "dose") delivered

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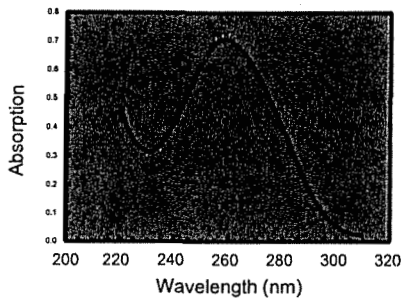
Absorbance Spectrum of DNA



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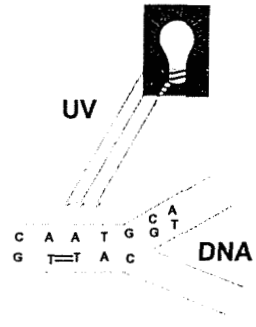
UV Mechanism of Action - Overview

- Physical Process
- Light Energy Absorbed by DNA
- Dimer Formation
- Inhibits Replication
- Organism that Cannot Replicate, Cannot Infect
- Still metabolically active



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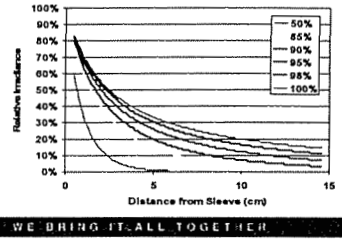
UV Transmittance

- Related to absorbance
  - $\%T = 100 \times 10^{-A}$
- Measures ability of light to penetrate water



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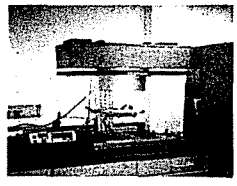
CT Equivalent → UV Dose

- Irradiation
  - milliwatts per square centimeter (mW/cm^2)
- Time of exposure
  - seconds (S)
- Dose
  - $mW/cm^2 * S \rightarrow mJ/cm^2$ (*Intensity * Time → IT* value)
- Easy for a fixed system
- Difficult for flow through
- *Need a model or a test*
  - validation



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UV Dose Requirements

Log credit	Cryptosporidium UV dose (mJ/cm^2)	Giardia lamblia UV dose (mJ/cm^2)	Virus UV dose (mJ/cm^2)
0.5	1.6	1.5	39
1.0	2.5	2.1	58
1.5	3.9	3.0	79
2.0	5.8	5.2	100
2.5	8.5	7.7	121
3.0	12	11	143
3.5	15	15	163
4.0	22	22	186

- UV doses (mJ/cm^2) based on scientific findings
- Need these doses to achieve given log inactivation
- Based on LP UV studies only

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UV Doses Required for Compliance

- May have to validate that the reactor can deliver a higher dose
  - Reactors are not ideal
  - Safety factors will be required
    - RED Bias, Polychromatic Bias, Expanded Uncertainty
- Actual validation UV doses may be 2-3 times higher

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What is Validation?

- UV Reactor is designed to achieve a given level of disinfection performance
- Verify claims made on disinfection performance
- Evaluate dose delivery and dose monitoring
  - monitoring provides the basis for assigning disinfection credit during operation
- UV is "special" – you cannot measure a residual to assess performance!

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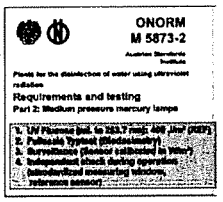
Existing Validation Protocols

- German DVGW
- Austrian ONORM
- NSF Standard 55 (POE/POU)
- NWRI/AWWARF UV Guidelines
- US EPA Guidance Manual (Draft)


ONORM
M 5873-2
Requirements and testing
Part 2: Medium pressure mercury lamps

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Principal Elements of a Validation Protocol

- Documentation of the reactor and its components to ensure it matches the validated system
- Measurement of dose delivery via biodosimetry
- Correlation of the biodosimetry with on-line monitoring
- Assessment of uncertainty and bias in the interpretation of results

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Biodosimetry

- The current standard for reactor validation
- Basis for validation protocols in Austria, Germany, USA
- Involves seeding a flowing reactor with an indicator microbe
- The reactor dose is determined from the amount of inactivation observed through the reactor

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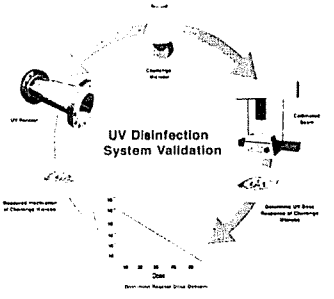
Biodosimetry Approach



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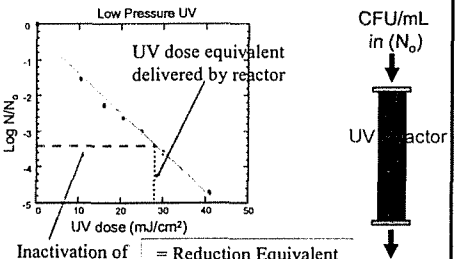
Biodosimetry



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On-site vs. Off-site Validation

Off-Site Validation

- Positives
  - At test facility (e.g. German)
  - At available test site (WTP)
  - May have more flexibility for spiking chemicals/bugs
  - Experience and established protocols
- Negatives
  - Flow rate limitations
  - Stuck with conditions available for piping/reactor size
  - Long wait for testing time

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On-site vs. Off-site Validation

On-site Validation

- Positives
  - Flow rates similar to operation
  - Evaluate fouling of specific water
  - Identical inlet/outlet conditions
- Negatives
  - Capital costs could be high for testing train
  - Discharge of test water with microbes
  - No water sent to distribution during testing
  - May not have very high UVT for set point testing
  - Utility Constraints
  - What if the reactor does not validate?

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Off-Specification Operation

- Operating outside the validated range
  - High or low flow
  - Low UV intensity
  - High UV absorbance (Low UV transmittance)
- Power Quality Problems
  - Power cycle interruptions

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LT2ESWTR Key Points

- Validate on-site or off-site
- Monitor UV reactors to demonstrate validated conditions
  - Flow rate, UV intensity, UV lamp status
- 5 percent off-spec allowed on a monthly basis – filtered and unfiltered systems
- Dose table -- UV after filters

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UV Disinfection Guidance Manual

- Final document available early 2006

Chapter	Content	
1 – Introduction	• UVDGM organization	• Regulations summary
2 – Fundamentals	• Fundamentals of UV disinfection	• Microbial response to UV light • Overview of UV reactors
3 – Planning	• Design criteria • Data collection	• Hydraulics considerations
4 – Design	• Facility layout • Drawings and specs	• Hydraulic design • Instrumentation and alarms
5 –Validation Testing	• Validation process • Testing procedures	• Equipment factor • Data analysis
6 – O&M	• Start-up • Operational issues	• Maintenance needed • Operation challenges

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Suppliers of UV Systems for Drinking Water

- Low-Pressure, High-Output
  - Wedeco, Inc.
  - Trojan Technologies
- Medium Pressure
  - Aquionics
  - Calgon Carbon Corporation
  - Infilco Degremont Inc.
  - Trojan Technologies Inc.

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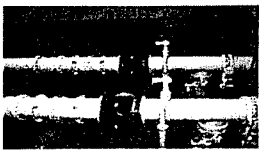
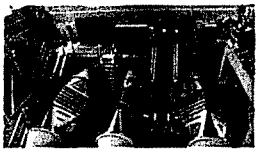
UV Reactor Examples



West Valley Water District, Rialto
California – Trojan, Inc.



Clayton County Water Authority,
Georgia – Wedeco, Inc.

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Questions?

BLACK & VEATCH
building a world of difference™

ENERGY • WATER • INFORMATION • GOVERNMENT

January 13, 2006

DEP ☐ DOW ☒ DWM ☐ DAQ ☐ DES ☐ EQC ☐

PROJECT NAME: NORTHERN KY WATER DISTRICT
MEETING SUBJ: UV DISINFECTION
LOCATION: CONF RM 2B
DATE: 1/13/06 TIME:

NAME, TITLE	REPRESENTING	PHONE NUMBER
MIKE RILEY, SUPERVISOR	DOW/DWB	502/564 2225 EXT. 592
Amy Kramer, Eng Mgr	NKWD	859-426-2734
Julie W. Roney	DOW/DWB	502/564-3410 xt 535
Anissa Baker	Black & Veatch	513·936·5114
Bruce Long	Black & Veatch	913-458-3785
MARISSA ANZEK	BLACK & VEATCH	513·936·5148.
Heather Landis	Black & Veatch	913-458-3067
Don DeKoster	DOW	502 429.7122
Bill Wulfeck	NKWD	859-441-0482 x3211
Mary Carol Wagner	NKWD	859-441-0482 x 3217
Bobi Joslyn	NKWD	859 441 0482 x 3227
Donnie Ginn	Black & Veatch	513-936-5717
Solitha Dharman	DOW/DWB	5025643410 EXT 572

MEETING NOTES:

BLACK & VEATCH

CONFERENCE MEMORANDUM

Northern Kentucky Water District
Taylor Mill Treatment Plant UV Disinfection
KDOW Meeting Minutes

B&V Project 143757
February 7, 2006

The meeting was held on January 13, 2006 at 10:00 a.m., at the Kentucky Division of Water (KDOW) office in Frankfort, Kentucky, for the Northern Kentucky Water District (NKWD) Taylor Mill Treatment Plant (TMTP) UV Disinfection project.

Recorded by: Marissa Anzek, Anissa Baker

Attending:

Mike Riley, KDOW	Bari Joslyn, NKWD	Donnie Ginn, Black & Veatch
Solitha Dharman, KDOW	Amy Kramer, NKWD	Bruce Long, Black & Veatch
Julie Roney, KDOW	Bill Wulfeck, NKWD	Marissa Anzek, Black & Veatch
Don DeKoster, KDOW	Mary Carol Wagner, NKWD	Anissa Baker, Black & Veatch
		Heather Landis, Black & Veatch

MEETING MINUTES

1. **Introduction.**

   - KDOW
     - Mike Riley, Supervisor – Permits and Plans Review Section
     - Julie Roney, Supervisor – Technical Assistance and Outreach Section
     - Solitha Dharman – Permits and Plans Review Section
     - Don DeKoster – Technical Assistance and Outreach Section
   - NKWD
     - Amy Kramer, Engineering Manager – NKWD project contact
     - Bari Joslyn, Vice President of Water Quality and Production
     - Bill Wulfeck, Operations Manager
     - Jim Dierig, Maintenance Manager
     - Mary Carol Wagner, Water Quality Manager
   - Black & Veatch (B&V)
     - Donnie Ginn, Project Manager
     - Bruce Long, Process Technical Advisor
     - Marissa Anzek, Engineering Manager
     - Anissa Baker, Project Engineer
     - Heather Landis, Process Engineer

2. **Meeting Purpose.** The purpose of the meeting was to update KDOW on the UV Disinfection project at the Taylor Mill Treatment Plant and discuss regulatory requirements with the implementation of the Long Term 2 Surface Water Treatment Rule (LT2ESWTR).

3. **UV Disinfection Overview.** A presentation on UV disinfection was provided by B&V that included information on the principle of UV disinfection, regulations associated with

the disinfection process, equipment requirements, validation and operation procedures. B&V noted that NKWD must submit a monthly report to KDOW to demonstrate that the UV system is operating within validated conditions for at least 95 percent of the flow that is sent into the distribution system. This report will include transmittance, flow, lamp usage and lamp energy.

Operation of the UV reactors entails calibration of the sensors, which measure the lamp intensity. The monthly calibration check can be completed in-house while the annual calibration process would require the sensors to be sent back to the manufacturer for calibration.

KDOW mentioned their concern of mercury in the water if a lamp broke within the reactor. It was discussed how each lamp is contained within a quartz sleeve to protect the lamp from breakage. Some installations have included a sink or pit in the piping downstream of the UV reactor for the mercury to settle if the quartz sleeve were to break.

NKWD noted that they are required to specify a minimum of two equipment manufacturers. B&V will develop specifications with detailed performance requirements including headloss, reactor length, dosage and power usage.

4. **Taylor Mill Treatment Plant UV Improvements Project Objectives and Goals.** The goals for the Taylor Mill Treatment Plant UV Disinfection project include:

- Additional disinfection barrier – NKWD is concerned because they have had five *Cryptosporidium* hits on the Licking River in the past two years.
- Increase consistent degree of inactivation under all conditions
- Minimize formation of disinfection byproducts (DBPs)
- Achieve enhanced treatment goals in the future

5. **Taylor Mill Treatment Plant UV Demonstration Study.** B&V provided an overview of the TMTP UV Demonstration Study completed in 2003. In conjunction with KDOW, B&V assisted NKWD with evaluating the effectiveness of UV disinfection at the TMTP. The demonstration study was completed in two phases with a different lamp configuration for each phase. Phase 1 testing, the lamps were oriented parallel to the flow path while during Phase 2 the lamps were perpendicular to the flow. For both phases, the target dose for the UV reactor was 40 mJ/cm^2. Phase 1 data included high heterotrophic plate counts (HPCs), which were a result of the sampling procedures as the HPCs were reduced significantly in Phase 2. In addition to water quality sampling, Phase 2 included testing for aldehydes and carboxylic acids, which were not formed during the UV disinfection demonstration study. B&V noted that lamp fouling is typically seen with water that have a higher concentration of iron and manganese while carbonate levels do not seem to have an effect on lamp fouling. NKWD noted that they have higher levels of manganese in the reservoirs at the Fort Thomas Treatment Plant and will need to take that into consideration when evaluating UV disinfection for that plant. During the

demonstration study, the lamp wiping times were modified to determine an optimal wiping set time for cleaning the lamps.

6. **Preliminary Project Schedule.** The following preliminary schedule was provided at the meeting:

- Notice to Proceed – January 2006
- Draft Basis of Design Memorandum – March 2006
- 50% Completion Milestone – April 2006
- 90% Completion Milestone – May 2006
- KDOW Review Meeting – June 2006
- Design Complete – July 2006
- Construction Start – December 2006
- Construction Complete – December 2007

The Draft Basis of Design Memorandum will be submitted to KDOW for review per B&V suggestion. KDOW was invited to all design review meetings and will be informed when scheduled. The 90% complete drawings and specifications will be forwarded to KDOW for review and approval. Following this submission, NKWD and B&V will coordinate a site visit to the Taylor Mill Treatment Plant for KDOW and a meeting will be scheduled to discuss the documents in detail.

7. **KDOW Requirements.** KDOW mentioned that they plan to adopt the LT2ESWTR verbatim. KDOW also noted that the TMTP would also qualify for the additional 0.5-log credit based on the filter effluent turbidity levels.

KDOW noted that they will accept UV reactors that were validated off-site. On-site validation will not be required at the TMTP. The validation of the reactors and lamp intensity will be addressed in the Basis of Design Memorandum (BDM). As noted above, the Draft BDM will be submitted to KDOW for review.

Currently, the TMTP prechlorinates the water before filtration. KDOW asked NKWD what their plan was regarding filter prechlorination. NKWD noted that with the UV disinfection the prechlorination probably would not be required; however, they were planning to continue it at this time. It was also noted that chlorine helps break down organisms which enhances the UV transmittance.

Distribution:

Attendees
Adam Westermann, B&V
Mark Magella, B&V
Steve Yakimow, B&V

BLACK & VEATCH

11500 Northlake Drive
Suite 205
Cincinnati, Ohio 45249
Tel: 513-984-6630
Fax: 513-984-6686

Black & Veatch Corporation

Northern Kentucky Water District
Taylor Mill Treatment Plant UV Disinfection

B&V Project 143757
B&V File D-1.4
October 16, 2006

Kentucky Division of Water
Drinking Water Branch
Plans Review - Checklist
14 Reilly Road
Frankfort, Kentucky 40601

Subject: Construction Plan Review

To Whom It May Concern:

As discussed with Solitha Dharman, please find 4 sets of full-size drawings and 1 set of specifications for the Northern Kentucky Water District (District) Taylor Mill Treatment Plant's UV Disinfection project for your review and comment. A letter from the District approving these documents has also been included for your reference. In addition, the Distribution Systems Checklist has also been completed as it pertains to this project and included for your review.

The project involves the installation of a new ultraviolet (UV) disinfection system, electrical utility service and uninterruptible power supply (UPS) at the Taylor Mill Treatment Plant. The UV disinfection system will include two UV reactors, local control panels for each reactor, piping, valves and associated electrical and instrumentation. The UV disinfection system also includes chemical feed piping modifications for sodium hypochlorite, caustic soda, corrosion inhibitor and fluoride. The new electrical utility service will include a concrete vault for a new pad mounted transformer, service entrance switchboard and distribution power panels. The opinion of probable construction cost for this project is $2,286,000.

If you have any questions or need additional information for your review, please feel free to contact Marissa Albright or me at (513) 936-5148 or (513) 936-5117, respectively.

Very truly yours,
BLACK & VEATCH CORPORATION

Donnie Ginn, P.E.
Project Manager

Enclosures
cc: Amy Kramer, NKWD
Bari Joslyn, NKWD
Marissa Albright, B&V

Northern Kentucky
Water District

October 12, 2006

Division of Water
Drinking Water Branch
14 Reilly Road
Frankfort, KY 40601

To Whom It May Concern,

The purpose of this letter is to indicate that the Taylor Mill Treatment Plant UV Disinfection project was initiated by the Northern Kentucky Water District and that we have reviewed and approve the plans and specifications and agree to accept maintenance of the project upon completion.

If you have any questions, please feel free to contact me at (859) 426-2734.

Sincerely,

Amy Kramer

Amy Kramer, P.E.
Design Engineering Manager

cc: Marissa Albright, Black & Veatch

Northern Kentucky Water District 2835 Crescent Springs Road, P.O. Box 18640 Erlanger, Kentucky 41018
859-578-9898 859-578-5456 Fax

DRINKING WATER DISTRIBUTION SYSTEMS CHECKLIST

PROJECT NAME: Taylor Mill Treatment Plant UV Disinfection

PWSID #: 0590220 Utility Name: Northern Kentucky Water District

County: Kenton

Utility Address: 2835 Crescent Springs Road

City: Erlanger STATE: KY

Engineer: Black & Veatch Corporation Phone: 513-984-6630

Fax: 513-984-6686

E-mail Address: ginndh@bv.com

Address: 11500 Northlake Drive, Suite 205

City: Cincinnati STATE: Ohio 45249

To improve the effectiveness of the DOW's review process, please respond to all the applicable questions that follow and provide all of the requested information.

Is this a federally funded project (i.e. SRF or SPAP)? No

Drinking Water State Revolving Fund

US EPA Special Appropriation (Congressional) Grant

If yes, has an Environmental Information Document been reviewed and approved? ___

If the project has been submitted to the State Clearinghouse for review, please provide the SAI number: _____

Identify all funding sources: Northern Kentucky Water District through the issuance of Bonds and/or Bond Anticipation Notes

Provide a brief description for waterline projects with less than 10,000 linear feet (at a minimum identify the various line sizes, corresponding lengths and cost estimate):

All other Distribution projects should be accompanied with a *detailed* project description.

Is your system currently under any type of waterline or sewer sanctions? _____

If yes, please submit an exception request and attach supporting documentation to justify its approval.

If another utility will serve the proposed project, provide the name and the PWSID No.

Utility: _____ PWSID No. _____

Identify the number of new customers and their projected demand? _____

Identify the number of existing residents; and their projected water demand, that may get served as a result of this project? _____

Identify the total number of customers in your service area? _____

You may modify Page 1 to suit your own personal needs as long as all of the information from the first page is on your modified page(s). Please use separate sheets of paper, if needed, to provide a response to questions from Page 1. When ready to submit, MAIL TO: **DRINKING WATER BRANCH, ATTN: PLANS REVIEW; CHECKLIST, 14 Reilly Road, Frankfort, KY, 40601**

Regulation 401 KAR 8:100, requires the submittal of the following:

Four (4) copies of detailed plans and specifications (**no larger than 24" X 36"**) that depict the mains' sizes and type of material, valves, master meters, storage tanks, pump stations, a vicinity map, stream crossing and road crossing details.

Please submit a United States Geological Survey quadrangle map, which shows the project location.

Projects with cost in excess of $2,000 shall be prepared, stamped, signed and dated by a Professional Engineer. Projects that propose to provide water service to existing residences shall submit names and addresses of all existing residences.

Fees: Refer to the regulation about fees (401 KAR 8:050), which can be found at http://www.lrc.state.ky.us/kar/401/008/050.htm. Projects funded by a municipality, water District, or other publicly owned treatment works are exempt from the fee. If your project involves the extension of less than 10,000 feet of waterlines, then the applicable fee is $ 150. Projects that involve more than 10,000 feet of lines or the addition of pump stations or tanks have $ 325 applicable fee. **Make checks payable to the Kentucky State Treasurer.**

A signed letter of acceptance from utility, which states the utility has reviewed and approved the plans and specifications and agrees to serve the proposed project upon completion. If the utility is a purchaser and the project demand is greater than 10,000 gallons per day, please submit a valid water purchase contract and acceptance letter from the seller.

Engineering calculations; demonstrate the availability of 30 psig at the discharge side of each proposed connection under peak demand conditions and the ability to flush the lines using 2.5 ft/sec flow, while maintaining 20 psig throughout the distribution system.

Projects that propose the addition of storage tanks should be accompanied with engineering calculations, which demonstrates a complete fill and drain cycle every 72 hours. Also identify each tank's location coordinates.

New or upgraded pump stations require the submittal of pump sizing calculations and the proposed pump's characteristics curve along with the efficiency, horsepower and NPSHR data. Also identify each pump station's location coordinates.