NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

NORTHERN KENTUCKY WATER DISTRICT
Taylor Mill Treatment Plant Advanced Treatment Improvements
184-457

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Taylor Mill Treatment Plant
Advanced Treatment Improvements

Project 184-457

Project Description:

The project involves the construction of a new concrete and masonry brick building that houses the Preliminary Treatment Building on one side and the Granular Activated Carbon Building on the other side. The new Preliminary Treatment Building will contain a rapid mix basin, 4 flocculation basins, and 2 sedimentation basins with plate settlers and residuals collection system. The new GAC building with a vegetative roof will house 14 granular activated carbon pressure vessels plus a smaller pump for backwashing the pressure vessels, and the relocation of 2 existing medium pressure ultraviolet disinfection reactors. The GAC Feed Pump Station consists of 3 vertical turbine pumps and variable speed drives along with electrical gear for two diesel driven standby power generators located adjacent to the GAC Feed Pump Station that will operate the entire treatment plant in a power loss. The project includes ancillary improvements such as a relocated operator's laboratory, control through the existing SCADA system, mechanical HVAC and plumbing systems, and electrical systems.

The bids will be opened May 3, 2011 and are subject to acceptance for 120 days. Therefore, the bids will expire August 31, 2011. The project is scheduled to take 31 months to substantial completion and another 2 months to reach final completion.

The estimated cost of the total project with engineering, construction, and contingencies is $35,000,000.

Case No. 2011-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

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Kenton County
184-0457

ENGINEERING REPORTS AND INFORMATION

Project Map

Basis of Design Report

Engineer's Opinion of Probable Total Construction Cost

Plans prepared by Malcolm Pirnie, GRW, CDP Engineers, and Strand Associates titled "Taylor Mill Treatment Plant Advanced Treatment Improvements" dated March 2011

Specifications prepared by Malcolm Pirnie, GRW, CDP Engineers, and Strand Associates titled "Taylor Mill Treatment Plant Advanced Treatment Improvements" dated March 2011

Case No. 2011-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

Project
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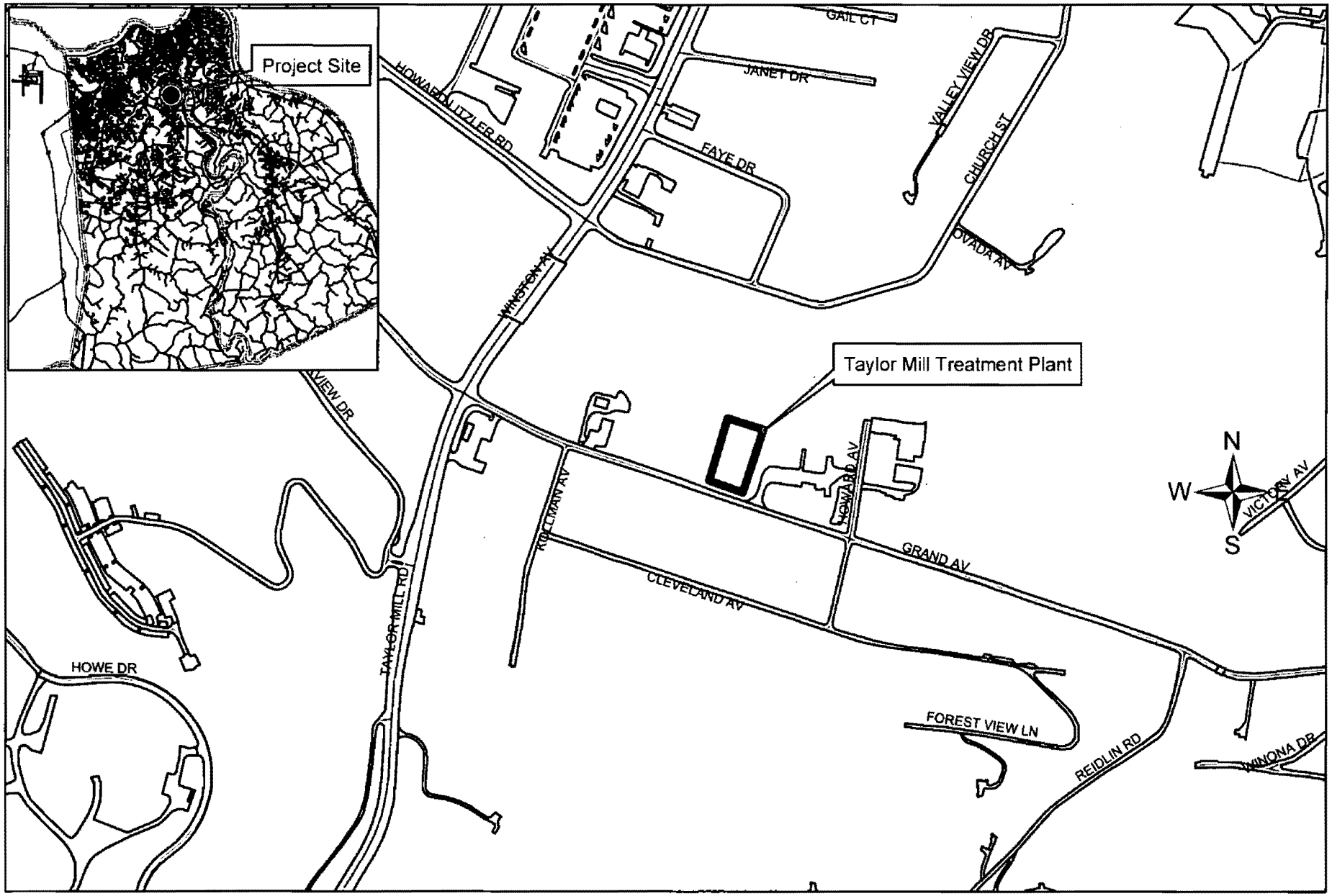
184-0457

Project Map



Taylor Mill Treatment Plant
GAC Project

Case No. 2011-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

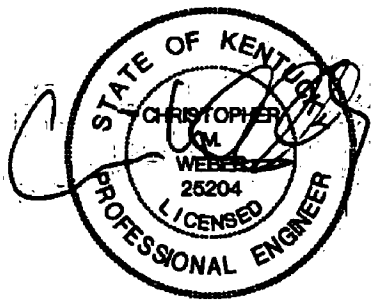
Basis of Design Report

[redacted]

Northern Kentucky Water District
2835 Crescent Springs Road • Erlanger KY 410108

Taylor Mill Advanced Treatment Improvements Basis of Design Report

January 2009
Updated: March 2009



Report Prepared By:

Malcolm Pirnie, Inc.

8600 Governor's Hill Drive
Suite 210
Cincinnati OH 45249

4775-012

GRW, Inc.

MALCOLM PIRNIE

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Appendices

ES - Executive Summary

ES.1. Overview

This report presents the Basis of Design for replacing preliminary treatment and incorporating post-filtration granular activated carbon (GAC) adsorption facilities into the Northern Kentucky Water District's (NKWD, District) Taylor Mill WTP (TMTP) located in Kenton County. The TMTP is a 10 MGD conventional treatment facility, which receives water from the Licking River, a tributary of the Ohio River. Approximately 45% of the District's customers rely on the TMTP for their water supply, which is more than TMTP's rated capacity. The balance of the demand is met by blending water treated by the Fort Thomas Treatment Plant (FTTP). The major areas of work include removal and replacement of the existing rapid mix, flocculation and sedimentation basins, installation of a new GAC treatment process including a GAC Feed Pump Station, GAC Building, GAC Equalization Basin, and relocation of the existing UV disinfection system.

ES.2. Project Driver

The Stage 2 Disinfectant/Disinfection By-product (D/DBP) Rule will require utilities to transition from meeting system-wide running annual averages (RAAs) for TTHMs and HAA5 to meeting locational running annual averages (LRAAs) at each sampling location by 2012. The Stage 2 D/DBP Rule requires that the LRAA concentrations of TTHMs and HAA5 remain at or below 80 and 60 µg/L, respectively. Based on testing completed as part of this and past projects, it was found that NKWD will not meet the regulations with the current treatment approach.

ES.3. Pretreatment Facilities

The preliminary treatment process includes rapid mixing, flocculation, and sedimentation. The concrete in the existing rapid mix, flocculation, and sedimentation basins is severely deteriorated, requiring replacement of these process basins. To conserve site footprint, the new sedimentation basins will be constructed in the area where the South Sedimentation Basin currently resides and will be fitted with plate settlers. The entire preliminary treatment process will be enclosed in a Preliminary Treatment Building. Piping and trough modifications will be implemented to connect the raw water main to the new rapid mix and connect the new sedimentation process to the existing filtration process. The pumps in the existing residuals pump station will also be replaced. Preliminary process plans, preliminary process diagrams, and a hydraulic profile are provided in Appendix A.

ES.4. GAC Facilities

The GAC treatment process will include a GAC Feed Pump Station, a GAC Building housing fourteen 40,000 lb pressurized carbon vessels, backwash pumps, a UV disinfection system, and a GAC Equalization (EQ) Basin with dewatering pumps. The existing UV disinfection system, which is currently housed in the Filter Basement gallery, will be relocated to the GAC Building. The GAC Building will include a maintenance area, conference room, restrooms, control room/electrical room, operating area, and truck aisle. The structure will be located on the unused southwestern portion of the site. Preliminary process plans, preliminary process diagrams, and a hydraulic profile are provided in Appendix A.

ES.5. Opinion of Probable Project Costs

An opinion of probable construction costs (OPCC) was developed based on the current preliminary design. The cost opinion was developed as a Class 3 estimate in accordance with AACE guidelines and has a predicted accuracy of -20% to +30%. The summary of the opinion of probable construction costs is shown in Table ES-1 below.

Table ES-1.
Opinion of Probable Construction Costs

Item	Cost
Opinion Of Probable Construction Cost[1]	$21,434,000
AACE Class 3 Estimate -20% Range	$17,147,000
AACE Class 3 Estimate +30% Range	$27,864,000

Note: 1. The OPCC with GAC Building Option B in lieu of Option A is $400,000 less than the above estimate costs.

1. Introduction

1.1. General

The Basis of Design document for the Taylor Mill Water Treatment Plant Advanced Treatment Improvements Project provides an overview of the process and facility modifications that are to be designed and constructed as part of this project. The *Preliminary Design of GAC Systems Report* (by Malcolm Pirnie, Inc. and GRW, Inc., dated March 2008) served to define the basic scope of work anticipated for the project.

The Stage 2 Disinfectant/Disinfection By-product (D/DBP) Rule will require utilities to transition from meeting system-wide running annual averages (RAAs) for TTHMs and HAA5 to meeting locational running annual averages (LRAAs) at each sampling location by 2012. The Stage 2 D/DBP Rule requires that the LRAA concentrations of TTHMs and HAA5 remain at or below 80 and 60 µg/L, respectively. Based on testing completed as part of past projects, it was found that the Northern Kentucky Water District (NKWD, District) will not meet the regulations with the current treatment approach, therefore, granular activated carbon (GAC) treatment was selected.

The major areas of work include removal and replacement of the existing rapid mix, flocculation and sedimentation basins, installation of a new GAC treatment process including a GAC influent pump station, GAC building, equalization basin, and relocation of the existing UV disinfection system.

All project related improvements are located at the Taylor Mill Water Treatment Plant (TMTP), a 10 MGD conventional treatment facility, located in Kenton County. The plant receives its source water from the Licking River, a tributary of the Ohio River. Approximately 45% of the District's customers rely on the TMTP for their water supply, which is more than TMTP's rated capacity. The balance of the demand is met by blending water treated by the Fort Thomas Treatment Plant (FTTP).

1.2. Organization

The Basis of Design is organized into separate sections covering the various work disciplines as follows:

- Section 2 Site/Civil
- Section 3 Architectural
- Section 4 Structural

- Section 5 Process Mechanical
- Section 6 HVAC
- Section 7 Plumbing
- Section 8 Electrical
- Section 9 Instrumentation and Control
- Section 10 Permitting
- Section 11 Suggested Sequence of Construction
- Section 12 Opinion of Probable Construction Costs

Sections 2 through 9 are further divided into numbered subsections as follows (where 'X' denotes the appropriate Section number):

Subsection X.1 Introduction
Subsection X.2 Design Approach
Subsection X.3 Materials, Equipment and Systems
Subsection X.4 References
Subsection X.5 Miscellaneous

1.3. Facilities

New site facilities will include the following:

- Open basin rapid mix chamber
- Flocculation basins (2)
- Sedimentation basins (2)
- GAC feed pump station
- GAC building
- GAC EQ basin

2. Site/Civil

2.1. Introduction

Site/Civil improvements, as shown in figure 2-1 of Appendix A, will be made to facilitate the new GAC process and the replaced preliminary treatment. Access will be required to allow additional tanker truck access for the loading and unloading of GAC. The proposed improvements may have an impact on the current stormwater control of the facility. Approaches will be implemented to keep as much pervious area as possible and to keep the site facilities as far as practicable from the existing public neighbor that borders the western site boundary. Once the spatial layout of the buildings and the type of roofing systems for the buildings are finalized, the storm water control measures will be determined.

Site improvements include the following:

- Modifications to the Northwest service drive to incorporate access to the new GAC facility
- Modifications to the site grading required for the new facilities
- Stormwater control measures including retention basins, infiltration swales and rain gardens as required
- Inclusion of up to three parking spaces adjacent to the new GAC facility
- Incorporation of vehicle access to the GAC PS for removal maintenance activities associated with the GAC Supply Pumps
- Miscellaneous site piping including the following:
    - Connection to the existing 36-inch plant discharge along the Northwest property line for backup GAC contactor backwash connection and plant water feed to the GAC building
    - New GAC equalization basin overflow, and discharge connection
    - New GAC Pump Station with supply line, discharge line and overflow
    - New GAC contacted water line (from GAC facility to Clearwell, through north filter piping gallery)
    - New gravity sewer connection (from GAC facility to existing 8" sanitary line)
    - New 24-inch settled water pipe from new settled water effluent trough to the north side of the Filter Building
    - Removal of the 8-inch backwash recycle pipe that is on the east side of the preliminary treatment facilities. This pipe is reported to no longer be used.

  - Possible relocation/replacement of the 6-inch residuals pipe on the east side of the preliminary treatment facilities. This pipe may be disturbed during construction.
- Replace drive, curbs, and landscaping immediately south and west of the existing south sedimentation basin. These items will be removed during excavation for the new preliminary treatment facilities.
- Replace the storm water inlet and a portion of the 12-inch storm sewer located at the southwest corner of the existing south sedimentation basin. These items will be removed during excavation for the new preliminary treatment facilities.
- Relocate a segment of the 4-inch sewage force main near the southeast corner of the south Sedimentation Basin.

2.2. Design Approach

With the existing site configuration and topography, stormwater control options are limited and costly. Therefore, "green" infrastructure approaches have been recommended for control. The goal of the stormwater control approach is to maintain the same pre construction and post construction runoff characteristics. The proposed GAC building, Preliminary Treatment Building and GAC Feed Pump Station will have vegetative roofs to maintain pervious surface and mitigate the need for a stormwater retention basin. Other "green" approaches include routing downspouts for new facilities to rain gardens and surface runoff to infiltration swales.

The traffic impact of the new GAC facilities includes additional tanker truck traffic on a monthly basis for the loading and unloading of GAC from the GAC pressure vessels located in the GAC facility. Access will be provided for tankers to utilize the existing plant entrance along Grand Ave.

A landscaping plan will be developed. The plan will address the replacement of landscaping removed for construction purposes (around the south sedimentation basin) and new landscaping near the GAC Building.

2.3. Materials

Table 2-1.
Materials of Construction

Description	Material	Location
New or Replaced Pavement/parking	Concrete	GAC access drive, GAC pump station access drive
Retaining wall	Segmental modular concrete block	TBD
Sanitary sewer pipe	SDR 35	TBD
Sanitary sewer manholes	Precast concrete	TBD
Settled water pipe	Restrained joint DIP	TBD
Residuals pump station discharge	Restrained joint DIP	TBD
GAC pump station influent	Restrained joint DIP	TBD
GAC pump station overflow	Restrained joint DIP	TBD
GAC contactor influent	Restrained joint DIP	TBD
EQ basin overflow	Restrained joint DIP	TBD
Stormwater drainage pipe	RCP	Near preliminary treatment facilities
Stormwater catch basins	Precast concrete with cast iron grates	Near preliminary treatment facilities
Security fencing	Galvanized steel	GAC building area

2.4. References

- Kentucky Basic Building Code
- Recommended Standards for Water Works
- American National Standards Institute
- American Water Works Association
- Kentucky Transportation Cabinet
- Kentucky Division of Water
- Occupational Safety and Health Administration
- Sanitation District No. 1 Rules and Regulations

2.5. Miscellaneous

The 36 inch supply line that runs South to North, located to the East of the new GAC Building, may need to be relocated as part of the project. This is still under investigation, but will be presented at a future progress meeting.

3. Architectural

3.1. Introduction

The existing Taylor Mill Treatment Plant campus has multiple buildings (4) beginning with the 1953 Plant building through the 2006 Backwash Treatment and UV Disinfection facilities. The 1953 building has a significantly higher level of architectural design and the subsequent buildings are fairly utilitarian. All the buildings utilize a similar terra cotta color brick veneer as the exterior finish material. Preliminary floor plans and elevations for each facility are included in Appendix A along with renderings of proposed Alternatives A and B for the GAC Building.

3.2. Design Approach

The most open and level area of the site available is located at the southwest portion of the site adjacent to Grand Avenue at the opposite end of the site from the 1953 original Plant building. The GAC Building was sited here due to its building area, the need for tractor truck access, and the fact that the rest of the open site area slopes significantly. The new Preliminary Treatment Building has been placed at the location of one of the existing Preliminary Treatment Basins being demolished and the GAC Feed Pump Station to the north or just behind the new Preliminary Treatment Building at the location of the other basin being demolished.

The overall plan is that the new GAC Building and the original 1953 Plant building would act as book ends by being more architecturally significant. The Preliminary Treatment Building and GAC Feed Pump Station architectural design would be similar to the other newer buildings.

Sustainable initiatives for all new buildings currently being considered are: Vegetative roof system (which reduces storm water run off while increasing storm water quality / reduces heat island effect of the roof), envelope design that includes an R-value higher than standard (increase energy conservation / optimization), reuse of existing basin footprints (site recycling), use of regional / recycled materials, and collection and reuse of roof water. Buildings utilizing vegetative roof systems will incorporate a perimeter handrail system and the vegetative roof will be slightly sloped to provide an improved viewing angle.

3.2.1. Preliminary Treatment Building

This building is sited at the current location of the south flocculation and sedimentation basins. The building is approximately 84'x 67' and is 5,628 SF. It contains the new

flocculation / sedimentation basins. An electrical room is not shown but may be required. The effluent troughs shown are outside the building and make the entire structure approximately 95'x 72'.

3.2.2. GAC Building

Two options are proposed for this building. Each option includes the following spaces: truck aisle, GAC vessel area, UV electric room, EQ basin, backwash/ maintenance storage area, control room, electrical room, conference room, janitor, toilet, and entry lobby. The overall design of this building attempts to control the height of the building and overall scale by use of a low slope vegetative roof to minimize the impact on the adjacent residential neighborhood.

- Option A contains approximately 11,896 SF. The main volume of the building is the GAC contactor area / truck aisle. This option has two smaller volumes facing south with the equalization basin in between. One volume is office type program / dry areas and one volume is maintenance / wet areas.
- Option B contains approximately 11,458 SF. The main volume of the building is the GAC vessel area / truck aisle (same as option A). This option has one smaller volume at the southeast of the building with the equalization basin to the southwest.

The options show different types of roofs on the smaller volumes. These roofs are interchangeable for either option.

In both options, there will be a formal entrance into a lobby with access to the administrative areas of the facility. A secondary entrance is proposed adjacent to the parking areas, with carbon tanker truck access provided through an overhead coiling door. Control joints have been provided on the West wall of the facility to allow the installation of an overhead door for truck pull through.

As of January 21, 2009 NKWD had chosen Option B.

3.2.3. GAC Feed Pump Station

This building is sited at the current location of the north flocculation and sedimentation basins. The building is approximately 1,323 SF and has two rooms. The pump room is the main volume and lower volume is an electrical room at the north of the building. The building will include an interior bridge crane. Access to the building is proposed by making a new double man door opening at the north wall of the existing connector to the Chemical Feed Building, adjacent to the existing pair of doors at the end of the alley, to the east of the Chemical Building.

3.3. Materials, Equipment and Systems

3.3.1. Interior Materials

Interior wall finishes being considered are painted CMU, ground faced CMU, and oversized clay masonry units for durability and wash down (As of January 30, 2009 NKWD had decide on ground faced CMU for both the GAC Building and the Preliminary Treatment Building). Exposed concrete plank will generally be the finished ceiling. The conference room control room area of the GAC building is proposed to have a suspended acoustical ceiling at 10' above finished floor. The conference room will utilize a drywall material for the walls

3.3.2. Exterior Materials

Exterior wall materials will generally be clay masonry veneer to match the existing buildings. Fenestration at the GAC building is proposed to be insulated translucent panels. Roofs are proposed to be vegetative roof systems utilizing vegetation that requires minimum water and maintenance.

3.4. References

The Kentucky Building Code (KBC) is the 2006 International Building Code (IBC) with amendments.

PRELIMINARY BUILDING CODE ANALYSIS

- Height and floor area of the building:
  - Preliminary Treatment Building: Height 25' +/-, Area 5628 SF +/-
  - GAC Building: Height 31' +/-, Area 11,900 SF +/-
  - GAC Feed Pump Station Building: Height 30' +/-. Area 1,323 SF +/-
- Occupancy Classification:
  - Preliminary Treatment Building: F-1, Factory Moderate Hazard
  - GAC Building: F-1, Factory Moderate Hazard
  - GAC Feed Pump Station Building: F-1, Factory Moderate Hazard
- Construction Classification:
  - Preliminary Treatment Building: IIIB
  - GAC Building: IIIB
  - GAC Feed Pump Station Building: IIIB
- Area Modifications: Height and Area for F-1 buildings of IIIB construction is 2 stories with a building footprint of 12,000 SF. An area modification is not required.

- Means of Egress: F-1 occupancy load calculated for Industrial areas 100 SF per person and for Conference Rooms 15 SF per person. Occupancies over 49 persons require two means of egress. Maximum egress travel distance is:
  - Preliminary Treatment Building: Two means of egress required / Maximum travel distance 200'.
  - GAC Building: Two means of egress required / Maximum travel distance 200'.
  - GAC Feed Pump Station Building: One means of egress required / Maximum travel distance 75' (KBC 1019.2).
- Accessibility: The GAC conference room, control room, and toilet are accessible.
- Automatic Sprinkler Requirements: The threshold for F-1 classified buildings is 12,000SF (KBC 903.2.3). An automatic sprinkler system is not required.
- A modified code review indicating the buildings occupancy classification, as F-2 Factory Industrial Low Hazard, is being submitted to Northern Kentucky Area Planning Commission.
- If NKAPC concurs, this would increase the base allowable foot print to 18,000SF.

3.5. Miscellaneous

It is our understanding that the LEED system of checklists, UGBC registration, and commissioning is not a requirement for the project.

4. Structural

4.1. Introduction

Several new structures are planned as part of the project. This section describes the basis for structural design of these facilities. The geotechnical consultant's recommendations have not been received as of the date of this report.

4.2. Design Approach

Design shall be accomplished to provide watertight tank structures, which remain in the elastic stress range to limit the potential for cracking. Non-water retaining structures shall also be designed conservatively in keeping with the essential nature of the facility. Loading conditions shall be based on the worst operating scenario to design for static conditions. Design water surface elevations shall be based on the maximum level possible, and in some instances, in excess of levels shown on the hydraulic profile. The hydraulic profile water elevations shall be used for seismic design.

4.3. Facilities

4.3.1. Preliminary Treatment Facilities

This structure consists of rapid mix, flocculation, and sedimentation basins covered by a building. The basins shall be cast-in-place concrete and the building will be masonry CMU load bearing walls with brick veneer. The roof will be precast hollow core slabs.

4.3.2. GAC Feed Pump Station

The pump station wet well and foundation will be cast-in-place concrete. The building above the pump station will be masonry CMU load bearing walls with brick veneer. The roofs will be precast hollow core slabs.

4.3.3. GAC Building

The GAC Building will be masonry CMU load bearing walls with brick veneer. The roofs will be precast hollow core slabs.

4.3.4. Backwash Equalization Basin

This structure will be constructed of cast in place concrete.

4.3.5. Existing Tunnel

This is an existing structure and it will remain as it is except that the east end of the tunnel roof, which is severely deteriorated, will be replaced. The existing rapid mix will

be removed and the sedimentation basin effluent channel that runs north/south will be replaced with a larger channel.

If it is decided to cover the tunnel area with a roof, it is recommended that a light-weight canopy be used to minimize new loadings imposed on the existing tunnel.

4.4. Materials

4.4.1. Concrete

Concrete classes, strengths and their corresponding applications are outlined in the table below.

Table 4-1
Concrete

Concrete Class	Compressive Strength	Use
A	4000 psi	All applications unless otherwise noted.
B	3000 psi	Concrete fill, duct banks, unreinforced encasements, curbs, sidewalks and thrust blocks.

4.4.2. Reinforcement

The following types of reinforcements shall be used:

- ASTM A615, Grade 60
- ASTM A185, welded wire fabric.

4.4.3. Steel

The following criteria will apply to steel and steel sections:

- Structural tubing: ASTM A 500, Grade B.
- Structural pipe: ASTM A 53, Grade B.
- W-shapes: ASTM A 992.
- Plates, Angles, Channels, S-shapes, and HP-shapes: ASTM A 36.

Bolted Connections:

- Moment connections: ASTM A 325, slip critical. Moment connections shall be detailed on the drawings.
- All other connections: ASTM A 325 bearing type. Simple support bearing type connections specified to be designed and detailed by the Contractor to meet support reactions shown on the drawings. Where support reactions are not shown, the

connections shall be designed to carry half of the total uniform load capacity tabulated in AISC tables for allowable loads for laterally supported members.

4.4.4. Stainless Steel

The following criteria shall apply to stainless steel and stainless steel sections:

- ASTM A 276 (bars & shapes) (annealed).
- ASTM A 480/A 666 (plate).
- Type 316, (Type 304 for architectural uses) Fy = 30 ksi.
- Type 316L, (Type 304L for architectural uses) Fy = 25 ksi (required where subject to welding)
- Bolted connections (1/4" to 5/8") ASTM A 593/A 594, Condition CW, match type of stainless steel connected (Fu = 100 ksi, Fy = 65 ksi).
- Bolted connections (3/4" to 1 1/2") ASTM A 593/A 594, Condition CW, match type of stainless steel connected (Fu = 85 ksi, Fy = 45 ksi).

4.4.5. Aluminum

Aluminum sections shall be Alloy 6061 T6.

4.5. Design Criteria

DEAD LOADS

The following dead load criteria shall be used:

Table 4-2.
Dead Loads

ITEM	DEAD LOADS
Concrete	150 pcf
Steel	490 pcf
Aluminum:	169 pcf
CMU, normal weight, 8" wide	92 psf (grout solid)
	65 psf (grouted @ 32" on center)
	50 psf (ungrouted)

ITEM	DEAD LOADS
CMU, normal weight, 12" wide	140 psf (grouted solid)
	93 psf (grouted @ 32" on center)
	69 psf (ungrouted)
Clay Masonry (8" wide)	86 psf (grouted solid)
Fiberglass	100 to 115 pcf
Wood	40 pcf
Soil	130 pcf
Gravel	145 pcf

LIVE LOADS

The following live load criteria shall be used in addition to concentrated loads:

Table 4-3.
Live Loads

ITEM	LIVE LOADS
Roof load, Basic LL	30 psf
Office floors	50 psf
Electrical/Mechanical rooms	150 psf (in addition to equip loads)
Walkways, platforms, stairs	100 psf
Liquid loads	62.5 pcf
Shop Areas	200 psf
Traffic loads	Use AASHTO H-20 loading requirements for all vehicle access areas.
Forklift loads	Use wheel loads based on manufacturer's data for the maximum forklift capacity designated for each specific location
Monorail loadings	Vertical load = hoist system DL + (1.25 x hoist rated capacity)

WIND LOADS

Design will be in accordance with the requirements of the Kentucky Building Code.

Table 4-4.
Wind Loads

ITEM	WIND LOADS
Basic wind speed (3-second gust)	90 mph

SNOW LOADS

Design will be in accordance with the requirements of the Kentucky Building Code.

Table 4-5.
Snow Loads

ITEM	SNOW LOADS
Ground snow load, Pg	15psf

SEISMIC LOADS

Design will be in accordance with the requirements of the Kentucky Building Code.

Table 4-6.
Seismic Loads

ITEM	SEISMIC LOADS
Seismic use group	II
Spectral response coefficients	SDS = 0.125, SD1 = 0.051
Site class, Pg	B
Seismic Design Category	B

SAFETY FACTORS

The following Factors of Safety will be used for stability calculations:

Table 4-7.
Safety Factors

ITEM	SAFETY FACTORS
Overturning	1.5
Sliding	1.5
Buoyancy	1.5 for groundwater at normal mean elevation.
	1.10 for groundwater at 100-year flood elevation.

Forces resisting buoyancy shall be a combination of structure dead load, weight of soil directly over footings (considering buoyant soil weight), and the tensile resistance of piles and/or tension anchors (based on allowable load values provided by the geotechnical report). Where there are superstructures above grade, the drawings shall clearly indicate at what level of completion dewatering can be stopped.

4.6. References

4.6.1. Building Code

The design of this project will be governed by the following building code:

- Kentucky Building Code.

4.6.2. Codes and Standards

The following codes and standards shall be used in the structural design of this project:

- AASHTO. Standard Specification for Highway Bridges, Seventeenth Edition, 2002, American Association of State Highway & Transportation Officials, Washington, DC.
- ACI 318. Building Code Requirements for Structural Concrete, 2005, American Concrete Institute, Farmington Hills, MI.
- ACI 350. Code Requirements for Environmental Engineering Concrete Structures, 2006, American Concrete Institute, Farmington Hills, MI..
- ACI 530/ASCE 5/TMS 402 & ACI 530.1/ASCE 6/TMS 602. Building Code Requirements for Masonry Structures, 2002; & Specification for Masonry Structures, 2002, American Concrete Institute, Detroit, MI;

- AISC/ASD. Manual of Steel Construction Allowable Stress Design, Thirteenth Edition, American Institute of Steel Construction, Inc., Chicago, IL.
- PCI. PCI Design Handbook, Sixth Edition, 2004, Precast/Prestressed Concrete Institute, Chicago, IL.

4.7. Miscellaneous

4.7.1. Existing Conditions

The existing flocculation and sedimentation basins will be demolished and replaced due to severe deterioration of the concrete which is about 50 years old. NKWD's decision to replace the basins was based on the findings and recommendations contained in a May 2006 study by Black & Veatch. The Black & Veatch study focused on the water holding walls and troughs that are above grade and exposed to freezing temperatures. A basin diagram in the report indicates that the exposed walls should be replaced but the tunnel is to remain. However, the report did not contain an explicit recommendation that the tunnel remain in place.

An evaluation of the tunnel was performed to verify the tunnel can remain in service. The evaluation included an inspection and concrete testing. It was concluded that the tunnel is in adequate condition to be remain in place. A memorandum summarizing the evaluation is included in Appendix B to this report.

4.7.2. Leadership in Energy and Environmental Design (LEED) Goals

The structural design will be in accordance with LEED goals outlined in the Architectural section of this report.

4.7.3. Geotechnical Information

The geotechnical field work has been completed, but the report and recommendations have not yet been received. We have assumed H-piles will be required for foundation support for new structures based on preliminary discussions with Geotechnical Engineer.

5. Process Mechanical

5.1. Introduction

Process Mechanical improvements will be made as part of the Taylor Mill Advanced Treatment Improvements project to connect the existing facilities to the replaced preliminary treatment process, the new GAC treatment process, and the relocated UV disinfection system. Preliminary process plans, preliminary process diagrams, and a hydraulic profile are provided in Appendix A.

The preliminary treatment process includes rapid mixing, flocculation, and sedimentation. The concrete in the existing rapid mix, flocculation, and sedimentation basins is severely deteriorated, requiring replacement of these process basins. Piping and trough modifications will be implemented to connect the raw water main to the new rapid mix and connect the new sedimentation process to the existing filtration process. The pumps in the existing residuals pump station will also be replaced.

A 2006 evaluation of the concrete in the existing preliminary treatment basins included a limited evaluation of the tunnel that is located between the two flocculation basins. GRW inspected the tunnel in December 2008 and Thelen Associates performed coring and testing of concrete in the tunnel walls and roof. Based on the concrete testing results GRW concluded that the tunnel may remain in service performing its current function. A memorandum summarizing the tunnel evaluation is provided in Appendix B.

The GAC treatment process will include a GAC Feed Pump Station, a GAC Building housing fourteen 40,000 lb pressurized carbon vessels, backwash pumps, a UV disinfection system, and a GAC Equalization (EQ) Basin with dewatering pumps. The existing UV disinfection system, which is currently housed in the Filter Basement gallery, will be relocated to the GAC Building.

The GAC Feed Pump Station will be supplied from the current filter effluent header. Piping modifications will be made to connect to the existing header and a line will be routed to the southeast corner of the GAC Feed Pump Station wetwell. A bypass connection will also be made in the North Piping Gallery of the Filter Building Basement to allow bypassing of both the GAC facilities and UV disinfection facilities.

The GAC Feed Pump Station discharge header will be routed from the northwest corner of the pump station to the northeast corner of the GAC Building to supply the fourteen GAC vessels. After the GAC vessels, a GAC contacted water header will convey flow through UV disinfection to the existing clearwell. The header will also exit the northeast corner of the GAC Building. The GAC Building will also be equipped with a GAC bypass located on the GAC influent line as well as a UV emergency bypass.

Backwash waste and vessel-to-waste water will be conveyed to the GAC Equalization Basin. A visual observation well and air gap will be provided on the waste header for inspection of the waste. Basin contents will be recycled to the head of the plant.

5.2. Design Approach

5.2.1. General

The existing treatment plant has a nominal design capacity of 10 MGD. NKWD established a hydraulic design capacity of 12 MGD for the new rapid mix, flocculation, sedimentation, and GAC treatment facilities. The rated plant capacity will remain 10 mgd for planning purposes.

5.2.2. Preliminary Treatment Facilities

5.2.2.1. Rapid Mix

A new two-stage rapid mix will be provided to disperse pre-treatment chemicals into the process stream. The second stage will provide a redundant mixer and allow staged feeding of chemicals, if desired. The existing rapid mix basin will be removed. The components of this treatment process are presented in Table 5-1.

Table 5-1.
Rapid Mix Design

Description	Design	
Number of Basins	2	
Mixer Type	Vertical Turbine	
Basis of Design	Lightnin	
Number of Impellers per Shaft	1	
G Value, sec^{-1} at 32 degrees Fahrenheit	1000 (KDOW: no standard, Ten States Standards: minimum 750)	
Detention time, seconds	Maximum Flow (12 MGD), Two Mixers in Service	16 (KDOW: < 60, TSS < 30) This is in compliance with KDOW draft guidelines which have not yet been adopted
	Maximum Flow (12 MGD), One Mixer in Service	8
	Minimum flow (4.5 MGD), Two Mixers in Service	42

Description	Design	
	Minimum flow (4.5 MGD), One Mixer in Service	21
Basin Dimensions	Width, feet	4.75
	Length, feet	4.75
	Sidewater Depth, feet	6.5
	Freeboard, feet	2.5 +/-
Chemical Feed Points	Sodium Hypochlorite	Existing tap
	Caustic Soda	Existing tap New tap in pipe before new RM Pipe to second stage RM
	Ferric Sulfate	Existing tap New tap in pipe before new RM Pipe to second stage RM
	Hybrid Coagulant	Existing tap New tap in pipe before new RM Pipe to second stage RM
	Copper Sulfate/PAC	Existing tap
Drives	Motor Horsepower (Per Mixer)	10
	Speed Control	Variable Frequency Drives
Controls	VFDs located in the tunnel	
	Start/stop control at VFDs and mixers	
	Start/stop control in SCADA	
	Speed control at VFDs and through SCADA	
	Drive status and run time monitored in SCADA	
	Semi-automatic speed control based on setpoint G-value and water temperature entered in SCADA by operators.	
Design Concepts	Top of basin to be open grating with steel support structure for mixer	
	Fiberglass panels will be used on all exterior troughs to guard against freezing conditions. Interior troughs will utilze aluminum grating. Concrete will be utilized where walkways cross troughs (mainly near doorway access.	
	Provide drain valve(s) and piping for draining to residuals treatment facilities	

5.2.2.2. Flocculation

A new three-stage tapered flocculation process will be provided. The basis of design considers providing all new flocculation equipment; however, recommendations have been requested from Lightnin regarding the feasibility of reusing the eight existing 1.0 horsepower mixers in the second and third flocculation stages. The components of this treatment process are shown in Table 5-2.

Table 5-2.
Flocculation Design

Description	Design	
Influent Flume	Provide valve and piping for draining to residuals treatment facilities	
	Provide grating on top of channel for access	
	Freeboard: 1.5 feet	
Influent Flow Splitting Gates	One influent gate per basin for flow adjustment and basin isolation	
Effluent Gates	Two gates per basin for basin isolation	
Number of Flocculation Basins	4	
Mixer Type	Vertical Turbine	
Basis of Design	Lightnin	
Number of Impellers per Shaft	1	
Mixing G Values, seconds $^{-1}$	Stage 1	80
	Stage 2	50
	Stage 3	35
Detention Time, minutes	Maximum flow (12 MGD)	34 (Exisiting: 30, KDOW: 40-60, Ten States Standards: 30)
	Minimum Flow (4.5 MGD)	90 (all basins in service)
Mixer Peripheral Speed, fps	Stage 1	8.0
	Stages 2 and 3	7.6
Overall Dimensions of Each Basin	Width, feet	15
	Length, feet	14
	Average Sidewater Depth, feet	15
	Freeboard, feet	1.25
Drives	Stage 1 Horsepower	1.5
	Stage 2 Horsepower	1.0
	Stage 3 Horsepower	1.0
	Speed Control	Variable Frequency Drives
Controls	VFDs located in the tunnel	
	Start/stop control at VFDs and mixers	
	Start/stop control in SCADA	
	Speed control at VFDs and through SCADA	
	Drive status and run time monitored in SCADA	
	Semi – automatic speed control based on setpoint G-value and water temperature entered in SCADA by operators	
Design Concepts	Provide individual basin drains , which will match the elevation of the existing valves, for draining clear water to storm sewer.	
	Also provide individual basin drains in bottom for draining residuals to residuals treatment facilities.	
	Hard pipe drains to storm sewer or residuals sewer as appropriate	
Baffle Walls	Concrete walls with circular ports will be utilized	

5.2.2.3. Sedimentation

A new plate settler sedimentation process will also be provided. The concrete in the existing residuals pump station, which was constructed in 1989, is in good condition and it is recommended that only the pumps, valves, and controls be replaced. The components of this sedimentation treatment process are presented in Table 5-3.

Table 5-3.
Sedimentation Design

Description	Design	
Number of Sedimentation Basins	2	
Flow Per Basin	Design: 6 MGD	
	Maximum hydraulic throughput capacity per basin: 12 MGD (settling treatment objectives most likely will not be met at this max condition)	
Basin Dimensions, Feet (for sedimentation basins with plate settlers)	Width	30.5
	Length	38.0
	Average Sidewater Depth Excluding Cross Collection Trough and Residuals Hopper	18.0
	Maximum Water Depth, Including Hopper	21.25
	Freeboard	1.25
Volume, Excluding Cross Collector Troughs and Residuals Hoppers, Gallons	Per Basin	156,000
	Both Basins	312,000
Detention Time, Minutes	Both Basins in Service, 12 MGD	37
Plates (based on MRI plates with effluent troughs on the side)	Rows per Basin	5
	Plate Cartridges per Row	1
	Total Plates per Basin	594
	Total Plates	188
	Plate Width, feet	4.5
	Plate Length, feet	10
	Angle of Inclination, degrees	55
	Effective Surface Area, %	80
	Projected Surface Area per Plate, sf	20.65
	Effective Surface Area per Plate, sf (At 80% Efficiency)	25.81
	Effective Surface Area per Basin, sf	12,256
	Total Effective Surface Area, sf	24,512
Plate Surface Overflow Rate, GPM/SF	4.5 MGD With 2 Basins in Service	0.13 (KDOW ≤ 0.5 GPM/SF)
	12 MGD With 2 Basins in Service	0.34 (KDOW ≤ 0.5 GPM/SF)

Description	Design	
Sedimentation Design Concepts	Basins designed to meet treatment objectives at a maximum flow rate of 6 mgd per basin	
	Provide emergency overflow weir in effluent trough	
Residuals Collection	Type	Chain and Flight with Cross Collectors
	Vendors	Envirex/Siemens, E&I
	Flight Material	Fiberglass
	Chain Material	Plastic
	Return Rail Material	Fiberglass, CPVC, and Polypropylene
	Sprocket Material	Plastic
	Number of Collectors per Basin	2
	Number of Cross Collectors per Basin	1
	Bottom Slope, inches	6
	Cross Collector Bottom Slope, inches	6
Residuals Collection Drives	Number of Drive Units Per Basin	2
	Horsepower Per Unit	0.5
	Speed Control	Constant speed
Residuals Collection Controls	Start/stop control at sedimentation basins and at MCC located in the tunnel	
	Start/stop control in SCADA	
	Drives operate in auto mode controlled by adjustable timers in SCADA	
	Interlock drives with corresponding basin blowdown valves so collection mechanisms operate when blowdown valves are open	
	Drive status and run time monitored in SCADA	
	High torque warning and torque overload alarm in SCADA	
	Visual torque overload alarm in the Preliminary Treatment Building	
Residuals Design Concepts	Provide individual basin drains 2 feet above floors for draining clear water to storm sewer	
	Drain lowest 2 feet of water and residuals through residuals drawoff pipes to residual processing facilities	
	Hard pipe drains to storm sewer or residuals sewer as appropriate	
Residuals Blowdown	Gravity flow through one motor operated valve per basin	
	Residuals Flow Rate, gpm	TBD
Residuals Blowdown Controls	Provide automatic control of motor operated valves in SCADA with adjustable blowdown interval and duration (Only one valve may be opened at a time)	
	Provide local manual control on the valves	
	Provide remote manual control in SCADA	
	Valve status monitored in SCADA	

Description	Design	
Residuals Pump Station	Number of Existing Pumps	2
	Reported Capacity per Pump, gpm	400
	Reported Existing Pump Horsepower	7.5
	Existing Pump Discharge Size, inches	4
	Number of Replacement Pumps	2
	Capacity per Pump, gpm	TBD (estimated 400 – 500)
	New Pump Horsepower	TBD (estimated 7.5 – 10)
	New Pump Discharge Size, inches	4
Residuals Pump Station Controls	Replace existing float switches with new continuous level monitoring device.	
	Ability to change the pump level setpoints in SCADA	
	High level alarm (will close valve) and low (will stop pump) level alarm in SCADA	
	Visual local alarm at the pump station	
	Water level monitored in SCADA	
	Motor temperature and seal leakage monitored in SCADA	
	Pump status and run time monitored in SCADA	

5.2.3. GAC Treatment Facilities

The GAC treatment facilities consist of a GAC Feed Pump Station, a GAC Building, and a GAC Equalization Basin. Information on each is presented in the following sections.

5.2.3.1. GAC Feed Pump Station

The GAC Feed Pump Station will receive water by gravity flow from the existing filters. The wetwell will be designed utilizing the Hydraulic Institute (HI) recommendations for "sump design" with multiple pump installations. The wetwell will be designed to meet the minimum required water elevation, provide a two foot control band range, and allow one and a half foot freeboard prior to the overflow elevation. Table 5-4 summarizes the wetwell design parameters, as recommended by pump manufactures and the HI.

Table 5-4.
GAC Feed Pump Station Wetwell Design

Description	Design
Total Wetwell Volume, gallons	37,700 +/-
Wetwell Length, feet	35 +/-
Wetwell Width, feet	18 feet +/-
Wetwell Operating Depth, feet	8 feet +/-
Volume of 2 Foot Control Band, gallons	9,400

A wetwell overflow will be provided and routed to a drainage swale to the north of the pump station. Wetwell overflows are expected to be used on an emergency basis and therefore, no permanent dechlorination facilities will be provided. NKWD will draft an emergency SOP to deal with emergency events.

The GAC Feed Pump Station will utilize three vertical turbine pumps, two service pumps and one standby, complete with variable frequency drives (VFDs). The firm capacity of the station will be 12 MGD with two pumps operating at full speed. Table 5-5 summarizes the GAC feed pump design criteria.

Table 5-5.
GAC Feed Pump Design

Description	Design
Pump Type	Vertical turbine
Minimum Flow One Pump @ 1,360 RPM	3,125 GPM @ 66 feet +/-
Duty Point One Pump @ 1,770 RPM	4,166 GPM @ 70 feet +/-
Duty Point Two Pumps Operating in Parallel @ 1,770 RPM	8,333 GPM @ 81 feet +/-
Rated Speed, RPM	1,770
Motor Horse Power, hp	125
Pump Diameter, in	16
Pump Discharge, in	14

The discharge of each pump will be equipped with an air/vacuum release valve, check valve, and a butterfly valve for isolation purposes. The pumps will tie into a discharge header which will be routed around the pump room and exit the building below grade at the northwest corner of the room. The header will be equipped with a venturi meter and differential pressure transmitter for monitoring flow rate to the GAC facility. The header will also be equipped with a surge relief valve to protect the GAC vessels. The relief valve will discharge directly to the wetwell.

The level in the wetwell will be monitored by an ultrasonic level sensor. As the level in the wetwell raises or falls, the sensor will communicate with the PLC, which will control the VFDs, to match the speed being pumped out of the wetwell with the flow coming in from the filters by increasing or decreasing the flow of the pump(s). The two foot control band provides the VFDs with time to match the incoming flow from the filters.

A separate electrical room will be provided adjacent to the pump room on the north side of the building. The electrical room will house the VFDs and ancillary electrical equipment and will be air conditioned, while the pump building will be ventilated only. An electric bridge crane will be provided in the pump building for removal and maintenance of the pumps, motors and valves. The height of the pump room will be

sized so that the pump column pipe can be lifted from the wetwell by the bridge crane and uncoupled at five foot intervals.

The pump building and electrical room will have exterior double doors for removal of equipment. Since the GAC Feed Pump Station is located behind the existing tunnel, an additional double door will be installed on the north side of the tunnel (double doors already exist on the south side of the tunnel). The double doors will be sized to allow access by a small forklift. The forklift and the electric bridge crane will be utilized to remove the pumps and motors and convey them to the south side of the tunnel where they can be loaded on a truck should offsite maintenance be required.

5.2.3.2. GAC Building

The GAC Building is located on the west side of the plant property, along Grand Avenue. The north side of this location is bordered by steep topography, so the building layout is confined to the southern area of the open space. The open space is also bordered by an existing private residence to the west and an existing 36-inch water main to the east.

The GAC Building will house fourteen GAC pressure vessels, the relocated UV disinfection system, backwash pumps, compressed air system, plant water system, miscellaneous valves and instruments.

Several process layouts were discussed during progress meetings and the stakeholders selected a layout where all GAC vessels are aligned in an east west arrangement along the northern portion of the building, adjacent to the truck aisle. The layout confines all process areas to this northern portion of the building.

The southern portion of the building will house the administrative areas, including a lobby, control room, conference room, restroom, and janitor closet. The GAC Equalization (EQ) Basin will be located adjacent to the truck aisle on the south side of the facility as well.

This layout allows for a tiered appearance from the road. The selected arrangement allows for the optimum piping layout and for hydraulic symmetry. Due to the size requirements of the building, the distance to the neighbor's property line is approximately 30-feet. NKWD may want to consider purchasing the neighbor's property to allow for an increased distance between the residents and the GAC Building.

GAC PROCESS

Carbon pressurized vessels versus basin-style contactors were investigated as part of the *Preliminary Design of GAC Systems Report* (by Malcolm Pirnie, Inc. and GRW, Inc., dated March 2008). The pressurized vessels were selected due to the cost benefit, ease of carbon transfers, and the minimal excavation required in comparison to the basin-style contactors.

During the information request phase, both 20,000 lb and 40,000 lb vessels were recommended by the vessel manufacturers. All vendors can provide both 20,000 lb and 40,000 lb vessels. The use of 40,000 lb pressure vessels reduces the number of vessels from 28 (20,000 lb vessels) to approximately 14 (40,000 lb vessels), which ultimately simplifies the treatment system by reducing the number of valves and instruments required. Additionally, fourteen 40,000 lb vessels will occupy approximately 2,500 sf less than the 28-20,000 vessels. Furthermore, the 40,000 lb vessel arrangement also allows for the GAC EQ Basin to be located adjacent to the GAC Building, rather than across the plant entrance, adjacent to the Backwash Treatment Facility, which would require sub-grade construction and additional piping.

The disadvantages of the 40,000 lb vessel arrangement are that it requires multiple carbon loads to complete carbon transfers, requires a taller building, and there are limited installations (installed in two locations by Calgon). Weighing the advantages and disadvantages, the stakeholders selected 40,000 lb vessels as the basis of design. It was considered that the site constraints and reduction of maintenance items outweighed the listed disadvantages.

The required number of vessels, fourteen, was determined based on a 20-minute empty bed contact time (EBCT), a plant design flow rate of 10 MGD, and the 40,000 lb vessel capacity. The 20-minute EBCT was determined as part of the *Preliminary Design of GAC Systems Report* (by Malcolm Pirnie, Inc. and GRW, Inc., dated March 2008). During carbon change-outs with 13 vessels running and a plant flow of 10 MGD, the vessels will have a 19-minute EBCT, which is slightly less than the target of 20-minutes. Since carbon change-outs for a single vessel can be achieved in two days, and the EBCT is conservative, it was decided that this was an acceptable level of treatment.

Based on vendor recommendations, the minimum surface loading rate is 2 gpm/sf and the maximum surface loading rate is 7 gpm/sf. Table 5-6 summarizes the number of vessels that can be operating to meet the EBCT and surface loading rate criteria.

Table 5-6.
No. GAC Vessels Operating Versus Various Flow Conditions

Flow Condition (MGD)	No. Vessels Operating to Meet EBCT and Surface Loading Rate Criteria
4.5	7-14
6	9-14
10	14
12	14 (EBCT ~17 minutes)

0.71 MGD/vessel

$\frac{0.71 \times 10^6 \text{ gal}}{\text{day}} \frac{\text{day}}{24.60} = 500$ gpm

The fourteen vessels are configured in a seven, dual vessel system arrangement where each pair of vessels share a common 4-tier manifold. The manifold contains the GAC backwash waste, GAC influent, GAC effluent, and GAC backwash supply lines. Each pressurized vessel is provided with man ways, bed sampling ports, and carbon fill and drain lines. A rupture disk is also provided to keep the vessel from over pressurizing. The GAC vessels and equipment will be manufactured by Calgon Carbon Corporation (Calgon), Siemens Water Technologies (Siemens), or Norit-Americas (Norit).

A positive head loop is provided on the GAC contacted water header to ensure full vessel flow. A GAC bypass is located on the GAC influent line to bypass GAC treatment, but still route flow through UV disinfection.

VESSEL UNDERDRAINS

There are two types of underdrains that are available for the carbon pressurized vessels; false bottom type and external header type. The false bottom underdrain consists of approximately 80 to 120 strainers which are mounted on an internal cone false bottom. This type of underdrain increases the vessel structural requirements, requires confined space entry for maintenance, and may require more maintenance due to the hydraulic forces stretching the gasket materials. The false bottom underdrain provides more locations for failure of the internal coating and is more prone to corrosion, but has the benefit of better flow distribution.

The external header underdrain consists of 8 strainers arranged on an external header located beneath the pressurized vessel. This underdrain type does not require vessel entry for maintenance and allows for a more consistent vessel lining as there are a limited number of welds. Current vessel owners confirmed that the external header underdrains require less maintenance than the false bottom type underdrains. Based on the above comparison, the external header underdrain was selected for the design.

VESSEL VALVING

As noted previously, the vessels will be configured in a seven pair vessel system arrangement. Each system will share a common 4-tier manifold. Each vessel will have dedicated valving located on the common manifold so that each vessel can process flow and perform backwashes separately. Two vessels will not perform backwashes simultaneously. The GAC backwash waste, GAC backwash supply, and GAC influent manifold valves will all be open/close automated valves. The effluent valves will be modulating valves controlled by a flow meter on the influent line to ensure that each vessel processes the same flow rate regardless of carbon saturation. The carbon fill and drain valves will be manually operated, as is the standard with pressurized vessels. Two vessel systems will share a common header to reduce the amount of piping required to convey flow to and from the main header, located along the north wall. The plant air and plant water lines are discussed in Sections 5.2.5.5 and 5.2.5.6. The piping sizes and

associated valve sizes required for the pressurized vessels are summarized in Table 5-7 below.

Table 5-7.
GAC Pipe Sizes

Flow Description	Pipe Description	Pipe Diameter (in)
GAC Vessel Influent	Main Header	24
	Common Header (4 Vessels)	10
	Common Header (2 Vessels)	8
	Manifold (1 Vessel)	8
GAC Vessel Backwash Supply	Main Header	10
	Common Header (4 Vessels)	10
	Common Header (2 Vessels)	8
	Manifold (1 Vessel)	8
GAC Vessel Backwash Waste	Main Header	10
	Common Header (4 Vessels)	10
	Common Header (2 Vessels)	8
	Manifold (1 Vessel)	8
GAC Vessel Effluent	Main Header	24
	Common Header (4 Vessels)	10
	Common Header (2 Vessels)	8
	Manifold (1 Vessel)	8
GAC Vessel Carbon Fill		4
GAC Vessel Carbon Drain		4
GAC Vessel Plant Air		4
GAC Vessel Plant Water		4

VESSEL FLOW CONTROL

The rate of flow through each GAC vessel will be controlled to provide an equal flow rate to all vessels in service. Flow to the vessel will be monitored with a meter on the influent line to each vessel and the rate will be controlled by adjusting the effluent valve. The SCADA system will be programmed for flow control of the individual vessels based on a rate set with the discharge flow from the GAC Feed Pump Station and the number of vessels in service.

ACCESSORIES

One GAC vessel will include a view port at the top of the vessel, near the GAC water interface. The view port will be made out of Pyrex® glass and will not reduce the pressure rating of the GAC vessel. Additional access will be constructed at this vessel to allow two people to climb to the view port.

GAC BACKWASH

There are two modes of operation for vessel backwash, first, when the GAC is initially loaded into the vessel, and second, to "fluff" the media if needed to relieve some of the media compaction. The backwash flow rate requirements when GAC is initially loaded into the vessels are related to fine particle removal. The fluidization required for fine removal varies with water temperature and GAC particle characteristics. Since 12 x 40 mesh GAC is the basis of design, Calgon recommended a backwash rate of 850 gpm for fine removal based on a 55 degree Fahrenheit water temperature. Based on backwash supply curves provided by Calgon and Norit, a range of 750 – 1500 gpm may be required based on a temperature range of 32 – 90 degrees and differences in carbon characteristics. The rate of flow to "fluff" the media is more arbitrary, as the duration of backwash is more critical. A "fluff" should not redistribute the carbon bed and requires five minutes or less of backwash flow. Calgon recommended that this rate be established during startup.

Two backwash alternatives were investigated as part of preliminary engineering and are as follows:

1. Backwashing with dedicated backwash pumps located in the GAC Feed Pump Station.
2. Backwashing by utilizing in-line vertical centrifugal booster pumps located on the effluent header prior to the positive head loop with a backup connection to the 36-inch high service main from the TMTP.

Alternative 1 has dedicated backwash pumps located in the GAC Feed Pump Station. Disadvantages of Alternative 1 include control issues that would arise during backwash when the rate of flow to the GAC process would be reduced by the flow required for backwash, the increase in wetwell size for backwash requirements, and the increase in GAC Feed Pump Station size to house the additional pumps.

Alternative 2 utilizes in-line booster pumps located in the GAC Building. By taking suction from the GAC contacted water line, the pumps require less horsepower to achieve the pumping requirements than backwash pumps taking suction from the GAC Feed Pump Station wetwell as proposed in Alternative 1. Furthermore, less piping is required for Alternative 2. A disadvantage of Alternative 2 is that it requires a backup connection to the 36-inch TMTP discharge line to allow backwashing during startup and low flow conditions. Alternative 2 was selected due to the simplicity in operation, the redundancy provided and the cost advantage, estimated in the order of $80,000.

The basis of design for Alternative 2 is to provide two in-line booster pumps one service, one standby. The backwash flow rate will be controlled by a modulating flow control valve on the backwash supply discharge line. This valve will communicate with the PLC via a 4-20 mA signal. The flow meter will also communicate with the PLC. A control loop will be set up for flow control. The valve will have local controls on the actuator as well as remote controls at the local panel. Table 5-8 summarizes the GAC backwash supply pump criteria.

Table 5-8.
GAC Backwash Supply Pump Design

Description	Design
Pump Type	In-line vertical centrifugal
Backwash Range, gpm	750–1,500
Quantity	2 pumps; one service, one standby
Rated Speed, RPM	1,750
Power, hp	15
Pump Diameter, in	6
Pump Discharge, in	6

The backup backwash supply will be provided with a connection to the 36-inch TMTP discharge line. Dual pressure reducing valves in series will reduce pressure from approximately 210 psig to 100 psig, then 100 psig to 30 psig. This supply will have an independent flow control valve and venturi flow meter.

UV DISINFECTION

The two existing UV systems will be relocated to the GAC Building. The UV reactors will be located post-GAC and prior to the positive head loop. The existing systems are designed to treat 89% UV_T water with a Reduction Equivalent Dose (RED) of 40 mJ/cm^2. By relocating the UV disinfection system post-GAC, a UV_T of approximately 95% is anticipated. The UV electrical and control panels will also be relocated and housed in a small electrical room near the UV reactors, while the UPS will be relocated to the main electrical room in the GAC Building. An emergency UV bypass will be located in the GAC Building. A GAC and UV bypass will be located in the existing Filter Basement

North pipe gallery. Documentation showing the options evaluated, in regards to the relocation of theUV reactors is attached as Appendix C.

PLANT WATER

Plant water will be supplied by the backwash connection to the 36-inch TMTP Plant Discharge line to the GAC Building. This connection will split to provide water for backwashing as well as for plant water use. There will be a backflow preventer located on both lines. The plant water line will have one pressure reducing valve to regulate the pressure from approximately 210 psig to 70 psig and will be sized to provide 100 – 200 gpm. This system will supply water for the various water requirements of the GAC treatment process as follows:

- Carbon spray wash during spent carbon transfer (approximately 500 gallons at 100-200 gpm for 5 minutes)
- Pressurized vessel preparation for fresh carbon transfer (approximately 3,000 gallons at 100 – 200 gpm)
- Carbon truck preparation for fresh carbon transfer (approximately 5,000 gallons per 20,000 dry carbon)

PLANT AIR

Plant air will be supplied by a dedicated 30 hp rotary screw air compressor sized for 125 scfm regulated down to 30 psig. The air compressor will be equipped with a desiccant dryer and three air filters (2 pre-dryer, 1 post-dryer) and a 120-gallon receiver. The 4-inch air lines will be hard piped to each vessel for use during the carbon transfers. One to three tank air supply connections will be provided. The feed line will have a regulator set to 15psi. This system will supply air for the various air requirements of the GAC treatment process as follows:

- Vessel preparation for spent carbon transfer (100 scfm at 30 psig minimum)
- Spent carbon truck drain procedure (100 scfm at 15 psig maximum)
- Truck preparation for fresh carbon transfer (100 scfm at 15 psig maximum)

5.2.3.3. GAC Equalization Basin

The GAC treatment process requires an equalization basin to store flows from backwash waste events, vessel-to-waste events, carbon tanker truck drain events, and general wash down events of the GAC Building. The equalization basin was sized to hold 45,000 gallons and designed with a sump to facilitate cleanout. This equalization size is based on the following:

- Drain water from two spent carbon truck loads
- One vessel backwash event (30 minutes at maximum backwash rate of 1,500 gpm)

- One vessel-to-waste event (60 minutes)
- Equalization dewatering rate of 10% of 4.5 MGD (~313 gpm)
- 10% safety factor

Backwash waste or vessel-to-waste water will flow from the vessels through the backwash waste line located along the north and west walls. There will be an air gap located just upstream of the GAC EQ Basin to visually inspect the turbidity of the water if needed. This visual inspection will aid operators to ensure that large amounts of carbon are not exiting the top of the vessel and to verify when the backwash event is over (carbon fines are not largely visible). The GAC EQ Basin will be equipped with two 300 gpm submersible EQ dewatering pumps. The GAC EQ Basin effluent will be recycled to the head of the plant at a constant rate of 300 gpm by tying into the current Filter-to-Waste Return. This connection is shown on the Site Plan in Appendix A. The GAC EQ dewatering flow will take precedence over the filter-to-waste return flow and will be controlled automatically through SCADA. Details of operation will be finalized as the design develops.

The GAC EQ Basin will also be equipped with an overflow line that will connect to the filter-to-waste overflow line through the dechlorination station to avoid permit violations. An ultrasonic level transmitter will be provided for level status. Table 5-9 summarizes the GAC EQ dewatering pump criteria.

Table 5-9.
GAC EQ Dewatering Pump Design

Description	Design
Pump Type	Submersible
Duty Point	300 gpm @ 73 ft +/-
Discharge, in	8

5.3. Materials, Equipment, and Systems

5.3.1. Materials of Construction

The materials of construction associated with the preliminary and GAC treatment processes are summarized in below in Table 5-10.

Table 5-10.
Preliminary and GAC Treatment Processes Materials of Construction

Description	Material	Location
Flanged Pipe	Ductile Iron	Inside all buildings
Restrained Joint Pipe	Ductile Iron	Buried and yard piping
Solvent Welded Pipe	PVC	Drain piping
Grating	Aluminum	Rapid Mix, Troughs
Gates	Aluminum	Preliminary Treatment
Handrail & Kick Plates	Aluminum	Walkways, Basins
Mixing Baffles	Concrete	Rapid Mix Basins

5.3.2. Equipment

The equipment associated with the Preliminary Treatment and GAC process facilities are summarized below in Table 5-11.

Table 5-11.
Preliminary and GAC Treatment Processes Equipment

Description	Type	Quantity	Design Conditions
Preliminary Treatment – Rapid Mix			
Mixer	Turbine	2	G = 1,000 Sec-1
Drain Valve	Plug	1	4-inch
Preliminary Treatment – Flocculation			
Influent Gates	Rising Gate	4	Manual
Flocculators	Turbine	12	VFD controlled
Drain Valves for Clear Water	Butterfly Valve	4	Manual, 8-inch
Drain Valves for Residuals	Mud Valve	4	Manual, 8-inch
Baffles	TBD	8	NSF Approved
Preliminary Treatment – Sedimentation			
Influent Gates	Rising Gate	8	Manual
Plate Settlers	Lamella	5 Plate Cartridges Per Basin	SS Plates and troughs, 55 degree angle of incline
Residuals Collection Equipment	Chain and Flight	2	One main collector per basin, one cross collector per basin
Automated Residuals Blowdown Valves	Plug Valve	2	Open/close, 8-inch
Drain Valves for Clear Water	Butterfly Valve	4	Manual, 8-inch

Description	Type	Quantity	Design Conditions
Drain Valves for Residuals	Mud Valve	4	Manual, 8-inch
Preliminary Treatment – Residuals Pump Station			
Residuals Pumps	Submersible	2	Constant speed, 400 - 500 gpm each
Pump Check Valves	Ball Check	2	4-inch mounted vertically in pump well
4-inch mounted vertically in pump well	Plug Valve	2	Manual, mounted vertically in pump well, 4-inch
GAC Feed Pump Station			
GAC Feed Pump	Vertical Turbine	3	6 MGD, VFD operated
GAC Feed Pump Discharge	Check Valve	3	14-inch
GAC Feed Pump Discharge	Butterfly Valve	3	Manual, 14-inch
GAC Feed Pump Discharge	Air/Vacuum Release Valve	3	150 psi – 300 psi
GAC Feed Pump Discharge	Air Release Valve	3	150 psi – 300 psi
GAC Feed Pump Header	Pressure Relief Valve	1	125 psi
GAC Feed Pump Station Pump Room	Electric Bridge Crane	1	Motorized, 5-ton
GAC Building			
Carbon Pressurized Vessel	N/A	14	40,000 lbs, arranged in 7 vessel systems
GAC Vessel Backwash Waste	Butterfly Valve	14	Electric Open/Close, 8-inch,
GAC Main Header Backwash Waste	Butterfly Valve	±1	Manual, 10-inch
GAC Influent	Butterfly Valve	1	Manual, 24-inch
GAC Vessel Influent	Butterfly Valve	14	Electric Open/Close, 8-inch,
GAC Bypass	Butterfly Valve	1	Manual, 24-inch
GAC Vessel Effluent	Butterfly Valve	14	Electric Modulating, 8-inch,
GAC Vessel Influent/Effluent Isolation	Butterfly Valve	14	Electric Open/Close, 8-inch
GAC Main Header Effluent	Butterfly Valve	1	Manual, 24-inch,
GAC/UV Effluent Air Release Valve	N/A	1	150 psi – 300 psi
GAC Vessel Carbon Fill	Full Port Ball Valve	14	Manual, 4-inch
GAC Vessel Carbon Drain	Full Port Ball Valve	±14	Manual, 4-inch

Description	Type	Quantity	Design Conditions
GAC Vessel Pneumatic Port	Ball Valve	56	Manual, 1-inch
GAC Vessel Pressure Relief	Rupture Disk	14	APCO 143C
GAC Vessel Bed Sampling Port	Ball Valve	42	Manual, ¾-inch
GAC Vessel Piping Sampling Port	Ball Valve	28	Manual, ½-inch
GAC Vessel Piping Pneumatic/Pressure Port	Ball Valve	14	Manual, 1-inch
GAC Backwash Supply Pump Suction	Butterfly Valve	2	Manual, 10-inch
GAC Backwash Supply Pump	In-line Vertical Centrifugal	2	750 - 1,500 gpm
GAC Backwash Supply Pump Discharge	Butterfly Valve	2	Manual, 10-inch
GAC Backwash Supply Pump Discharge	Check Valve	2	Manual, 10-inch
GAC Backwash Supply Pump Discharge	Butterfly Valve	1	Electric Modulating, 10-inch
GAC Vessel Backwash Supply	Butterfly Valve	14	Electric Open/Close, 8-inch,
GAC Backup Backwash Supply Main Header	Pressure Reducing Valve	2	Manual, 8-inch
GAC Backup Backwash Supply Main Header	Butterfly Valve	1	Electric Modulating, 8-inch
GAC Backup Backwash Supply Main Header	Butterfly Valve	±2	Manual, 8-inch
GAC Center Gallery Sump Pump	Submersible	1	200 gpm
GAC Vessel Wash Down Sump Pump (if required)	Submersible	1	50 gpm
GAC Air Compressor	Rotary Screw	1	125 scfm, 30 hp motor, 1-inch inlet/outlet
GAC Air Compressor Dryer	Desiccant	1	130 scfm, 1-inch inlet/outlet
GAC Air Compressor Filter	Filter	3	2 pre-dryer, 1 post-dryer
GAC Air Compressor Regulator	Heavy Duty	±1	1-inch, with gauge
GAC Vessel Plant Air Port	Ball Valve	14	Manual, 4-inch
GAC Plant Air Header	Ball Valve	±2	Manual, 4-inch
GAC Plant Water Main Header	Pressure Reducing Valve	1	Manual, 4-inch

Description	Type	Quantity	Design Conditions
GAC Plant Water Main Header	Butterfly Valve	±2	Manual, 4-inch
GAC Vessel Plant Water Port	Ball Valve	14	Manual, 4-inch
GAC EQ Basin			
GAC Dewatering Pumps	Submersible	2	300 gpm
GAC Dewatering Pump Header	Check Valve	2	8-inch
GAC Dewatering Pump Header	Plug Valve	2	8-inch

6. HVAC

6.1. Introduction

The HVAC portion of the project involves heating and ventilation of the new Preliminary Treatment Building; heating and ventilation of the new GAC Feed Pump Station pump room; heat and air condition the pump station electrical room; heating, air conditioning and dehumidification of the GAC vessel area, truck aisle, and maintenance storage area of the new GAC Building; heat and air condition the control room, conference room, lobby, and electrical room of the GAC Building.

6.2. Design Approach

Simple heating will be provided by gas fired unit heaters. Plain ventilation will be by exhaust fan with wall louvers. Large area air conditioning/dehumidification will be by split system air cooled condensing unit and central air handler unit with ductwork and diffusers. Individual room air conditioning will be by air cooled split system heat pumps and ductless split system heat pumps. Toilet and janitor room exhaust will be by individual ceiling exhaust fans.

6.3. Facilities

6.3.1. Proposed Preliminary Treatment Building

Heating of the proposed Perliminary Treatment Building will be by individual gas fired unit heaters spaced around the perimeter of the proposed building. Ventilation will be by exhaust fans with wall mounted motor operated louvers.

6.3.2. Proposed GAC Feed Pump Station

Heating of the pump room will be by individual gas fired unit heaters. Ventilation will be provided by exhaust fans with wall mounted motor operated louvers. The electrical room shall be air conditioned by an air cooled split system heat pump and air handler with auxiliary electric heating coil. NKWD has requested the use of ceiling fans be evaluated

6.3.3. Proposed GAC Building

The GAC vessel area, truck aisle, and maintenance storage area will be heated by individual gas fired unit heaters spaced around the perimeter of the areas. The air conditioning/dehumidification will be provided by an air cooled split system condensing unit and a central air handler unit with a ductwork and diffuser air distribution system. The control room, conference room, and lobby will be served by individual ductless split

system heat pump condensing units and air handlers, with auxiliary electric heater coils. The toilet and janitor rooms will be provided with ceiling mounted exhaust fans to meet code. The electrical room will be ventilated to and from the GAC vessel room.

6.4. Materials, Equipment and Systems

6.4.1. Materials

Table 6-1
Materials of Construction

Area	Atmosphere (1)	Equipment or System	Materials of Construction
Process	Corrosive	Ductwork	FRP/SS
		Piping	Coated S/coated CU
		Equipment	Coated GS/Al/SS/FRP
Process	Non-Corrosive	Ductwork	Al
		Piping	S/CU
		Equipment	Coated GS/Al
Chemical Storage	Corrosive	Ductwork	FRP
		Piping	Coated S/coated CU/PVC/CPVC
		Equipment	FRP
Chemical Storage	Non-Corrosive	Ductwork	Al
		Piping	S/CU/PVC/CPVC
		Equipment	Coated GS/Al
Administration	Non-Corrosive	Ductwork	Al
		Piping	S/CU
		Equipment	GS
Toilet Rooms	Non-Corrosive	Ductwork	Al
		Piping	S/CU
		Equipment	Al

Table Notes and Abbreviations:
(1) – Corrosive areas are areas that have elevated levels of moisture, hydrogen sulfide or chemical vapors.
FRP – Fiberglass Reinforced Plastic
SS – Stainless Steel (Type 316)\
S - Steel
GS – Galvanized Steel
Al – Aluminum
CU – Copper
PVC – Polyvinyl Chloride
CPVC – Chlorinated Polyvinyl Chloride

6.4.2. Equipment

Heat pumps and condensing units shall be standard outdoor, pad mounted condensing units with condensing coils and fans. Air handling units will have a supply fan, evaporator coil, air filter, intake and supply air plenums and grilles/diffusers. Air handling unit for dehumidification shall have a supply fan, air filter, evaporator coil, hot gas reheat coil, return air plenum and grille and a supply air duct collar. Gas unit heaters shall have stainless steel burners and heat exchangers and shall have propeller fans. Exhaust fans for ventilation shall be sidewall propeller type with wall housing, motor guard, motor operated shutter and weatherhood with birdscreen. Toilet exhaust fans shall

be ceiling mounted with grille, exhaust duct and wall exhaust cap. Wall louvers shall be combination drainable type with motor operator.

6.4.3. Systems

Air conditioning and dehumidification systems shall be direct expansion split system air cooled condensing or heat pump units with matching air handling units.

6.5. Design Criteria

Table 6-2
Outdoor Design Criteria

Location	Elevation (Ft)	Cooling Criteria (ASHRAE 1%)			Heating Criteria (ASHRAE 99.6%)	
		DB (°F)	WB (°F)	CDD (ASHRAE)	DB (°F)	HDD (ASHRAE)
Covington/ Cincinnati IAP, KY	876	91.0	74.4	3,488	1	5,248

Table Abbreviations:
ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers, 2001
DB - Dry Bulb Temperature
WB - Wet Bulb Temperature
CDD - Cooling Degree Days (50°F basis)
HDD - Heating Degree Days (65°F basis)

Table 6-3
Mechanical System Criteria

Space or Area	Cooling (°F)	Cooling Method	Heating (°F)	Heating Method	Ventilation Basis
Process Area	92	Exhaust fan w/ wall louver	55	Gas unit heaters	12 AC/Hr or ΔT = 10°F (100% O.A.)
Electric Rm w/VFD	75	AC	55	Electric duct coil	6 AC/Hr min (0% O.A.)
Electric Rm w/o VFD	92	Exhaust fan w/ wall louver	55	Gas unit heaters	12 AC/Hr or ΔT = 10°F (100% O.A.)= 10°F

Table Abbreviations:
AC/Hr - Air Changes per Hour
ΔT – Temperature Rise
O.A. – Outside Air

6.5.1. Miscellaneous Design Criteria

6.5.1.1. Controls

Gas fired unit heaters will be controlled by a remote wall mounted thermostat with adjustable set point to operate when the room temperature falls below the thermostat set

point and to cease operations when the room temperature rises 2 degrees above the set point. Ventilation exhaust fans shall be interlocked with the wall mounted motor operated louvers and shall be controlled by a remote wall mounted thermostat with adjustable set point to operate when the room temperature rises above the thermostat set point and to cease operation when the room temperature falls 2 degrees below the set point. The individual room air conditioner heat pump units shall be operated by a 7-day programmable heating/cooling thermostat with set-up and set-back capability and manual change over. The air conditioner/dehumidification unit shall have a space mounted humidistat and a space mounted cooling thermostat which will operate in series to control the humidity and temperature of the area. The space mounted humidistat shall be set at 50 degrees F dew point (adjustable), and will close contact on a rise in humidity. If the space dew point rises above 50 degrees F. and there is a call for cooling, the unit will operate in cooling mode. If the space dew point is above 50 degrees F. and the thermostat is satisfied, the unit will operate in dehumidification mode. The unit will run the compressor to cool the incoming air below 50 degrees F. and use a modulating hot gas reheat coil to reheat the air to an adjustable set point. The unit fan will run continuously.

6.5.1.2. Louver Sizing

- Intake Louvers – 500 feet per minute
- Exhaust Louvers – 700 feet per minute

6.5.1.3. Ductwork Sizing

Friction Rate Sizing:

- **Low Pressure:** 0.1 inches of water column pressure drop per 100 feet of ductwork up to an air velocity of 1,500 to 1,800 feet per minute.
- **Medium Pressure:** 0.2 inches of water column pressure drop per 100 feet of ductwork up to an air velocity of 2,000 to 2,500 feet per minute.
- **Transfer Ducts:** 0.03-0.05 inches of water column pressure drop per 100 feet of ductwork.
- **O.A Intake Shafts:** 0.05-0.10 inches of water column pressure drop per 100 feet of ductwork up to an air velocity of 1,000 feet per minute.
- **Gravity Relief Shafts:** 0.03-0.05 inches of water column pressure drop per 100 feet of ductwork up to an air velocity of 1,000 feet per minute.

6.6. References

6.6.1. Codes

The design of this project will be governed by the following codes:

- The Kentucky Building Code, 9th Edition, 2007.

- International Mechanical Code
- International Fuel Gas Code, 2006.

6.6.2. Standards

The following standards and guides will be used for the mechanical design of this project:

- ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers)
- SMACNA (Sheet Metal and Air Conditioning Contractors' National Association)
- ACGIH (American Conference of Governmental Industrial Hygienists) Industrial Ventilation Manual of Recommended Practice
- NFPA (National Fire Protection Association)

6.7. Miscellaneous

6.7.1. Dehumidification

High relative humidity in summer months make it necessary to dehumidify the GAC Vessel area to prevent condensation from forming on the vessels and piping. Sizing and type of dehumidifier will be established as the design progresses.

6.7.2. Calculation Software

- Heating and Cooling Load Analysis: Carrier E20-II Block Load or Hourly Analysis Program (HAP)

7. Plumbing

7.1. Introduction

This section describes plumbing services for the Preliminary Treatment Building, GAC Feed Pump Station, and the GAC Building.

7.2. Design Approach

7.2.1. General

It is anticipated that the plumbing requirements for the project will be for the most part simple floor drains with gravity flow to the existing sanitary sewer system and hose stations for washing down the floor area. There will be a toilet room and a janitor room with a small water heater. The GAC Building is classified as a F-1 Construction by the State HBC Office. The final shape and size of the building has not been determined at this time. If the total area is over 12,000 square feet sprinklers will be required. If it is less than 12,000 square feet, sprinklers will only be required if the material safety data sheet for the GAC is listed as hazardous

7.2.2. Preliminary Treatment Building

Hose bibb and hose rack stations will be provided at designated locations around the basins for use in wash-down of the area. A backflow preventer will be provided for this building if the existing plant water system in the tunnel does not already have one.

7.2.3. GAC Feed Pump Station

Floor drains and a hose bibb and hose rack station will be provided in the pump room. A backflow preventer will be provided in the pump room if the source of supply does not already have one. No plumbing facilities will be installed in the electrical room.

7.2.4. GAC Building

Several floor drains will be installed in the GAC vessel area with hose bibb and hose rack stations located at designated points around the area perimeter. A trench drain will run the length of the truck aisle and drain to the sanitary sewer. A men's and women's toilet room will be provided with a wall mounted water closet and a wall mounted lavatory, with access through the lobby area. The janitor room shall have a floor mounted mop sink, a tankless water heater, wall mounted water closet and will only be accessible through the GAC Vessel area. A plumbing system backflow preventer will be provided in the building. All sanitary drains will flow by gravity to a nearby sanitary sewer manhole.

A process main will be tapped into the existing main on Grand Avenue. This process main will be tapped inside the GAC building for water supply to plumbing fixtures. It is reported that the pressure on the process main is greater than 200 psi. It is necessary to install a pressure reducing valve on the plumbing system supply.

7.2.5. Design Criteria

SERVICE WATER SYSTEM:

- Water Source: City Water
- System Capacity: 300 GPM
- System Pressure: 100 PSI
- Hydrostatic Test Pressure: 200 PSI

COMPRESSED AIR SYSTEM:

- Type of Compressor: Oil less Rotary Screw
- System Capacity: 100 CFM
- System Pressure: 125 PSI
- Air Quality: Dry Air @ Pressure Dew Point of 33 °F

FIRE SPRINKLER SYSTEM:

- Occupancy Classification: Light Hazard
- Type of System: Wet Automatic
- Area of Sprinkler Application: 1500 Sq. Ft. (test area for calculating fire flow requirements)
- Design Density: 0.1GPM/Sq. Ft.
- Sprinkler Requirments Per Building Size: Sprinklers may be required if the building is over 12,000 SF

7.3. Materials, Equipment and Systems

7.3.1. Materials

Table 7-1
Materials of Construction

Area	Atmosphere (1)	Equipment or System	Materials of Construction
Process	Corrosive	Piping	SS/GS/CU/AL/HCI/CU/CPVC
		Equipment	Coated GS/Al/SS/CU
Process	Non-Corrosive	Piping	CU/BS/CI/DI
		Equipment	Coated GS/Al
Chemical Storage & Laboratory	Corrosive	Piping	HCI/SS/CU/CPVC
		Equipment	SS/AL
Chemical Storage	Non-Corrosive	Piping	BS/DI/CS/CU/PVC
		Equipment	Coated GS/Al
Administration	Non-Corrosive	Piping	GS/BS/CU/DI/PVC
		Equipment	GS/CS
Administration - Toilet Rooms	Non-Corrosive	Piping	CU/BS/CI/PVC
		Equipment	CU/DI/CI

Table Notes and Abbreviations:
(1) – Corrosive areas are areas that have elevated levels of moisture, hydrogen sulfide or chemical vapors.
PVC – Polyvinyl Chloride
SS – Stainless Steel (Type 316)
GS – Galvanized Steel
Al – Aluminum
CU - Copper
CI – Cast Iron
DI – Ductile Iron
BS – Black Steel
HCI – High Silicon Cast Iron
CS – Carbon Steel
CPVC – Chlorinated Polyvinyl Chloride

7.3.2. Equipment

The water closet will be a wall hung type with flush valve. The lavatory will be a vitrified china wall mounted type with a single handle faucet. The mop sink will be a floor mounted molded stone construction type with wall mounted faucets. The water heater will be a tankless on-demand point-of-use device.

7.3.3. Systems

If a sprinkler system is required, it will be a simple wet pipe system. A fire pump system will not be required.

7.4. References

7.4.1. Codes

The design of this project will be governed by the following codes:

- Kentucky State Building Code, 9th Edition, 2007,
- Kentucky State Plumbing Code, 2007.

7.4.2. Standards

The following standards and guides will be used for the plumbing design of this project:

- ANSI (American National Standard Institute)
- ASPE (American Society of Plumbing Engineers)
- ASTM (American Society for Testing and Materials)
- AWWA (American Waterworks Association)
- CISPI (Cast Iron Soil Pipe Institute)
- NFPA (National Fire Protection Association)Miscellaneous

7.5. Miscellaneous

There is an existing wash down hydrant on the top of the tunnel. This hydrant will be removed. Its function will be replaced by new wash stations inside the new Preliminary Treatment Building.

8. Electrical

8.1. Introduction

Electrical service for the facilities in this Contract will come from the newly constructed substation that was built for the UV disinfection project by Duke Energy. That substation will be modified as part of this work, as the load at the WTP will increase with these new facilities. The new facilities requiring electric service are the GAC Building, GAC Feed Pump Station and the Preliminary Treatment Building.

8.2. Design Approach

8.2.1. General

Power distribution will be arranged in a simple radial fashion, utilizing 480/277 volts, 3 phase for service to the facilities. One main feeder shall be run from the substation to the GAC Building main switchboard (or MCC if loading is less than 2500 amperes). The GAC Feed Pump Station shall be subfed from the GAC Building. UV disinfection equipment is to be relocated from the Existing Filter Building to the new GAC Building as part of this work. Each of these buildings shall have step-down transformers and panelboards for serving small power needs for such loads as lighting and HVAC.

The new Preliminary Treatment Building equipment shall be powered from the existing UV disinfection panelboard in the Filter Building Basement Tunnel, specifically Power Panel PPL-1.

8.2.2. Proposed Facilities

The new facilities include the following specific electrical scope items:

- Modifications to existing switchboard SWBD-1 in the yard.
- Modifications to existing electrical vault below SWBD-1.
- Modifications to panelboard PPL-1 the filter pipe gallery tunnel.
- Relocation of UPS-1 from the filter pipe gallery tunnel to the new GAC Building.
- Relocation of PPU-1 from the filter pipe gallery to the new GAC Building.
- Relocation of UV system control panels UVUVL-1 and UVUVL-2 to the GAC Building from the filter pipe gallery.
- Rapid mix, Flocculation and Sedimentation Basin drives motor controls and VFD's.
- Transformer and service panel for Preliminary Treatment Building.

- GAC Feed Pump Station Main Distribution Panelboard, transformer and service panel.
- GAC Feed Pump VFD's.
- GAC Building Main Switchboard or MCC with motor controls, transformer and service panel.
- Preliminary Treatment Building, GAC Building and GAC Feed Pump Station will be provided with wiring and equipment for interior and exterior lighting, HVAC, duplex receptacles inside and out for plug-in devices, and control wiring for process equipment into the SCADA system.
- Branch circuits and feeders to all process equipment designed as part of this project.
- No site lighting standards are proposed. All site lighting to be wall mounted as part of an associated building.
- The buildings access control system will match that of the existing buildings.
- No standby power is provided except for egress lighting in the form of internal batteries.
- Three security cameras will be provided. A fire alarm will be provided if required by regulations.
- Fiber Optic communications cabling shall be provided for SCADA system interconnection with the Plant PLC.
- One ¾ inch conduit with fiber optic communications cable shall be provided to existing telephone service entrance for telephone service in the conference room of the GAC Building.
- Data cables and conduits and power supply shall be provided for field instruments.

8.2.3. Constraints

A separate project by NKWD to design standby power for this WTP using a different design team and potentially being on similar schedules will be a constraint on the work. At this time, it is our intent that our work not interfere with the standby power concept laid out in the UV disinfection project by B&V in 2006.

8.2.4. Staging

It is the design team understanding that chlorine can be used as the only disinfecting agent on a temporary basis during the time that the UV disinfection equipment is relocated to the GAC Building. Chlorine disinfection alone will also be required during the time that the UV disinfection substation is down for modifications at the substation to provide a power feeder to the GAC Building. There should be no other unusual power interruptions except short duration tie-ins.

8.2.5. Energy Efficient Design

Kentucky Building Code requires compliance with the International Energy Conservation Code (IECC), which requires all spaces to have at least manual control of lighting in each space, and where more than one fixture is used, two levels of switching to reduce the level of light by 50 percent. Further, buildings larger than 5000 square feet are required to have automatic controls to turn off the lights during unoccupied periods, either by timer or occupancy sensor (with a manual local override).

The IECC also mandates a maximum wattage per square foot for interior lighting, but offers no category for a water treatment plant. The most similar category among those offered is a Manufacturing Facility at 1.3 watts per square foot and for the office area in the GAC Building 1.0 watts per square foot. These numbers will be used in calculations submitted to the Department of Housing, Building and Construction when applying for plan review.

Exterior lighting will be limited to 5 watts per linear foot of each illuminated wall and walkways 1.0 watt per linear foot. Main entry doors may be illuminated to 30 watts per linear foot of door width, other doors to 20 watts per linear foot of door width.

Motors will be energy efficient, and use of variable frequency drives on the large GAC Feed Pumps assures that power factor will be high and only the needed horsepower for driving the load is consumed.

8.2.6. Area Classification

- The electrical vault in the yard is considered a permittable confined space.
- The GAC Feed Pump Station shall be considered a wet location.
- The GAC Building process area shall be considered a wet location.
- The Preliminary Treatment Building and pipe tunnel are considered wet locations.
- No areas are considered as hazardous locations requiring compliance with NEC Article 500.

8.2.7. Lighting

- In order to meet energy code requirements, lighting must be HID or fluorescent.
- Exit signs, if required, will be LED type.
- All lighting in wet locations will be enclosed and gasketed, NEMA 4X rated.
- Lighting in office areas shall be commercial quality, designed to match the finish schedule.

8.2.8. Design Methods

- Lighting will be modeled utilizing Visual lighting software for all interior spaces.

- Short circuit analysis, if required, will be performed utilizing SKM Power Tools software.
- Voltage drop calculations will be manually performed to confirm wire selections on long feeders.
- During detailed design, load analysis in accordance with the NEC shall be performed by the Electrical Engineer of Record to prove final sizing.
- Comcheck software shall be utilized to document energy code compliance to the State Department of Housing, Building and Construction.

8.3. Materials, Equipment, Systems

8.3.1. Materials

All power conductors for branch circuit and feeder wiring shall be THW or THWN/THHN insulated, #12 minimum, copper. All raceways shall have an additional conductor pulled for grounding and bonding, instead of depending on the integrity of the raceway continuity.

Instrumentation cables shall be individual #16 shielded and twisted pairs, rated 600 volts. All instrumentation and signal cables that are shielded shall have the shield bonded on one end only (and insulated on the other end to prevent accidental intermittent grounding of both ends). Communications cables for Ethernet communications shall be CAT 6.

All conduits in finished spaces shall be concealed. Conduit in process areas, electrical and mechanical equipment rooms shall be exposed. All exterior conduits shall be underground.

Exposed conduit shall be galvanized rigid steel or rigid aluminum. Flexible conduit shall be liquidtight in all process areas. Underground conduit shall be schedule 40 PVC direct burial. A minimum of one general purpose 120 volt, 20 ampere duplex receptacle outlet shall be provided in every room of the new buildings.

Roof, mechanical equipment service and other receptacles shall be provided as required in the NEC. Weatherproof receptacles shall be weatherproof while in use. All exterior receptacles to be ground fault circuit interrupting.

Grounding electrodes will be designed to exhibit less than 5 ohms resistance. A new ground reference is required at each separately derived system, which can be individual transformer outputs, main electric service, as well as supplemental ground references which may be established for such things as signal reference or lightning protection systems. In order to prevent any objectionable currents, all such grounding electrodes should be interconnected with each other to form one continuous reference.

Buried, concealed or concrete encased grounding electrode connections shall be made using exothermic welds.

Each new building shall have a grounding electrode system that consists of the following:

- A minimum 10-foot length of buried metal water line, if available.
- Metal Frame of the building, if available.
- A minimum 20 foot length of at least ½ inch diameter steel reinforcing rod near the bottom of the foundation footing for the building.
- A ground ring encircling the building at a depth of at least 30 inches, at least 20 feet in length, bare copper conductor, no smaller than #2 AWG.
- Driven ground rods, 3/4 inch diameter, 10 feet in length, fully driven in the ground at locations where required for lightning down conductor grounding.

All the above items shall be bonded together utilizing a grounding electrode conductor sized in accordance with NEC article 250.66. All such grounding electrode conductors shall be copper. They shall be sleeved with PVC conduit into the respective buildings where they are to be landed in the equipment.

8.3.2. Equipment

SWITCHBOARD

The main service equipment at the UV substation shall utilize low voltage front access only switchboard, non walk-in sloped roof exterior construction. This low voltage switchboard will be rated for 480/277 volt, 3-phase, 4-wire service. Bus bars will be silver plated copper. A TVSS unit shall be included as described below.

The incoming service section of the main switchboard shall include an electronic circuit monitor with local display unit, to facilitate Facilities Management staff viewing of key electrical parameters such as incoming voltage and amperage per phase. The electronic circuit monitor shall be provided with management software and Ethernet communications connection to allow future remote interface with the SCADA system.

MOTOR CONTROL CENTER

Motor Control Centers (MCC's) will be utilized whenever economics justify based on a structure having numerous 3-phase motors that require remote control and motor starters. Individually mounted or MCC mounted combination motor starters will utilize magnetic only circuit breakers and ambient compensated thermal overload relays. GAC Feed Pumps will be started utilizing variable frequency drives (VFD's) furnished with the equipment. The 12 flocculators and the two new rapid mixers shall also be controlled using individual VFD's.

PANELBOARDS

Panelboards will be provided with copper or copper-clad aluminum bus bars and will utilize bolt-on, thermal magnetic type circuit breakers. Panelboards will be located in electrical rooms wherever possible.

Ground-fault interrupting circuit breakers will be installed in lieu of ground-fault interrupting receptacles where most cost effective.

DRY TYPE TRANSFORMERS

Dry type transformers will be provided for 120/208V, 3-phase, 4-wire applications such as small appliances, receptacles, water coolers, telecommunications equipment, small HVAC equipment, field instruments, etc.

All transformers will be delta-wye connected, in order to prevent unwanted circulating currents, and will be solidly grounded on the secondary neutral.

SURGE PROECTION DEVICES

Transient Voltage Surge Suppressors will be provided to protect critical loads against unwanted electrical surges which occur over the wiring in the facility, due to motor starting, switching and offsite lightning strokes which enter through the utility service, or onsite lightning strokes which hit buried ductbanks or the building structure.

Transient Voltage Surge Suppressors (TVSS) will be hybrid type, offering MOV technologies, for high speed and high power dissipation. Two levels of TVSS will be provided, one at the building service level, and the other at the switchboard/panelboard level. The device at the service will be rated higher power and allow a higher let through voltage than the unit located at the switchboard/panelboard. Panelboard TVSS units will lower the transient let through voltage to levels that will satisfy industry standards to reduce erroneous data or damage caused by externally generated transients at the equipment.

LIGHTNING PROTECTION SYSTEM

Direct hit lightning protection shall be provided in the form of an air terminal system. The system will be designed in compliance with NFPA Standard 780, UL Standard 96A, and Lightning Protection Institute (LPI) Standards. The system shall be installed by a UL listed installer, LPI certified, and at substantial completion the building shall have a UL Master Label affixed near the main entry door to the at grade main entry to the three new buildings or some other mutually agreed location.

A system of air terminal points will be provided in accordance with UL 96A and NFPA 780 guidelines. Air terminals will be connected by cross conductors and down conductors to offer two paths to ground. Any metal object which is closer than 6 feet to an air

terminal, grounded conductor, or down conductor, shall be bonded to the grounded conductor to prevent sideflash during conduction.

The down conductors will be exothermically bonded to the counterpoise that is used for creating the power distribution system-grounding electrode. Where a lightning protection down conductor attaches to this counterpoise, a driven ground rod will also be connected exothermically.

8.3.3. Systems

The types of systems proposed shall be corrosion resistant and industrial quality, UL listed as an assembly. Specifically:

- Outdoor Switchboard – NEMA 3R enclosed non walk-in construction
- Panelboards – NEMA 12 enclosed, bolt-in branch breakers
- MCC – NEMA 1 enclosed, 20 inch deep sections
- Equipment disconnects in the field – NEMA 4X, 600 volt heavy duty
- VFD in pipe gallery – NEMA 4X enclosed

8.4. References

8.4.1. Codes

The electrical design will be governed primarily by the following codes:

- National Electrical Code.
- Kentucky Building Code.
- National Electrical Safety Code.

8.4.2. Standards

The following primary standards will be used for the electrical design of this project:

- ANSI (American National Standard Institute)
- IEEE (Institute of Electrical and Electronic Engineers)
- UL (Underwriter's Laboratories)
- NFPA (National Fire Protection Association)
- Others will be added to specifications as detailed design occurs.

8.5. Miscellaneous

8.5.1. Existing Conditions

In order to complete the detailed design, it will be necessary to verify in the field, actual layout, electrical characteristics and dimensions of all UV equipment to be relocated, as

well as UPS-1, SWBD-1, PPL-1 and the electrical vault. This can be accomplished in a one day site visit. Existing drawings have been relied on solely for this report.

8.5.2. Leadership in Environmental and Energy Design (LEED) Goals

The following LEED credits can be achieved easily by our standard design procedures:

- EQ Credit 6.1 – Controllability of Systems

  By providing individual local lighting controls in each space per the energy code, requirements for this credit will be met.

- SS Credit 8 – Light Pollution Reduction

  By using cutoff luminaires for exterior lighting and assuring that 95 percent of interior illumination falls below the window sill on exterior rooms, requirements for this credit will be met. Alternately, interior lighting occupancy controls will comply for this credit as well if used on exterior rooms.

With direction from the Owner, it is also possible to reduce lighting energy to below requirements of the energy code to achieve LEED points under EA Credit 1, but this is a larger issue that must be worked with improvements to the building envelope and HVAC system equipment. A lighting reduction of 10.5 percent below the energy code would be easily achievable toward that end. The necessary energy modeling to prove this has not been included in the scope of work. LEED compliance is also not a part of the scope of work.

9. Instrumentation and Control

9.1. Introduction

It is anticipated that NKWD will upgrade the current version of Wonderware along with a portion of the existing hardware as part of separate project prior to the construction of the Advanced Treatment Project. As of now, the details and extents of the upgrade are unknown, but the Advanced Treatment Project details will be coordinated with this upgrade.

9.2. Design Approach

9.2.1. Preliminary Treatment Facilities

9.2.1.1. Rapid Mix

The rapid mixers will be outfitted with VFDs located in the tunnel area. Start/Stop functionality will be provided locally at the mixers as well as at the VFD and through the SCADA System. Speed control will be provided at the VFD and remotely through SCADA. Drive status and run-time will be monitored in SCADA. Semi-automatic speed control based on setpoint G-Value and water temperature is a proposed option through SCADA.

9.2.1.2. Flocculation

The flocculators will be outfitted with VFDs located in the tunnel area. Start/Stop functionality will be provided locally at the mixers as well as at the VFD and through the SCADA System. Speed control will be provided at the VFD and remotely through SCADA. Drive status and run-time will be monitored in SCADA. Semi-automatic speed control based on setpoint G-Value and water temperature is a proposed option through SCADA.

9.2.1.3. Sedimentation

The residuals collection of the sedimentation basins will have local control panels located at the sedimentation basins and the MCC located in the tunnel. Drives will run in Stop, Start, as well as Auto mode through timers in SCADA. Drive status and run-time will be monitored in SCADA and a drive torque overload alarm will be provided in SCADA.

Local manual control (at the valves) will be provided for residuals blowdown. Automatic and manual valve control and adjustable blowdown interval and duration will be provided in SCADA. The collection drives will be interlocked with corresponding basin

blowdown valves so collection mechanisms operate when blowdown valves are open. Only one blowdown valve will be operated at a time.

The residuals pump station float switches will be replaced with continuous level monitoring device and a new control panel will be provided. High and low level alarms, continuous water level, motor temperature, seal leakage, pump status and run time will be monitored in SCADA.

9.2.2. GAC Process

9.2.2.1. GAC Influent Pump Station

The GAC Feed Pump Station (GAC FPS) will receive filtered effluent from the filter effluent header. The operation strategy for the GAC FPS is to maintain an operating band within the wetwell to match the pumping capacity with the influent flow. To achieve this, each pump will be outfitted with a variable frequency drive (VFD). An ultrasonic level element will be utilized to monitor and relay the current wetwell level. Control of the modulating valves will be controlled by the SCADA PLC. The level setpoint will be entered through SCADA. Local control of the pumps will occur through the local/remote switch on the individual VFD. Local manual speed control will be available at the VFD as well. A venturi flow meter with differential pressure transmitter will be provided on the pump discharge header. The local control panel will include SCADA controls, start/stop, remote/local, run status, and speed.

9.2.2.2. GAC Contactors

Each contactor will have the following automated valves:

- Influent (EOC)
- Effluent (EM)
- Waste (EOC)
- Backwash Supply (EOC)
- Influent/Effluent Isolation (EOC)

Each contactor will be provided with a strap-on style flow meter for effluent flow control on the influent header piping. Effluent flow control will be maintained through a flow control loop between the vessel influent flow meter and the modulating contactor effluent control valve. Flow control will occur through a distributed mode, where all vessels in operation will be controlled to process the same flow.

A local control panel will be provided for each pair of contactors. The local control panel will allow local control of the automated contactor valves. A local flow readout will be provided as well.

9.2.2.3. GAC Backwash

GAC backwash will utilize a backwash rate setpoint control loop. A modulating control valve will be provided for both sources of backwash supply, the backwash booster pumps, which take suction from the contactor effluent, and the Taylor Mill Plant Discharge, downstream of the pressure reducing valves in series. Each supply will utilize a dedicated venturi meter with differential pressure transmitter. An individual local control panel will be provided for each supply as well and will include control of the modulating valve and a local readout for backwash flow rate and backwash EQ level.

9.2.3. GAC Equalization Basin

The equalization basin will be provided with an ultrasonic level element and two dewatering pumps. The dewatering pumps will operate automatically based on level setpoints programmed in the main PLC. A local control panel will be provided for manual control as well.

9.3. Equipment

Table 9-1.
Preliminary Instrument List

Description	Location	Type	Quantity
Flow Meter	GAC IPS Discharge Line	Venturi	1
Influent Flow Meter (one per vessel)	Vessel Influent Line	Strap on Ultrasonic Flow Meter	14
Turbidimeter	GAC Effluent Header	NTU	1
Level Indicating Transmitter	Equalization Basin	Ultrasonic	1
Flow Meter	Backwash Supply Header	Venturi	2
Differential Pressure Indicating Transmitter	GAC Vessel Effluent Line		14
Level Indicating Transmitter	Residuals Pump Station	Ultrasonic	1

10. Permitting

Below is a list of permits that will likely be required for the Project:

- KDOW Construction Permit, submitted upon completion of design (Design Team);
- Kentucky Transportation Cabinet, Encroachment Permit, submitted upon completion of design (Design Team);
- Sanitation District No. 1 Grading, Erosion Control and/or Land Disturbance Permit, submitted upon completion of design (Design Team);
- Public Service Commission Certificate of Public Convenience and Necessity, submitted as soon as possible after bids received (NKWD);
- Local Road/Street Encroachment Permit, submitted upon completion of design (Design Team);
- Kentucky Housing and Building Code Enforcement Review, submitted upon completion of design (Design Team);
- Local Building Permit, submitted upon completion of design (Design Team);
- Plumbing Permit, submitted upon completion of design (Design Team).

11. Suggested Sequence of Construction

The suggested sequence of construction is as follows:

1. Begin construction of the GAC Building. Relocate 36" feed if required, coordinate with plant shutdown.

2. Relocate the underground electric and small diameter process piping that would otherwise be disturbed during excavation for the new preliminary treatment facilities.

3. Demolish the south flocculation and sedimentation basins and excavate for the new preliminary treatment facilities.

4. Close the existing gate that is located at the southeast corner of the north flocculation basin and divert all settled water flow to the existing 24-inch pipe that connects to the north end of the filters.

5. Demolish the top of the existing tunnel between the existing rapid mix and filter building (an area about 12 feet by 15 feet). Demolish the existing settled water channel that is connected to the north side of the tunnel. Temporarily leave the existing rapid mix in place.

6. Construct a new settled water channel from the north side of the tunnel to the existing filter influent channel at the filter building wall (north of the tunnel). Construct a new top for the tunnel between the existing rapid mix and filter building. Construct the new preliminary treatment facilities. All of this construction would take place concurrently.

7. Take the plant out of service for a short time to disconnect the raw water main from the existing rapid mix and connect it to the new rapid mix.

8. Place the new preliminary treatment facilities in service.

9. Demolish the top of the existing rapid mix basin walls. Cap existing basin with concrete.

10. Demolish and fill the north flocculation and sedimentation basins. Connect the existing 24-inch settled water pipe to the new settled water trough.

11. Construct the GAC Feed Pump Station.

12. Tap the 36" high pressure distribution main from the TMTP to provide backwash and potable water to the GAC building.

13. Complete the GAC Building.

14. Following the construction of the GAC Feed Pump Station and prior to placing the PS into service, piping modifications and tie-ins must be completed in the existing filter building pipe gallery to the GAC Feed PS. The clearwell will need to be drained to construct the pipe modifications in the existing "North" and "West" filter building pipe galleries. The plant will be out of service while these modifications are made.

15. Following the pipe modifications, in the existing filter building pipe galleries, and while the UV systems are being relocated utilize the emergency UV / GAC bypass in the North pipe gallery.

16. Place the GAC Feed Pump Station and GAC Building in Service.

17. At no time shall the FTTP distribution pumps be taken out of service.

12. Opinion of Probable Construction Costs

An opinion of probable construction costs (OPCC) was developed based on the current preliminary design. The cost opinion was developed as a Class 3 estimate in accordance with AACE guidelines and has a predicted accuracy of -20% to +30%. The summary of the opinion of probable construction costs is shown in Table 12-1 below.

Table 12-1.
Opinion of Probable Construction Costs

Item	Cost
Opinion Of Probable Construction Cost[1]	$21,434,000
AACE Class 3 Estimate -20% Range	$17,147,000
AACE Class 3 Estimate +30% Range	$27,864,000

Note: 1. The OPCC with GAC Building Option B in lieu of Option A is $400,000 less than the above estimate costs.

Since the OPCC was developed utilizing the current preliminary design, many variables and options remain, which require further evaluation. Therefore, markups and contingencies were utilized in an attempt to account for the remaining unknowns associated with this project.

The OPCC summary sheet and subsequent breakdowns of the cost, by CSI Master Format 1995 division, can be found in Appendix D. The summary sheet includes a markup of 25% for the contractor's indirect costs for bonds, mobilization, insurance, overhead and profit, and contingency. An additional 11.3% (5.5% ENR annual increase in construction cost) is included to escalate the cost to the end of 2010, the middle of the construction project. In total the OPCC has been marked up 36.3% or approximately $7,700,000.

In the *Preliminary Design of GAC Systems Report* (by Malcolm Pirnie, Inc. and GRW, Inc., dated March 2008), an opinion of probable construction cost of approximately $24,000,000 ($21,000,000 construction cost + $3,000,000 contingency) was estimated. This estimate falls within the -20% to +30% calculated at the current preliminary design stage.

Since the preliminary design report was written, various design parameters have changed. Previously, the preliminary treatment building was only to cover the flocculation and sedimentation basins. Currently, the building has been expanded to cover the entire preliminary treatment process. Additional work is also required on the tunnel roof including an additional structure/cover over the tunnel to access the preliminary treatment

building from the filter building. As part of the preliminary engineering stage, both the UV and GAC facilities were also reassessed. As part of this analysis, the UV disinfection system was relocated to the GAC Building. As a result of reevaluating the GAC Building, larger GAC vessels were chosen, which resulted in fewer vessels and a different building layout.

As the project progresses and the design is finalized, the OPCC will be reevaluated to provide a more accurate and narrower range of cost opinion.

Appendix A: Figures

GRW, Inc.

MALCOLM PIRNIE

1.0 BACKGROUND AND PURPOSE

The existing flocculation and sedimentation basins will be demolished and replaced due to severe deterioration of the concrete which is about 50 years old. NKWD's decision to replace the basins was based on the findings and recommendations contained in a May 2006 study by Black & Veatch. The Black & Veatch study focused on the water holding walls and troughs that are above grade and exposed to freezing temperatures. A basin diagram in the report indicates that the exposed walls should be replaced but the tunnel is to remain. However, the report did not contain an explicit recommendation that the tunnel remain in place.

The purpose of this evaluation is to determine whether the tunnel should continue to remain in service or be demolished and replaced.

2.0 FINDINGS OF THE 2006 STRUCTURAL EVALUATION

The Black & Veatch study concluded that the exposed water-holding walls deteriorated due to moisture in the concrete (which was not air entrained) and exposure to a large number of freeze/thaw cycles.

During the Black & Veatch study several concrete cores were obtained and tested. One core was obtained from the north tunnel wall and tested. The concrete in this core was concluded to be in good condition.

3.0 OBSERVATIONS

Krish Narayanappa, a GRW senior structural engineer, inspected the tunnel on November 10, 2008. Steve Vogelsberg accompanied Mr. Narayanappa.

The following observations were made:

- One crack 3 to 4 feet long was observed in the top of the south wall at the east end of the tunnel. No other cracking of the walls was observed.
- There was a leak in the bottom of the south wall at the east end of the tunnel.
- There was one crack in the underside of the tunnel concrete roof which appeared to be caused by a pipe hanger anchor which has pulled out a section of concrete.
- The top of the tunnel concrete roof appeared to have some hair-line cracks but it was covered with a thin coat of topping so it was difficult to assess the condition of the concrete.

- The east end of the tunnel concrete roof in the vicinity of the rapid mix and concrete channels is in poor condition.
-

4.0 PRELIMINARY EVALUATION

Based on the field observations, the north and south walls of the tunnel appeared to be in good condition and should provide adequate future service as non-water-holding walls. However, it was difficult to fully assess the condition of the concrete on the outside which was submerged and on the inside which was painted. It was also difficult to assess the condition of the tunnel roof which had been coated with topping. Therefore, it was decided to obtain and test additional concrete cores from the tunnel roof and walls.

5.0 CONCRETE TESTING

On December 17, 2008 Thelen Associates obtained the following concrete cores:

- Two cores from the inside face of the north wall
- Three cores from the inside face of the south wall
- Three cores form the upper surface of the tunnel roof

The tested compressive strength of the cores varied from 5,830 to 12,200 PSI. This exceeds the compressive strength required for new concrete. The test results are attached.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the field observations and test results, it is concluded that the walls and western three fourths of the tunnel roof can remain in service for an extended period of time. It is recommended that the highly deteriorated areas on the east end of the tunnel roof be removed and replaced. Careful consideration should be given to construction staging to keep the plant in service during construction.

Northern Kentucky Water District

Appendix C: Existing UV Evaluation Technical Memorandum

4775-012

GRW, Inc.

MALCOLM PIRNIE

MALCOLM PIRNIE

Technical Memorandum

Date: January 29, 2009

To: Amy Kramer, P.E., NKWD

From: Jason M. Abbott, P.E.

Re: TMTP Existing UV Evaluation

Project No.: NKWD Taylor Mill Advanced Treatment Improvements Project

SUMMARY

With the construction of the proposed post filter GAC facility at the TMTP, the existing UV reactors were evaluated based on their location and current treatment parameters. We evaluated the following options:

1. Leave the UV reactors in their current location post filtration;
2. Leave the UV reactors in their current location, but provide space for future process relocation post GAC absorption when existing reactors are replaced / removed;
3. Purchase new UV reactors and install them post GAC;
4. Relocate existing UV reactors post GAC.

It was determined that the best option was to relocate the existing UV reactors, UV electrical / control panels, and UPS from their current locations, in the pipe galleries of the existing filter building, to the proposed GAC Building.

UV LOCATION EVALUATION

This determination was based on discussions held during the Friday, November 14, 2008 and Friday, December 5, 2008 progress meetings.

During the November 14, 2008 progress meeting, it was discussed that the current electrical costs to operate the existing UV system are approximately $1,400 per month ($16,800 per year). The raw purchase price of a new UV system to operate at a UV_t of 95% is approximately $400,000 (UV equipment only, excluding installation, piping, etc.). Therefore, the purchase of a new UV system is not economically warranted due to payback from electrical costs.

During the December 5, 2008 progress meeting, the remaining three options and the treatment goals associated with the UV system were discussed. It was determined that NKWD would like the UV process to be located post-GAC. NKWD also mentioned that the installation should consider the issue with the current reactor location that results in air entrainment and unit nuisance trips. Furthermore, NKWD wants to avoid running new piping through the existing clearwell. Other UV constraints were discussed including:

- UV redundancy required
- Full bypass of GAC desired
- Piping modifications / relocation
- North and West filter basement gallery space limitations
- Gallery access must be maintained

Malcolm Pirnie presented three UV alternatives, which are described below. Based on the previous UV analysis, new UV reactors were not investigated as a possible alternative at the December 5, 2008 meeting.

a. The first UV alternative presented was to leave the existing reactors in their current location to receive filtered water flow. Due to the current UV configuration, this alternative requires piping modifications to accomplish the flow objectives. Additionally, utilizing the current location would not provide a solution for the current air entrainment issues. Another disadvantage of this alternative is that the UV does not provide an additional barrier for bacterial growth or other contamination that may occur in the GAC process. This alternative was not selected for these reasons.

b. The second UV alternative presented is similar to the first alternative, in that the UV systems would remain in their current location to receive filtered water flow, but space would be provided for future replacement of the reactors post-GAC. Due to the reasons cited for the first alternative, this alternative was not selected.

c. The third alternative presented was to relocate the UV systems post-GAC. The team presented a cost efficient alternative, which kept the UV reactors located within the filter piping galleries. This alternative would require that UV system No.2 (currently in the North pipe gallery) be relocated above UV system No. 1 in the West pipe gallery and that a post-filtration effluent line pass through the clearwell to convey water to the GAC feed pump station. Relocating the UV systems, post-GAC, within the pipe galleries takes advantage of the higher UV_t and allows for the bypass of the GAC vessels without having the utilize the GAC Feed Pump Station. Another advantage, by installing the reactors post-GAC, they will provide an additional barrier for bacterial growth. The main disadvantage to the this option is that a a pipe conveying filtered water with a low residual would need to be routed through the clearwell. This was a major concern for the stakeholders and this alternative was not selected.

Upon further discussion, two additional UV alternatives were discussed. The first alternative was to relocate the existing reactors to the GAC Building to process GAC treated water. Relocating the UV reactors in the GAC building requires additional footprint in the GAC Building and requires relying on the GAC Feed Pump Station. If the GAC process is bypassed, filtered water flow will have to be pumped through the UV reactors. This alternative eliminates the need for a pipe passing through the clearwell and relieves some of the congestion in the filter basement gallery. The UV

reactors will be located on the GAC effluent line prior to the positive head loop to maintain submergence of the UV reactors at all times.

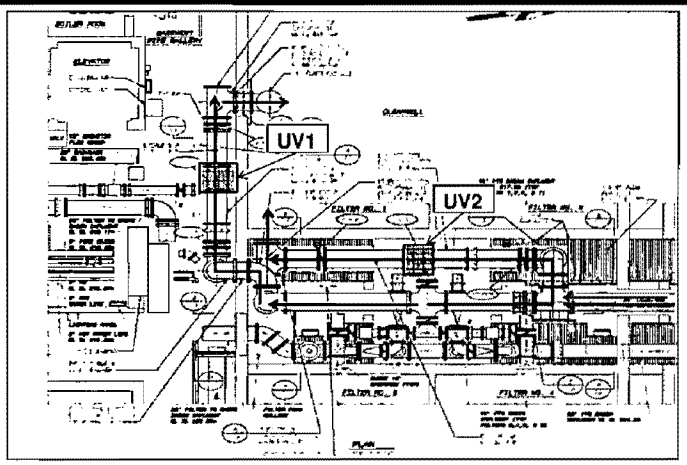
The second was to relocate the UV reactors to the GAC Feed Pump Station. This option requires a basement level be added for the UV equipment (to maintain submergence of the reactors at all times). This option was estimated to cost significantly more than the GAC building location and was not selected.

Based on the many advantages of relocating the UV reactors to the GAC Building, NKWD selected this alternative. This alternative will be designed with a UV/GAC bypass located in the filter basement gallery and a UV bypass located in the GAC Builidng. The slides from this progress meeting (12/5/08) have been attached for future reference.

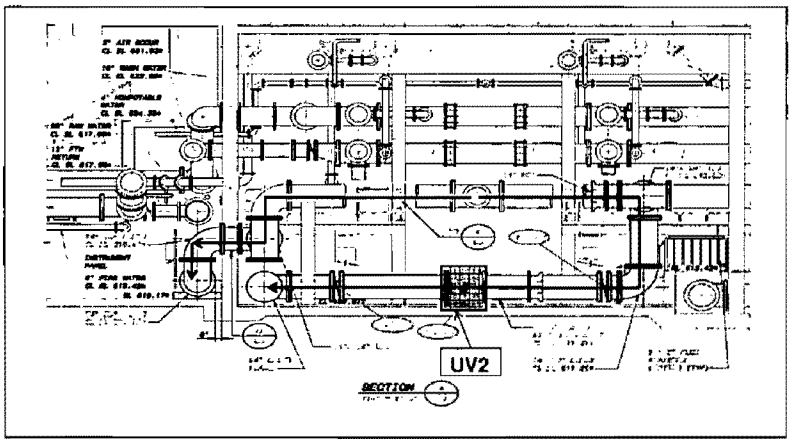
cc: File: 4775-012

amw

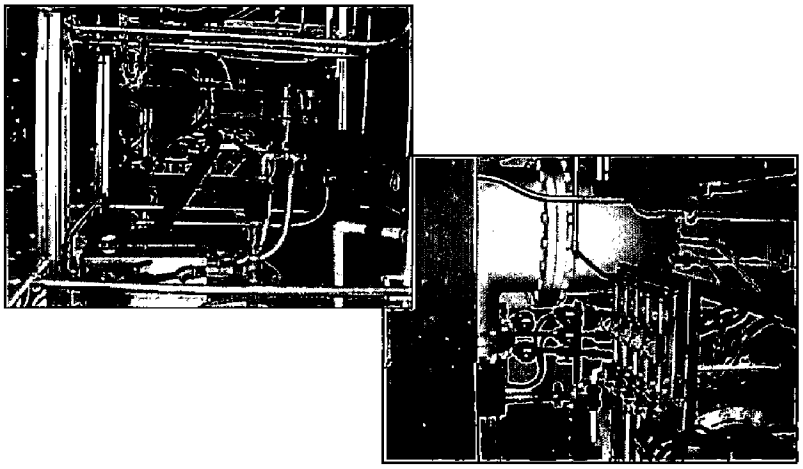
UV Alternatives
Current UV Locations



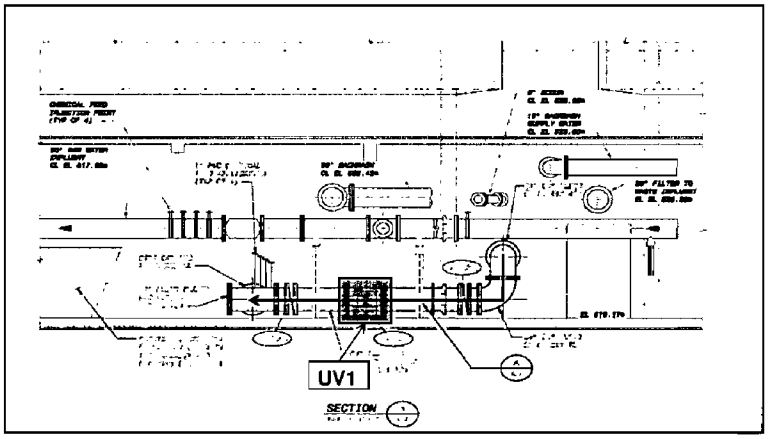
UV Alternatives
North Pipe Gallery (Existing UV)



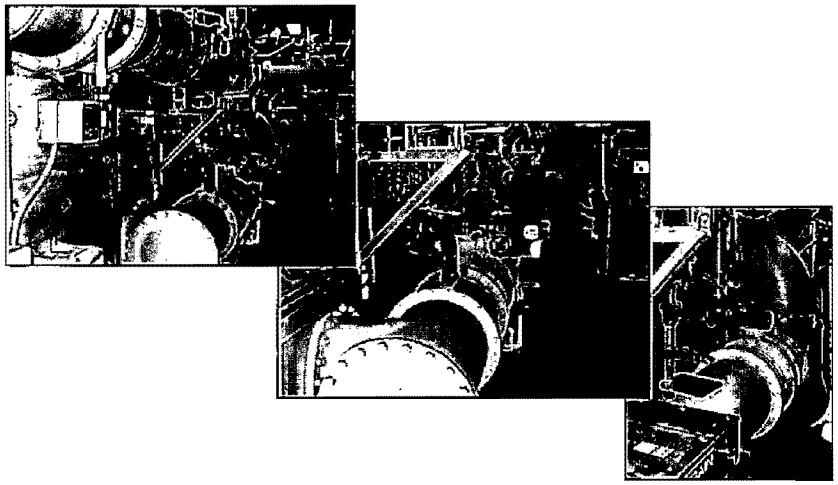
UV Alternatives
North Pipe Gallery (Existing UV)



UV Alternatives
West Pipe Gallery (Existing UV)



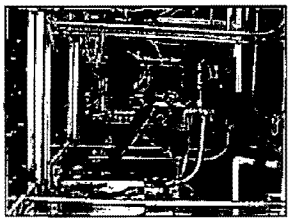
UV Alternatives
West Pipe Gallery (Existing UV)

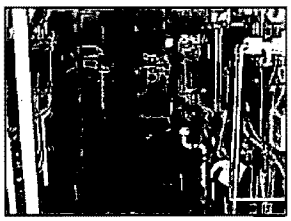


UV Alternatives

1. leave the reactors in their current location post filtration;
2. leave reactors in current location but provide space for future process relocation post GAC adsorption when existing reactors are removed;
3. ~~provide new reactors following GAC;~~ 11/14/08 PM
4. and relocate existing reactors post GAC

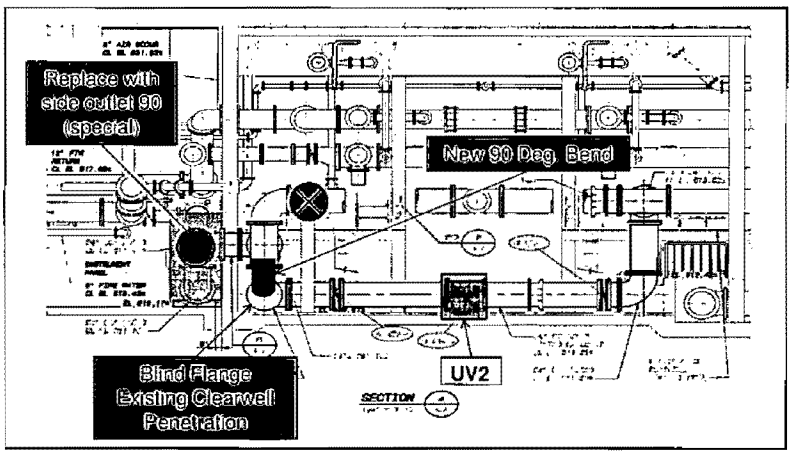
UV Alternatives
Constraints





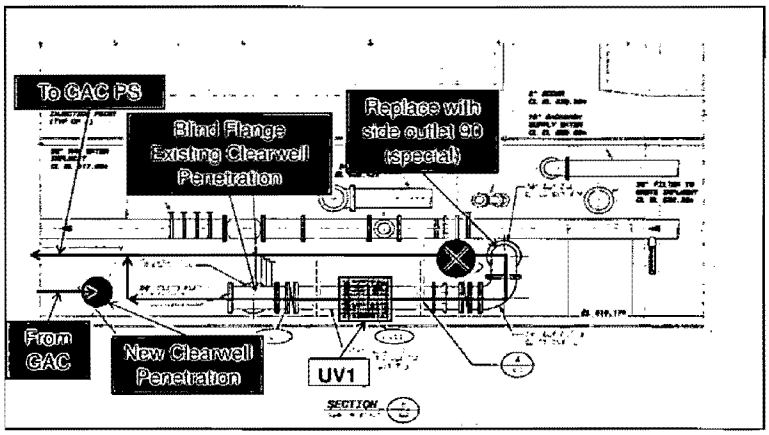
- UV bypass not allowed
- UV redundancy required
- Full bypass of GAC desired
- Tight gallery limits options
- As constructed condition requires piping modifications to accomplish flow objectives (all alternatives)
- Maintain gallery access

UV Alternatives
Alternatives 1 & 2: North Pipe Gallery (Removal/Relocation)



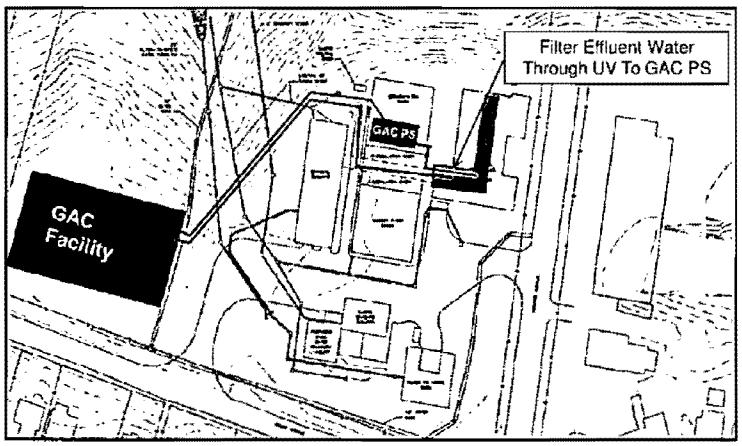
UV Alternatives

Alternatives 1 & 2: West Pipe Gallery (Removal/Relocation)



UV Alternatives

Alternatives 1 & 2: UV Relocation (Yard Piping)



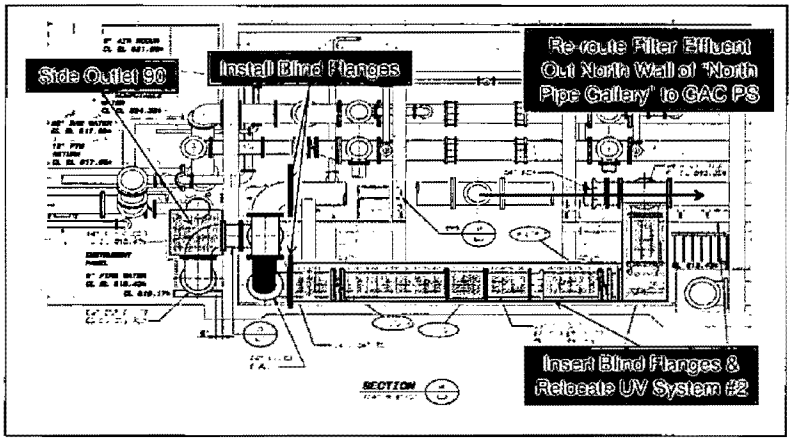
UV Alternatives

Alternative 4: Relocate Existing Reactors Post GAC

- Requirements:
  - Relocate the existing UV systems so that the filter effluent flows to the GAC PS. The GAC PS would then pump the filter effluent through the GAC, through the relocated UV systems, and into the clearwell.
  - Piping setup allows for future replacement with units sized to take advantage of higher UVT of GAC treated water.

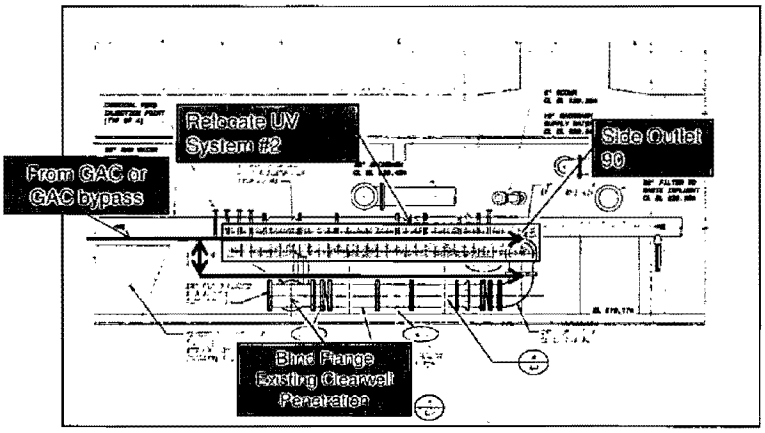
UV Alternatives

Alternative 4: North Pipe Gallery (Removal/Relocation)



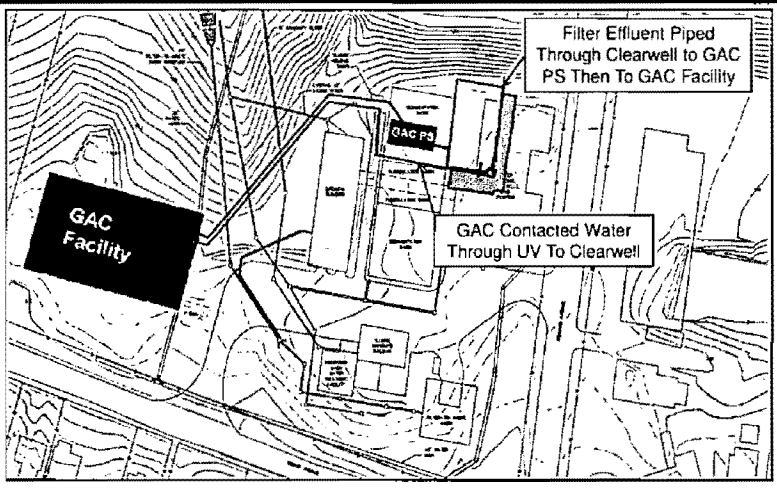
UV Alternatives

Alternative 4: West Pipe Gallery (Removal/Relocation)



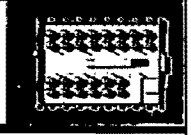
UV Alternatives

Alternative 4: UV Relocation (Yard Piping)



UV Alternatives

UV Relocation Alternatives



	Alternative 1	Alternative 2	Alternative 4
Location	"West Pipe Gallery"	GAC Treatment Facility	"West Pipe Gallery"
Reconfigure Piping In the "North & West Pipe Galleries"	Yes	Yes	Yes
Pre or Post GAC	Pre	Pre/Post	Post
Relocate Electrical & Control Panels	No	Yes	No
Piping in Clearwell	No	No	Yes
Future UVT Sizing	No	Yes	Yes
Additional Footprint For UV	No	~ 6.5' x 31' (201.5 ft²)	No
Additional Footprint for Electrical & Control	No	~ 12' x 6' (72 ft²)	No
Total Additional Footprint	N/A	~ 274 ft²	N/A

Northern Kentucky Water District

Appendix D: Opinion of Probable Construction Cost

4775-012

GRW, Inc.

MALCOLM PIRNIE

TMTP ADVANCED TREATMENT IMPROVEMENTS: Opinion Of Probable Construction Cost Estimate Summary

Division	Description	Total Construction Cost	% of Total
1	General Requirements	$ 93,000	0.4
2	Site Work	$ 1,363,000	6.4
3	Concrete	$ 2,098,000	9.8
4	Masonry	$ 1,116,000	5.2
5	Metals	$ 291,000	1.4
6	Wood and Plastics	$ -	
7	Thermal and Moisture Protection	$ 1,469,000	6.9
8	Doors and Windows	$ 250,000	1.2
9	Finishes	$ 162,000	0.8
10	Specialties	$ 6,000	0.0
11	Equipment	$ 8,698,000	40.6
12	Furnishing	$ -	
13	Special Construction	$ 1,705,000	8.0
14	Conveying Systems	$ -	
15	Mechanical	$ 1,600,000	7.5
16	Electrical	$ 2,583,000	12.1
	Opinion Of Probable Construction Cost[1]	**$ 21,434,000**	**100.0**
	AACE Class 3 Estimate (-20%)	**$ 17,147,000**	
	AACE Class 3 Estimate (+30%)	**$ 27,864,000**	

[1]The estimated cost with GAC Building Option B in lieu of Option A is $400,000 less than the above estimated cost.

Costs above include the following construction contingencies

Bonds	1.5%
Mobilization	2.0%
Insurance	1.5%
Overhead & Profit	10.0%
Contingency	10.0%
Subtotal	25.0%
Escalation (5.50% of Direct and Indirect)	11.3%
Subtotal Indirect Cost	**36.3%**
Construction Contingencies' contribution to Total Construction Cost	**$ 7,781,000**

Note: All costs rounded to the nearest $1,000.

TMTP ADVANCED TREATMENT IMPROVEMENTS:

OWNER: Northern Kentucky Water District

LEAD DESIGNER: MALCOLM PIRNIE

CSI NO./DESCRIPTION: 1.0 General Requirements

ESTIMATED BY:	DATE:
Malcolm Pirnie Inc. & GRW Engineers, Inc.	1/16/2009

(A) Design Contingencies	0.0%
(B) Construction Contingencies (see Summary)	36.3%
*Total Known Costs + Compounded Contingencies**	136%

* = (1 + A) x (1 + B)

CONSTRUCTION COST TOTAL ESTIMATE (1.0):	
$	92,684

Item No.	Description	Unit	Quantity	Cost/Unit Installed	Subtotal	Total Compounded Contingencies	Total Construction Cost	Source	Comments
				($)	($)	36%	($)		
1	Bonds								Included in Construction Contingencies
2	Mobilization								Included in Construction Contingencies
3	Insurance								Included in Construction Contingencies
4	Field Office with Utilities				$ 48,000	$ 17,424	$ 65,424		
5	Quality Control Services				$ 20,000	$ 7,260	$ 27,260		

TMTP ADVANCED TREATMENT IMPROVEMENTS:
LEAD DESIGNER: MALCOLM PIRNIE
CSI NO./DESCRIPTION: 2.0 Site Work

OWNER: Northern Kentucky Water District

ESTIMATED BY:	DATE:
Malcolm Pirnie Inc. & GRW Engineers, Inc.	1/16/2009

(A) Design Contingencies	10.0%
(B) Construction Contingencies (see Summary)	36.3%
*Total Known Costs + Compounded Contingencies**	150%

* = (1+ A) x (1 + B)

CONSTRUCTION COST TOTAL ESTIMATE (2.0):	
$	1,363,316

Item No.	Description	Unit	Quantity	Cost/Unit Installed	Subtotal	Total Compounded Contingencies	Total Construction Cost	Source	Comments
				($)	($)	50%	($)		
	PRELIMINARY TREATMENT FACILITIES								
	Demolition	LS	1	$ 50,000	$ 50,000	$ 24,965	$ 74,965		
1	Demolition South Flocculation Basin								
2	Demolition South Sedimentation Basin								
3	Demolition Walkway and walls between Tunnel and Filter Building								
4	New door opening for access to GAC pump bldg	EA	1	$ 2,500	$ 2,500	$ 1,248	$ 3,748		
	Preliminary Treatment								
5	Excavation	CY	1,440	$ 50	$ 72,000	$ 35,950	$ 107,950		
6	Backfill	CY	261	$ 10.00	$ 2,610	$ 1,303	$ 3,913		
7	Floor bedding	CY	565	$ 21.00	$ 11,865	$ 5,924	$ 17,789		
8	Steel H-Piles	LS	1	$ 300,000	$ 300,000	$ 149,790	$ 449,790		
	Residuals transfer								
9	24" DI fittings	EA	5	$ 6,900.00	$ 34,500	$ 17,226	$ 51,726		
10	24" DI residuals pipe	LF	36	$ 300.00	$ 10,850	$ 5,417	$ 16,267		
11	24" connection to existing manhole	LS	1	$ 1,900.00	$ 1,900	$ 949	$ 2,849		
	Overflow and drain								
12	30" DI Yard piping	LF	150	$ 200.00	$ 30,000	$ 14,979	$ 44,979		
13	30" connection to existing manhole	EA	1	$ 1,900.00	$ 1,900	$ 949	$ 2,849		
14	30" DI fittings	EA	4	$ 4,200.00	$ 16,800	$ 8,388	$ 25,188		
	General								
15	Concrete curb replacement	LF	232	$ 35	$ 8,120	$ 4,054	$ 12,174		
16	Sidewalk replacement	LF	232	$ 35	$ 8,120	$ 4,054	$ 12,174		
	GAC FEED PUMP STATION								
1	Excavation	CY	1,256	$ 50	$ 62,800	$ 31,356	$ 94,156		
2	Backfill	CY	521	$ 10	$ 5,210	$ 2,601	$ 7,811		
3	Floor bedding	CY	80	$ 21	$ 1,680	$ 839	$ 2,519		
4	Steel H-Piles	LS	1	$ 50,000	$ 50,000	$ 24,965	$ 74,965		
5	Topsoil final grading	CY	4	$ 10	$ 40	$ 20	$ 60		
6	Exterior concrete paving	LF	100	$ 35	$ 3,500	$ 1,748	$ 5,248		
7	Pipe roof drainage	LF	76	$ 12	$ 912	$ 455	$ 1,367		
	GAC FEED PS OVERFLOW OUTLET					$ -			
8	Precast Concrete Outlet	EA	1	$ 5,000	$ 5,000	$ 2,497	$ 7,497		
9	Rip Rap	TON	20	$ 30	$ 600	$ 300	$ 900		

TMTP ADVANCED TREATMENT IMPROVEMENTS:

OWNER: Northern Kentucky Water District

LEAD DESIGNER: MALCOLM PIRNIE

CSI NO./DESCRIPTION: 2.0 Site Work

ESTIMATED BY:	DATE:
Malcolm Pirnie Inc. & GRW Engineers, Inc.	1/16/2009

(A) Design Contingencies	10.0%
(B) Construction Contingencies (see Summary)	36.3%
*Total Known Costs + Compounded Contingencies**	150%

* = (1+A) x (1 + B)

CONSTRUCTION COST TOTAL ESTIMATE (2.0):	
$	1,363,316

Item No.	Description	Unit	Quantity	Cost/Unit Installed	Subtotal	Total Compounded Contingencies	Total Construction Cost	Source	Comments
				($)	($)	50%	($)		
	GAC BUILDING								
1	Excavation	CY	750	$ 50	$ 37,500	$ 18,724	$ 56,224		
2	Backfill	CY	250	$ 10.00	$ 2,500	$ 1,248	$ 3,748		
3	Slab subgrade	CY	280	$ 8.00	$ 2,240	$ 1,118	$ 3,358		
4	Topsoil final grading	CY	505	$ 10	$ 5,050	$ 2,521	$ 7,571		
5	Exterior asphalt paving	SY	1,233	$ 75	$ 92,475	$ 46,173	$ 138,648		
6	Pipe roof drainage	LF	220	$ 12.00	$ 2,640	$ 1,318	$ 3,958		
7	EQ basin excavation	CY	860	$ 50	$ 43,000	$ 21,470	$ 64,470		
8	Fence	LF	622	$ 45.00	$ 27,990	$ 13,975	$ 41,965		
9	8" DI sewer pipe	LF	200	$ 75.00	$ 15,000	$ 7,490	$ 22,490		

TMTP ADVANCED TREATMENT IMPROVEMENTS:

OWNER: Northern Kentucky Water District

LEAD DESIGNER: MALCOLM PIRNIE

CSI NO./DESCRIPTION: 3.0 Concrete

ESTIMATED BY:	DATE:
Malcolm Pirnie Inc. & GRW Engineers, Inc.	1/16/2009

(A) Design Contingencies	10.0%
(B) Construction Contingencies (see Summary)	36.3%
*Total Known Costs + Compounded Contingencies**	150%

* = (1 + A) x (1 + B)

CONSTRUCTION COST TOTAL ESTIMATE (3.0):	
$	2,098,165

Item No.	Description	Unit	Quantity	Cost/Unit Installed ($)	Subtotal ($)	Total Compounded Contingencies 50%	Total Construction Cost ($)	Source	Comments
	PRELIMINARY TREATMENT FACILITIES								
1	Slab	CY	239	$ 500	$ 119,500	$ 59,666	$ 179,166		
2	Walls	CY	863	$ 700	$ 604,100	$ 301,627	$ 905,727		
3	Precast column	EA	3	$ 1,785	$ 5,355	$ 2,674	$ 8,029		
4	Precast beam	EA	6	$ 1,850	$ 11,100	$ 5,542	$ 16,642		
5	Precast hollow core roof	SF	6,840	$ 12	$ 78,660	$ 39,275	$ 117,935		
6	Lightweight conc slab @ area above tunnel	SF	912	$ 3	$ 2,736	$ 1,366	$ 4,102		
	GAC FEED PUMP STATION								
1	Footer (elec room)	CY	6	$ 275	$ 1,650	$ 824	$ 2,474		
2	Grade Beam (elec room)	CY	12	$ 450	$ 5,400	$ 2,696	$ 8,096		
3	Slab	CY	41	$ 75	$ 3,075	$ 1,535	$ 4,610		
4	Column crane supports	EA	6	$ 2,550	$ 15,300	$ 7,639	$ 22,939		
5	Precast hollow core roof	SF	1,108	$ 12	$ 12,742	$ 6,362	$ 19,104		
6	Precast beam	EA	2	$ 1,950	$ 3,900	$ 1,947	$ 5,847		
7	Wet well basin slab	CY	40	$ 500	$ 20,000	$ 9,986	$ 29,986		
8	Wet well basin walls	CY	76	$ 700	$ 53,200	$ 26,563	$ 79,763		
	GAC BUILDING								
1	Footer	CY	23	$ 275	$ 6,325	$ 3,158	$ 9,483		
2	Grade Beam	CY	152	$ 450	$ 68,400	$ 34,152	$ 102,552		
3	Tank Foundations	EA	14	$ 2,500	$ 35,000	$ 17,476	$ 52,476		
4	Slab	CY	440	$ 75	$ 33,000	$ 16,477	$ 49,477		
5	Curb	LF	170	$ 12	$ 1,955	$ 976	$ 2,931		
6	Column	EA	6	$ 2,550	$ 15,300	$ 7,639	$ 22,939		
7	Precast beam	EA	6	$ 2,900	$ 17,400	$ 8,688	$ 26,088		
8	Precast hollow core roof	SF	9,768	$ 12	$ 112,332	$ 56,087	$ 168,419		
9	EQ basin	CY	258	$ 650	$ 167,700	$ 83,733	$ 251,433		
10	Backwash viewing structure	LS	1	$ 3,500.00	$ 3,500	$ 1,748	$ 5,248		
11	Retaining wall	CY	4	$ 450	$ 1,800	$ 899	$ 2,699		

TMTP ADVANCED TREATMENT IMPROVEMENTS:

OWNER: Northern Kentucky Water District

LEAD DESIGNER: MALCOLM PIRNIE

CSI NO./DESCRIPTION: 4.0 Masonry

ESTIMATED BY:	DATE:
Malcolm Pirnie Inc. & GRW Engineers, Inc.	1/16/2009

(A) Design Contingencies	10.0%
(B) Construction Contingencies (see Summary)	36.3%
*Total Known Costs + Compounded Contingencies**	150%

* = (1 + A) x (1 + B)

CONSTRUCTION COST TOTAL ESTIMATE (4.0)	
$	1,115,791

Item No.	Description	Unit	Quantity	Cost/Unit Installed	Subtotal	Total Compounded Contingencies	Total Construction Cost	Source	Comments
				($)	($)	50%	($)		
	PRELIMINARY TREATMENT FACILITIES								
1	12"cmu w/ reinforcing / 3" Rig. Insul./ 3 5/8"Brick Veneer	SF	5,722	$ 28	$ 157,355	$ 78,567	$ 235,922		
2	3 5/8" Brick Veneer at foundation	SF	2,672	$ 11	$ 29,392	$ 14,675	$ 44,067		
	GAC FEED PUMP STATION								
1	12" cmu w/ reinforcing / 3" Rig. Insul./ 3 5/8"Brick Veneer	SF	4,128	$ 28	$ 113,520	$ 56,681	$ 170,201		
2	Precast conc. Coping	LF	90	$ 75	$ 6,750	$ 3,370	$ 10,120		
	GAC BUILDING								
1	12" cmu w/ reinforcing / 3" Rig. Insul./ 3 5/8"Brick Veneer	SF	14,602	$ 28	$ 401,555	$ 200,496	$ 602,051		
2	8" cmu w/ reinforcing	SF	1,472	$ 13	$ 19,136	$ 9,555	$ 28,691		
3	Precast conc. Sills	EA	6	$ 250	$ 1,500	$ 749	$ 2,249		
4	Precast conc. Coping	LF	200	$ 75	$ 15,000	$ 7,490	$ 22,490		

TMTP ADVANCED TREATMENT IMPROVEMENTS:
LEAD DESIGNER: MALCOLM PIRNIE
CSI NO./DESCRIPTION: 5.0 Metals

OWNER: Northern Kentucky Water District

ESTIMATED BY:	DATE:
Malcolm Pirnie Inc. & GRW Engineers, Inc.	1/16/2009

(A) Design Contingencies	10.0%
(B) Construction Contingencies (see Summary)	36.3%
*Total Known Costs + Compounded Contingencies**	150%

* = (1+ A) x (1 + B)

CONSTRUCTION COST TOTAL ESTIMATE (5.0)	
$	291,261

Item No.	Description	Unit	Quantity	Cost/Unit Installed	Subtotal	Total Compounded Contingencies	Total Construction Cost	Source	Comments
				($)	($)	50%	($)		
	PRELIMINARY TREATMENT FACILITIES								
1	Trough grate	SF	880	$ 21	$ 18,260	$ 9,117	$ 27,377		
2	Safety railings	LF	712	$ 46	$ 32,752	$ 16,353	$ 49,105		
3	Egress stair	Riser	13	$ 372	$ 4,836	$ 2,415	$ 7,251		
4	Roof stair	Riser	26	$ 372	$ 9,672	$ 4,829	$ 14,501		
5	Roof railing	LF	72	$ 120	$ 8,640	$ 4,314	$ 12,954		
6	Long span roof deck to cover area above tunnel	SF	912	$ 9	$ 8,208	$ 4,098	$ 12,306		
7	Steel beam and columns at tunnel area to support deck	Lump	1	$ 5,500	$ 5,500	$ 2,746	$ 8,246		
8	Infill skylight penetrations @ area above tunnel	EA	3	$ 500	$ 1,500	$ 749	$ 2,249		
	GAC FEED PUMP STATION								
1	Roof stair	Riser	48	$ 372	$ 17,856	$ 8,916	$ 26,772		
2	Roof railing	LF	34	$ 120	$ 4,080	$ 2,037	$ 6,117		
	GAC BUILDING								
1	Trench drain grate	SF	150	$ 21	$ 3,113	$ 1,554	$ 4,667		
2	Roof stair	Riser	54	$ 372	$ 20,088	$ 10,030	$ 30,118		
3	Roof railing	LF	100	$ 120	$ 12,000	$ 5,992	$ 17,992		
4	Pipe Supports	LS	1	$ 35,000	$ 35,000	$ 17,476	$ 52,476		
5	Center Gallery Grating	SF	580	$ 22	$ 12,760	$ 6,371	$ 19,131		

TMTP ADVANCED TREATMENT IMPROVEMENTS:
LEAD DESIGNER: MALCOLM PIRNIE
CSI NO./DESCRIPTION: 6.0 Wood and Plastics

OWNER: Northern Kentucky Water District

ESTIMATED BY:	DATE:
Malcolm Pirnie Inc. & GRW Engineers, Inc.	1/16/2009

(A) Design Contingencies	10.0%
(B) Construction Contingencies (see Summary)	36.3%
*Total Known Costs + Compounded Contingencies**	150%

* = (1 + A) x (1 + B)

CONSTRUCTION COST TOTAL ESTIMATE (6.0):
$ -

Item No.	Description	Unit	Quantity	Cost/Unit Installed	Subtotal	Total Compounded Contingencies	Total Construction Cost	Source	Comments
				($)	($)	50%	($)		
	PRELIMINARY TREATMENT FACILITIES								
	GAC FEED PUMP STATION								
	GAC BUILDING								

Case No. 2011-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

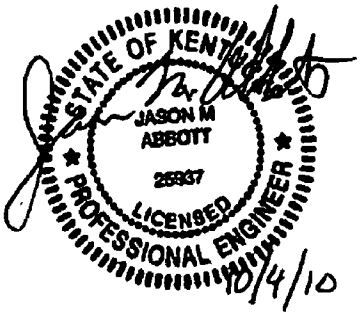
Engineer's Opinion Of Probable Construction Cost

[redacted]

Northern Kentucky Water District
2835 Crescent Springs Road • Erlanger KY 410108

Taylor Mill Water Treatment Plant Advanced Treatment Improvements

100% Opinion of Probable Construction Cost



October 2010

4775-012

Malcolm Pirnie, Inc.
8600 Governor's Hill Drive
Suite 210
Cincinnati, OH 4249

GRW, Inc.
801 Corporate Drive
Lexington, KY 40503

CDP Engineers
3250 Blazer Parkway
Lexington KY 40509

Strand Associates, Inc.
1525 Bull Lea Road, Ste 100
Cincinnati, OH 45249

MALCOLM PIRNIE

GRW, Inc.

cdpengineers

STRAND ASSOCIATES, INC. ENGINEERS

MALCOLM PIRNIE

Memorandum

Date: October 5, 2010

To: Amy Kramer, P.E., NKWD

From: Jason M. Abbott, P.E.

Re: TMTP 100% Submittal Opinion of Probable Construction Costs

Project No.: NKWD Taylor Mill Advanced Treatment Improvements Project

An opinion of probable construction costs (OPCC) was developed for the 100% submittal based on the current design. The cost opinion was developed as a Class 1 estimate in accordance with AACE guidelines and has a predicted accuracy of -5% to +10%. This range of accuracy has "narrowed" throughout the project. The summary of the OPCC is shown below.

100% Submittal
Opinion of Probable Construction Costs

Item	Cost
Opinion of Probable Construction Cost	$27,468,000
AACE Class 3 Estimate -5% Range	$26,095,000
AACE Class 3 Estimate +10% Range	$30,215,000

Many of the design variables have been addressed since the OPCC was first developed for the (BOD). Design Contingencies have been reduced to 0%, while markups and construction contingencies continue to be utilized in an attempt to account for any remaining unknowns associated with the construction.

The 100% submittal OPCC summary sheet, subsequent breakdowns of the costs by CSI Master Format 1995 division, and the comparison of the 60% submittal and the 100% submittal OPCCs can be found attached to this memo. The summary sheet includes a markup of 20% for the contractor's indirect costs, which include bonds, mobilization, insurance, overhead and profit, and contingency. The contractor's indirect cost markup remains reduced by 5%, to 20% (originally 25% in the 30% OPCC) due to the current bidding climate. The 5.5% that was originally included to escalate the cost to the middle of the construction project (2012) based on 5.5% ENR annual increase in construction costs, has been reduced to 2.25% due to the current bidding climate. In total the OPCC includes a markup of 22.25% or approximately $6,112,000.

In the 60% Submittal, an OPCC of approximately $28,021,000 was estimated.

Since the 60% Submittal was compiled, additional items have been added to the project and other variables have been finalized, resulting in the change in cost between the 60% submittal OPCC and this 100% OPCC. The total change in cost is

approximately $553,000. Divisions 4, 6, 7, 8, 9, 10, 11, 12, and 16 show a cost savings due mainly to the further understanding of the building design and removal of the design contingency. Summaries of the increases in cost, as broken down by Division follow:

- Div 1 (General Requirements) - The computer and Owner's contingency allowance$117,000.
- Div 2 (Site Work) - Further understanding of the extent of storm water conveyance, detention pond, demolition and additional fencing and gates $331,000.
- Div 3 (Concrete) - Additional cost for generator and substation concrete pad $1,000.
- Div 5 (Metals) - Increased cost due to addition of elevated walkway panels and railings, and the generator stairs and landing $30,000.
- Div 13 (Special Construction) - Increased cost due to finalized instrumentation and controls costs for pH instrument, turbidity analyzer, PLC components and security equipment $109,000
- Div 14 (Conveying Systems) - Increased cost for EQ and GAC backwash pump removal systems (portable hoist and jib crane) $10,000.
- Div 15 (Mechanical) - Increased cost for dehumidification unit, air cooled condensing unit, HVAC control wiring, water lines, natural gas lines, temporary FI pipe, sump pumps, and additional valves and fittings $226,000.

cc: File: 4775-012
jma

100% SUBMITTAL

TMTP ADVANCED TREATMENT IMPROVEMENTS: **Opinion Of Probable Construction Cost Estimate Summary**

Division	Description	Total Construction Cost	% of Total
1	General Requirements	$ 240,000	0.9
2	Site Work	$ 2,253,000	8.2
3	Concrete	$ 2,615,000	9.5
4	Masonry	$ 1,251,000	4.6
5	Metals	$ 428,000	1.6
6	Wood and Plastics	$ 11,000	0.0
7	Thermal and Moisture Protection	$ 953,000	3.5
8	Doors and Windows	$ 436,000	1.6
9	Finishes	$ 337,000	1.2
10	Specialties	$ 2,000	0.0
11	Equipment	$ 7,850,000	28.6
12	Furnishing	$ 36,000	0.1
13	Special Construction	$ 413,000	1.5
14	Conveying Systems	$ 93,000	0.3
15	Mechanical	$ 3,542,000	12.9
16	Electrical	$ 7,008,000	25.5
	Opinion Of Probable Construction Cost	**$ 27,468,000**	**100.0**
	AACE Class 1 Estimate (-5%)	**$ 26,095,000**	
	AACE Class 1 Estimate (+10%)	**$ 30,215,000**	

Costs above include the following construction contingencies

Bonds	1.5%
Mobilization	2.0%
Insurance	1.5%
Overhead & Profit	5.0%
Contingency	10.0%
Subtotal	20.0%
Escalation (2.25% of Direct and Indirect)	2.3%
Subtotal Indirect Cost	**22.3%**
Construction Contingencies' contribution to Total Construction Cost	**$ 6,112,000**

Note: All costs rounded up to the nearest $1,000.

Case No. 2011-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

Plans and Specifications prepared by Malcolm Pirnie, GRW, CDP Engineers, and Strand Associates titled "Taylor Mill Treatment Plant Advanced Treatment Improvements"

Northern Kentucky Water District

The following items are enclosed separately from this volume in hard copy and enclosed in this submittal in electronic copy.

- Plans prepared by Malcolm Pirnie, GRW, CDP Engineers, and Strand Associates titled "Taylor Mill Treatment Plant Advanced Treatment Improvements" dated March 2011

- Specifications prepared by Malcolm Pirnie, GRW, CDP Engineers, and Strand Associates titled "Taylor Mill Treatment Plant Advanced Treatment Improvements" dated March 2011

2835 Crescent Springs Rd Erlanger, KY 41018 (859) 578-9898 Fax (859) 578-5456

Case No. 2011-____
Exhibit ____B____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

CERTIFIED STATEMENTS

Affidavit

Franchises

Plan Review and Permit Status

Easements and Right-of-Way Status

Construction Dates and Proposed Date In Service

Plant Retirements

AFFIDAVIT
Taylor Mill Treatment Plant Advanced Treatment Improvements

Affiant, Jack Bragg, Jr., being the first duly sworn, deposes and says that he is the Vice President of Finance of the Northern Kentucky Water District, which he is the Applicant in the proceeding styled above; that he has read the foregoing "Taylor Mill Treatment Plant Advanced Treatment Improvements" Application and knows the contents thereof, and that the same is true of his own knowledge, except as to matters which are therein stated on information or belief, and that is to those matters he believes them to be true.

Jack Bragg, Jr.
Vice President - Finance
Northern Kentucky Water District

Subscribed and sworn to before me in said County to be his act and deed by Jack Bragg, Jr., Vice President of Finance of the Northern Kentucky Water District, this 4 day of April 2011.

NOTARY PUBLIC
Kenton County, Kentucky
My commission expires 5/9/2011

Northern Kentucky
Water District

Franchises required – None

Plan Review and Permit Status - The District has reviewed and approved the plans and specifications prepared by Malcolm Pirnie, GRW, CDP Engineers, and Strand Associates titled "Taylor Mill Treatment Plant Advanced Treatment Improvements" dated March 2011.

The District received approval from the Division of Water on February 18, 2011 (see attached letter).

Easements and Right-of-Way Status - Easement and Right-of-Way statements are not required.

Start date of construction – October 2011

Proposed date in service – May 2014

Plant retirements – There are no retirements as a result of this project.

2835 Crescent Springs Rd Erlanger, KY 41018 (859) 578-9898 Fax (859) 578-5456

Case No. 2011-____
Exhibit ____B____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

PLAN REVIEW AND PERMIT STATUS

Approval Letter from Kentucky Division of Water

184-457
copy

STEVEN L. BESHEAR
GOVERNOR

LEONARD K. PETERS
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE, 4TH FLOOR
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

February 18, 2011

Amy Kramer, Engineering Manager
Northern KY Water District
2835 Crescent Springs Rd
PO Box 18640
Erlanger, KY 41018

RE: Northern KY Water District
AI # 2485
APE20100018
Taylor Mill WTP Advanced Treatment Improvements
Kenton County, KY

Dear Ms. Kramer:

We have reviewed the plans and specifications for the above referenced project. The plans include the following:

1. Construction of Preliminary Treatment/Granular Activated Carbon (GAC)
2. Building with rapid mix flocculation, Plate settling, residuals collection system and GAC pressure vessels.
3. Construction of a GAC Feed Pump Station.
4. Relocation of existing UV system
5. Installation of an electrical substation and two back-up generators;
6. Demolition of existing flocculation basins, sedimentation basins, and tunnel structure.

It has been determined that the plans and specification are technically APPROVED with respect to the sanitary features of design as of this date with the following stipulations:

A. The capacity of the treatment plant shall remain at 12 MGD (8,333 gpm).

B. Water pipe materials and adhesives used in the construction shall be NSF approved and compatible with various pH ranges and chemical to be used.

The following information and requirements relate to the Drinking Water State Revolving Fund.

1. You are hereby authorized to advertise for bids to construct this project. In addition to other notices, you shall advertise the bid for seven (7) to twenty-one (21) days prior to the Bid Opening date in the newspaper with the largest circulation in your area. Please provide the bid opening date to Cathy Arnett at the Division of Water who may be reached at (502) 564-3410.

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

If you have any questions concerning this project, please contact William Wright at (502) 564-3410 ext. 4829.

Sincerely,

Solitha W. Dharman

Solitha Dharman, PE
Supervisor, Engineering Section
Drinking Water Branch
Division of Water

SWD:WLW

Enclosures
C: Jason Abbott, Malcolm Pirnie
Kentucky Infrastructure Authority
Cathy Arnett, Division of Water
Public Service Commission
Division of Plumbing
Florence Regional Office

Case No. 2011-____
Exhibit ____C____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

BID INFORMATION AND BOARD RESOLUTION

Bid Tabulation

Engineer's Recommendation of Award

Board Resolution

Northern Kentucky Water District

ITEMS CONCERNING BID INFORMATION AND BOARD RESOLUTION

- The bid opening is set for May 3, 2011. The bid tabulation will be forwarded.
- The Engineer's Recommendation of Award will be forwarded.
- The Board Resolution for the May 19, 2011 meeting will be forwarded.

2835 Crescent Springs Rd Erlanger, KY 41018 (859) 578-9898 Fax (859) 578-5456

Case No. 2011-____
Exhibit C

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

Bid Tabulation

Case No. 2011-____
Exhibit ____C____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

Engineer's Recommendation of Award

Case No. 2011-____
Exhibit ____C____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

Board Resolution

Case No. 2011-____
Exhibit ____D____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

PROJECT FINANCE INFORMATION

Customers Added and Revenue Effect

Debt Issuance and Source of Debt

Additional Costs for Operating and Maintenance

USoA Plant Account

Depreciation Cost and Debt Service After Construction

Customers Added and Revenue Effect: There will be zero new customers added and no revenue effect as a result of the Taylor Mill Treatment Plant Advanced Treatment Improvements project.

Debt Issuance and Source of Debt: This project will be paid from the District's Five-Year Capital Budget, PSC No. 136 "TMTP Advanced Treatment and Sedimentation Basin Replacement & Generator" with a budget of $35,000,000 which includes construction cost, engineering, and contingencies. A summary of the project costs (prior to opening bids) is provided below:

o Design Engineering	$ 1,950,280
o Construction Engineering	$ 1,150,000
o Contractor's Bid	$27,468,000
o Misc. & Contingencies	$ 4,431,720
Total Project Cost	$35,000,000

The Engineer's estimate presented in Exhibit A is $27,468,000 for construction. The construction contingency amount of $6,112,000 shown in the engineer's 100% Opinion of Probable Construction Cost covers contractor bonds, mobilization, insurance, overhead and profit, plus a contingency amount for items that may have been excluded from the quantity take-offs in the detailed estimate. The engineer's contingency also includes a factor for escalation to the mid-point of construction.

The District's $4,431,720 amount for miscellaneous costs and contingencies includes materials and equipment that the District will be purchasing directly to avoid the contractor's mark-up (i.e. SCADA computer hardware and software for process control) as well as repair of erosion in the hillside along Banklick Creek that, if left uncorrected, could be exacerbated by plant operations and future discharge of storm water from the detention pond that will be constructed with the Advanced Treatment project.

The project cost information will be reviewed following the Taylor Mill Treatment Plant Advanced Treatment Improvements bid opening and updated, if appropriate, for this application.

The project will be funded through multiple sources. The project is already partially funded through BAN 2009 in the amount of $1,833,000 for engineering services. It is proposed that the remaining $33,167,000 be taken from future Bond Anticipation Notes.

USoA Accounts: The anticipated amounts for the project cost of $35,000,000 will fall under the following Uniform System of Accounts Codes:

Code 304 "Structures and Improvements"	$17,967,802
Code 310 "Power Generation Equipment"	$ 7,029,820
Code 311 "Pumping Equipment"	$ 655,269
Code 320 "Water Treatment Equipment"	$ 9,347,109

Additional Costs and O&M: Additional operating and maintenance costs incurred for the project are as follows:

Power	$ 75,000
Labor	$ 70,000
Maintenance	$1,500,000
	$ 1,645,000 Annual O&M

Depreciation and Debt Service: Annual depreciation and debt service after construction are as follows:

Depreciation: $479,141/year over 37.5 years for Code 304 Structures & Improvements
$351,491/year over 20 years for Code 310 Power Generation Equipment
$32,763/year over 20 years for Code 311 Pumping Equipment
$311,570/year over 30 years for Code 320 Water Treatment Equipment

Debt Service: $2,483,336 over 25 years (conventional 5.0% loan).

Fort Thomas Treatment Plant			
Advanced Treatment Project			
		Depreciation	**Annual**
Depreciation	**Cost**	**Years**	**Depreciation**
Account 304 Structures & Improvements	$17,967,802	37.5	$479,141.39
Account 310 Power Generation Equipment	$7,029,820	20	$351,491.00
Account 311 Pumping Equipment	$655,269	20	$32,763.45
Account 320 Water Treatment Equipment	$9,347,109	30	$311,570.30
Total	**$35,000,000.00**		**$1,174,966.14**
Debt Service on SRF Loan			
Total Borrowed	$0		
Interest Rate including administration fee	2.20%		
Term (Years)	20		
Annual Debt Service SRF	**$0.00**		
Debt service on bond issue			
Total Borrowed	$35,000,000		
Interest Rate	5.00%		
Term (Years)	25		
Annual Debt Service Traditional	**$2,483,336.01**		
Total Annual Debt Service	**$2,483,336.01**		

Case No. 2011-____
Exhibit ____E____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

PSC ANNUAL REPORT – 2010

CLASS A & B

WATER DISTRICTS AND ASSOCIATIONS

ANNUAL REPORT

OF

Northern Kentucky Water District

2835 Crescent Springs Road, Erlanger, Kentucky 41018

TO THE

PUBLIC SERVICE COMMISSION

OF THE

COMMONWEALTH OF KENTUCKY

211 SOWER BOULEVARD
P. O. BOX 615
FRANKFORT, KENTUCKY 40602

FOR THE CALENDAR YEAR ENDED DECEMBER 31, 2010

Northern Kentucky
Water District

Class "A & B"

Water Districts & Associations

Annual Report

OF

Northern Kentucky Water District

2835 Crescent Springs Road, P.O. Box 18640

Erlanger, KY 41018

To the

PUBLIC SERVICE COMMISSION
of the
Commonwealth of Kentucky

For the calendar Year Ended: December 31, 2010

Rev. 7-19-2004

KENTUCKY PUBLIC SERVICE COMMISSION
REPORT OF GROSS OPERATING REVENUES DERIVED FROM INTRA-KENTUCKY
BUSINESS FOR THE YEAR ENDING DECEMBER 31, 2010

NORTHERN KENTUCKY WATER DISTRICT
(Utility Reporting)

Post Office Box 18640
2835 Crescent Springs Rd - Erlanger, Ky 41018-0640
(Address)

FEIN # (Federal Employer Indentification Number)
61-1311695

(DO NOT INCLUDE TAXES COLLECTED)

(1)	Gross Revenues of Electric Utility	$ _____
(2)	Gross Revenues of Gas Utility	$ _____
(3)	Gross Revenues of Water Utility	$ 42,118,806
(4)	Gross Revenues of Sewer Utility	$ _____
(5)	Other Operating Revenues	$ 1,619,954
	***** TOTAL GROSS REVENUES.....**	$ 43,738,760

OATH

State of Kentucky.....)
) ss.
County Campbell .....)

Jack Bragg, CPA being duly sworn, states that being duly sworn, states that he/she is Vice-President/CFO of the Northern Kentucky Water District that the above report of gross revenues is exact accordance with Northern Kentucky Water District , and that such books accurateley show the gross revenues of: Northern Kentucky Water District,derived from Intra-Kentucky business for the calendar year ending December 31, 2010

VP/CFO
(Officer)

This the 28th day of March, 2011

Notary Public

State at Large
County

5-9-2011
Commission Expires

Checklist for the Annual ' ort for C Ware Companies

To be completed and returned with the annual report

Page No.	Account No.		Page No.		Yes	No	If no, explain why
4 to 6	The identification pages have been completed.				X		
7	101-106	agrees with	13	Total 101-106	X		
7	108-110	agrees with	15	Total 301-348 Cols c & h	X		
7	114-115	agrees with	16	Net Blanace 114-115	X		
7	123	agrees with	17	Total 123	X		
7	124-125	agrees with	17	Total 124 & Total 125	X		
7	126	agrees with	17	Total 126	X		
7	127	agrees with	17	Total 127	X		
7	141-144	agrees with	18	Net Balance 141-144	X		
7	151-153	agrees with	19	Total 151-153	X		
7	162	agrees with	19	Total 162	X		
8	181	agrees with	20	Total 181	X		
8	182	agrees with	21	Total 182	X		
8	186	agrees with	20	Total 186	X		
9	214	agrees with	12	Total 214	X		
9	215.1	agrees with	12	Tolal 215.1	X		
9	215.2	agrees with	12	Total 215.2	X		
9	221	agrees with	23	Total Col 4	X		
9	221	agrees with	23	Total Col 12	X		
9	224	agrees with	22	Total Col f	X		
9	232	agrees with	24	Total 232	X		
9	223	agrees with	24	Total 233	X		
9	234	agrees with	24	Total 234	X		
9	236	agrees with	25	Beginning & Ending Balance 236	X		
9	237	agrees with	25	Total 237 Cols b & e	X		
9	242	agrees with	26	Total 242	X		
9	251	agrees with	20	Total 251	X		
9	252	agrees with	21	Beginning & Ending Balance 252	X		

Checklist for the Annual ort for C Ware Companies

To be completed and returned with the annual report

Page No.	Account No.		Page No.		Yes	No	If no, explain why
10	400	agrees with	27	Total Water Operating Revenue Col e	X		
10	401	agrees with	28	Total 601-675, Col c	X		
10	408.1&408.2	agrees with	25	Total Taxes Accrued 408-10-408.20	X		
11	427	agrees with	25	Total Interest Accrued Col c	X		
11	Net Income Before Contribution agrees with		12	Balance Trans Inc Col c	X		
13	101	agrees with	14	Total Water Plant Col f	X		
14	The analysis of water utility plant acounts cols c throuh k has been Completed				X		
15	The analysis of accumulated depreciation & amortization by primary accounts nas been completed				X		
20	186.1	agrees with	26	Total 186.1 Col c	X		
22	Schedule of Long-Term Debt has been completed				X		
23	Schedule ofBond Maturities has been completed				X		
27	Taxes collected (example: school tax, sales tax, granchise tax) have been excluded from Revenue and Expenses				X		
27	The analysis of water operating revenue Cols c,d, and e has been completed				X		
28	The analysis of water utiltiy expense Cols c through k has been complete				X		
29	Schedule of Pumping and Purchased Water Statistics has been completed				X		
29	Total Col (d)	agrees with	30	Line 4, Total Production & Purchased	X		
29	Total Col (e)	agrees with	30	Line 13, Total Water Sales	X		
30	466 Total Gals	agrees with	30	Line 11, Sales for Resale (466)	X		
	Oath page has been completed				X		

PUBLIC SERVICE COMMISSION OF KENTUCKY

PRINCIPAL PAYMENT AND INTEREST INFORMATION

FOR THE YEAR ENDING DECEMBER 31, 2010

1. Amount of Principle Payment during calender year $ 6,956,736.11

2. Is Principal Current? Yes X No _____

3, Is Interest Current ? Yes X No _____

4. Has all long-term debt been approved by the Public Service Commission?

Yes X No _____ PSC Case No _____

SERVICES PERFORMED BY

INDEPENDENT CERTIFIED PUBLIC ACCOUNTANT ("CPA")

Are your financial statement examined by a Certified Public Accountant?

Yes X No _____

If yes, which service is performed?

Audit X

Compilation _____

Review _____

Please enclose a copy of the accountant's report with the annual report

ADDITIONAL REQUESTED INFORMATION

Utility Name	Norther Kentucky Water District
Contact Person	Jack Bragg, Jr, CPA
Contact Person'ss E-Mail Address	jbragg@nkywater.org
Utility's Web Address	www.nkywater.org

PLEASE COMPLETE THE ABOVE INFORMATION, IF IT IS AVAILABLE.

IF THERE ARE MULTIPLE STAFF WHO MAY BE CONTRACTS PLEASE INCLUDE THEIR NAMES AND E-MAIL ADDRESS ALSO.

Additional Information Required by Commission Orders

Provide any special information required by prior Commission orders, as well as any narrative explanations necessary to fully explain the data. Examples of the types of special information that may be required by Commission orders include surchage amounts, collected, refunds issued, and unusual debt requirments.

Case #	Date of Order	Item/Explanation	
96-234	8/26/1996	Merger of Campbell Co. Ky. Water District and Kenton Co. Water District No.1. Effective date of Merger 1/1/1997	
97-3	9/21/1997	Defeasance of the former Campbell Co. Ky. Water District Bonds	
		Principal of the issue	$9,630,000
92-482	3/14/1992	SubDistrict A	
		a. Number of Customers as of 12-31-2010	586
		b. Total Surcharge billed during 2010	$61,018
		c. Accumulated surcharge billed.	$1,318,817
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$465,733
94-409	1/26/1995	SubDistrict B	
		a. Number of Customers as of 12-31-2010	292
		b. Total Surcharge billed during 2010	$62,972
		c. Accumulated surcharge billed.	$841,517
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$1,355,829
95-582	2/8/1996	SubDistrict R	
		a. Number of Customers as of 12-31-2010	236
		b. Total Surcharge billed during 2010	$52,070
		c. Accumulated surcharge billed.	$3,259,814
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$6,304,142
95-582	2/8/1996	SubDistrict RL	
		a. Number of Customers as of 12-31-2010	87
		b. Total Surcharge billed during 2010	$38,239
		c. Accumulated surcharge billed.	$583,440
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$2,776,943
97-468	9/4/1998	Per Item 7 on the order. See attached exhibit ML 1	
2000-329	7/21/2000	SubDistrict C	
		a. Number of Customers as of 12-31-2010	992
		b. Total Surcharge billed during 2010	$221,948
		c. Accumulated surcharge billed.	$1,809,581
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$5,201,932
2000-171	5/5/2000	SubDistrict D	
		a. Number of Customers as of 12-31-2010	154
		b. Total Surcharge billed during 2010	$55,648
		c. Accumulated surcharge billed.	$389,051
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$1,162,245
		e. Bond issued 2001, Payback $1,529,229.74 (25years), rate variable	
2001-198	6/27/2001	Defeasance of the former Kenton County Water District No.1 Bonds - Principle Issue	$45,448,000
2002-00363	10/1/2002	Defeasance of the former Klenton County Water District No.1 Bonds	$10,575,000
2002-00468	3/1/2003	Defeasance of 1995C Bonds with Issuance of 2003A Bonds	$1,615,000
2002-00105	4/30/2003	Water Rate Increase	

Additional Information Required by Commission Orders - Contiuned			
2002-00105	6/1/2003	Issue of 2003 B Bonds	$30,270,000
2003-00167	7/18/2003	SubDistrict E	
		a. Number of Customers as of 12-31-2010	183
		b. Total Surcharge billed during 2010	$66,988.00
		c. Accumulated surcharge billed.	$360,428.39
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$1,497,875.71
		e. Bond issued 2004, payback $1,859,684.55 (25years), rate variable	
2003-00191	7/18/2003	SubDistrict RF	
		a. Number of Customers as of 12-31-2010	33
		b. Total Surcharge billed during 2010	$8,621
		c. Accumulated surcharge billed.	$62,255
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$162,466
2003-00224	6/14/2004	Issue of 2004A Bonds	$10,455,000
2003-00224	6/14/2004	SubDistrict K	
		a. Number of Customers as of 12-31-2010	51
		b. Total Surcharge billed during 2010	$8,245
		c. Accumulated surcharge billed.	$44,241
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$177,739
		e. Bond issued 2004, payback $208,824.68, (25years), rate variable	
2003-00404	12/2/2003	Defeasance of 1993, 1195A and 1995B Bonds with Issuance of 2003C Bonds	$23,790,000
2005-00148	4/28/2006	Water Rate Increase & Bond Issuance	$29,000,000
2006-00315	12/26/2007	SubDistrict F	
		a. Number of Customers as of 12-31-2010	39
		b. Total Surcharge billed during 2010	$11,591
		c. Accumulated surcharge billed.	$24,973
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$396,426
		e. Bond issued 2007, payback $415,102.00 (25years), rate variable	
2007-00131	6/27/2007	SubDistrict G	
		a. Number of Customers as of 12-31-2010	88
		b. Total Surcharge billed during 2010	$28,148
		c. Accumulated srucharge billed.	$55,538
		d. Remaining Debt Service on debt which NKWD Issued to Finance Facilities	$1,001,425
		e. Bond issued 2007, payback $1,042,078.00 (25years), rate variable	
2007-00135	12/21/2007	Water Rate Increase & Bond Issuance	$30,075,125
2010-00049	1/7/2011	Water Rate Increase & Bond Issuance	$32,500,000

MAJOR WATER PROJECTS

Instructions: Provide details about each major water project which is planned but has not yet been submitted for approval to the Public Service Commission. For the limited purposed of this report a "Major Project" is defined as one which is not in the ordinary course of business, and which will increase your current utility plant by at least 20%

Brief Project Description (improvement, replacement, building construction, expansion. If expansion, provide the estimated number of new customers):

N/A

Projected Costs and Funding Sources/Amounts:

Approval Status: (Application for financial assistance filed, but not approved; or application approved, but have not advertised for construction bids)

Location: (coummunity, area or nearby roads)

TABLE OF CONTENTS

HISTORY

1. Exact name of utility making this report. (Use the words: "The, Company, Incorporated or Incorporated" only when a part of the corporate name.)

Northern Kentucky Water District

2. Give location including city, street and number, of the executive office:

2835 Crescent Springs Road
P.O. Box 18640
Erlanger, Kentucky 41018-0640

3. Give the location, including street, street number, and telephone number of the principle office in Kentucky:

Same as #2

4. Date of organization:

January 1, 1997

5. If a consolidated or merged entity, name all the previously separate entities.

Kenton County Water District
Campbell County Water District

6. Date of each consolidation and each merger

January 1, 1997

7. State whether the respondent is a water district or association.

Water District under Chapter 74 – KRS

8. Name all operating departments other than water.

None

9. Name of counties in which you furnish water service.

Kenton, Campbell, & Boone

10. Give the number of employees:.

Full Time: 148 **Part Time: 18**

Report of: **Northern Kentucky Water District**
For Year Ended: **12/31/2010**
Location where books and records are located: **2835 Crescent Springs Road, Erlanger, Ky 41018**

Contacts:

Name	Title	Principal Business Address		Salary Charged Utility	Current Term Expires
Send correspondence to: Jack Bragg	VP of Finance	2835 Crescent Springs Road P.O. Box 41018-0640 Erlanger, Kentucky 41018		xxxxxxxxx	xxxxx
Report prepared by: Jack Bragg	VP of Finance	Same as above		xxxxxxxxx	xxxxx
	Officers and Managers				
Drew Collins	Chairperson	Same as above		6,000.00	8/26/2012
Doug Wagner	Vice Chairperson	Same as above		6,000.00	8/28/2011
J[illegible]bester	Treasurer	Same as above		6,000.00	8/26/2013
Dr. Pat Sommerkamp	Commissioner	Same as above		6,000.00	8/21/2013
Frank Jackson	Commissioner	Same as above		6,000.00	8/28/2011
Fred Macke	Secretary	Same as above		6,000.00	7/26/2012
C. Ronald Lovan	President/CEO	Same as above		xxxxxxxxx	xxxxx

COMPARATIVE BALANCE SHEET - ASSETS AND OTHER DEBITS

Account No. (a)	2010 Account Name (b)	Ref. Page ©	Previous Year (d)	Current Year (e)
	UTILITY PLANT			
101-106	Utility Plant	13	$ 347,503,188	$ 369,386,212
108-110	Less: Accumulated Depreciation and Amortization	13,15-16	(74,669,512)	(82,113,459)
	Net Plant		$ 272,833,676	$ 287,272,753
114-115	Utility Plant Acquisition Adjustments (Net)	16	3,464,111	3,262,991
116	Other Utility Plant Adjustments			
	Total Net Utility Plant		$ 276,297,787	$ 290,535,744
	OTHER PROPERTY & INVESTMENTS			
121	Nonutility Property		$	$
122	Less: Accumulated Depreciation and Amortization			
	Net Nonutility Property		$	$
123	Investment in Asso. Companies	17		
124	Utility Investments	17	36,962,649	33,323,505
125	Other Investments	17	1,997,887	1,601,840
126-127	Special Funds	17		
	Total Other Property & Investments		$ 38,960,536	$ 34,925,345
	CURRENT AND ACCRUED ASSETS			
131	Cash		$ 12,973,478	$ 11,835,530
132	Special Deposits			
133	Other Special Deposits		27,917,544	21,540,563
134	Working Funds			
135	Temporary Cash Investments			
141-144	Accounts Receivable, Less Accumulated Provision for Uncollectible Accounts	18	4,753,541	5,238,301
145	Accounts Receivable from Associated Companies			
146	Notes Receivable from Associated Companies			
151-153	Materials & Supplies	19	1,251,889	1,343,411
161	Stores Expense			
162	Prepayments	19	152,269	442,448
171	Accrued Interest & Dividends Receivable			
172	Rents Receivable			
173	Accrued Utility Revenues		4,700,000	5,400,000
174	Misc. Current & Accrued Assets			
	Total Current & Accrued Assets		$ 51,748,721	$ 45,800,253

COMPARATIVE BALANCE SHEET - ASSETS AND OTHER DEBITS (CONT'D)

Account No. (a)	2010 Account Name (b)	Ref. Page c	Previous Year (d)	Current Year (e)
	DEFERRED DEBITS			
181	Unamortized Debt Discount & Expense	20	$ 3,395,826	$ 3,044,809
182	Extraordinary Property losses	21		
183	Preliminary Survey & Investagation Charges			
184	Clearing Accounts			
185	Temporary Facilities			
186	Misc. Deferred Debits	20	5,093,174	4,546,120
187	Research & Development Expenditures			
	Total Deferred Debits		$ 8,489,000	$ 7,590,929
	TOTAL ASSETS AND OTHER DEBITS		$ 375,496,044	$ 378,852,271

COMPARATIVE BALANCE SHEET - EQUITY CAPITAL AND LIABILITIES

Account No. (a)	2010 Account Name (b)	Ref. Page c	Previous Year (d)	Current Year (e)
	Equity Capital			
214	Appropriated Retained Earnings	12	$ 53,566,481	$ 43,992,811
215.1	Retained Earnings from Income Before Contributions	12	$ 24,856,196	$ 38,299,847
215.2	Donated Capital	12	$ 61,121,735	$ 62,190,539
	Total Equity Capital		$ 139,544,412	$ 144,483,197
	LONG-TERM DEBT			
221	Bonds	23	$ 185,065,000	$ 178,439,000
222	Reacquired Bonds			
223	Advances from Asso. Companies			
224	Other Long-Term Debt	22	12,289,068	17,451,799
	Total Long-Term Debt		$ 197,354,068	$ 195,890,799
	CURRENT & ACCRUED LIABILITIES			
231	Accounts Payable		$ 3,789,037	$ 3,706,678
232	Notes Payable	24	29,260,000	29,260,000
233	Acts. Payable to Asso. Co.	24		
234	Notes Payable to Asso. Co.	24		
235	Customer Deposits		13,413	8,006
236	Accrued Taxes	25		
237	Accrued Interest	25	3,579,652	3,492,903
239	Matured Long-Term Debt			
240	Matured Interest			
241	Tax Collections Payable			
242	Misc. Current & Accrued Liabilities	26	1,916,224	1,976,378
	Total Current & Accrued Liabilities		$ 38,558,326	$ 38,443,965
	DEFERRED CREDITS			
251	Unamortized Premium on Debt	20	$ 39,238	$ 34,310
252	Advances for Construction	21		
253	Other Deferred Credits			
	Total Deferred Credits		39,238	34,310
	OPERATING RESERVES			
	Accumulated Provision for:			
261	Property Insurance		$	$
262	Injuries & Damages			
263	Pensions & Benefits			
265	Miscellaneous Operating Reserves			
	Total Operating Reserves		$	$
	TOTAL EQUITY CAPITAL & LIABILITIES		$ 375,496,044	$ 378,852,271

COMPARATIVE OPERATING STATEMENT

Acct. No. (a)	Account Name (b)	Ref. Page c	Previous Year (d)	Current Year (e)
	Utility Operating Income			
	Operating Revenues	27	$ 41,046,714	$ 43,738,760
401	Operating Expenses	28	$ 23,563,528	23,154,089
403	Depreciation Expenses		8,023,443	8,487,677
406	Amortization of Utility Plant Acquisition Adjustment		201,120	201,120
407	Amortization Expense		378,962	378,962
408.1	Taxes Other Than Income	25	600,166	597,489
	Utility Operating Expenses		$ 32,767,219	$ 32,819,337
	Utility Operating Income		$ 8,279,495	10,919,423
413	Income From Utility Plant Leased to Others			
414	Gains (Losses) From Disposition of Utility Property		9,069	-
	Total Utility Operating Income		$ 8,288,564	$ 10,919,423
	Other Income and Deductions			
415	Revenues From Merchandising, Jobbing and Contract Deductions		$	$
416	Costs and Expenses of Merchandising, Jobbing and Contract Work			
419	Interest & Dividend Income		638,601	955,195
420	Allowance for Funds Used During Construciton			
421	Nonutility Income		(229,112)	(144,026)
426	Miscellaneous Nonutility Expense			
	Total Other Income & Deductions		$ 409,489	811,169
	TAXES APPLICABLE TO OTHER INCOME			
408.2	Taxes Other Than Income		$	$
	Total Taxes Applic. To Other Income		$	$

COMPARATIVE OPERATING STATEMENT - Continued

Account No. (a)	Account Name (b)	Ref. Page ©	Previous Year (d)	Current Year (e)
	INTEREST EXPENSE			
427	Interest Expense		$ 7,218,162	$ 7,514,523
428	Amortization of Debt Discount & Exp.		196,371	346,088
429	Amortization of Premiun on Debt		-	-
	Total Interest Expense		$ 7,414,533	$ 7,860,611
	EXTRAORDINARY ITEMS			
433	Extraordinary Income		$	$
434	Extraordinary Deductions			
	Total Extraordinarly Items		$ -	$ -
	NET INCOME		$ 1,283,520	$ 3,869,981

Statement of Retained Earnings

ST. (a)	2010 (b)	Amount (c)
214	Appropriated Retained Earnings (state balance and purpose of each appropriated amount at year end):	
	Bond Proceeds	$ 21,540,563
	Debt Service and Reserve	$ 15,577,413
	Improvement, Repair and Replacement	$ 6,874,835
	Total Appropriated Retained Earnings.....	$ 43,992,811

215.1	Retained Earnings From Income Before Contributions:	
	Balance Beginning of Year.....	$ 24,856,196
435	Balance Transferred from Net Income Before Contributions.....	$ 3,869,981
	Other Changes to Account:	
436	Appropriations of Retained Earnings.....	$ 9,573,670
439	Adjustments to Retained Earnings (requires Commission approval prior to use):	
	Credits (explain)	$
	Debits (explain)	$
	Balance End of Year.....	$ 38,299,847

215.2 Donated Capital:

	Tapping Fees	Grants	Other	Total
Balance Beginning of Year.....	8,100,610	21,781,761	31,239,364	61,121,735
Credits:				
432 Proceeds from capital contributions.....	340,794	728,010	-	1,068,804
Other Credits (explain)				
Debits: (explain - Requires Commission Approval)				
Balance End of Year.....	8,441,404	22,509,771	31,239,364	62,190,539

NET UTILITY PLANT (ACCTS. 101 - 106)

Account No.	Plant Accounts	Total
101	Utility Plant in Service	$ 331,504,524
102	Utility Plant Leased to Others	
103	Property Held for Future Use	
104	Utility Plant Purchased of Sold	
105	Construction Work in Progress	37,881,688
106	Completed Construction Not Classified	
	Total Utility Plant	$ 369,386,212

ACCUMULATED DEPRECIATION (ACCT. 108)

Description	Total
Balance first of year	$ 73,956,257
Credit during year:	
Accruals Charged to Account 108.1	8,487,677
Accruals Charged to Account 108.2	
Accruals Charged to Account 108.3	
Accruals Charged to Other Accounts (specify)	
Salvage	
Other Credits (specify)	
Total Credits	$ 8,487,677
Debits during year:	
Book Cost of Plant Retired	$ 330,475
Cost of Removal	
Other Debits (specify)	
Total Debits	$ 330,475
Balance end of year	$ 82,113,459

WATER UTILITY PLANT ACCOUNTS

Acct No. (a)	2010 Account Name (b)	End of Previous Year (c)	Additions (d)	Retirement (e)	End of Current Year (f)	.1 Intangible Plant Intan- (g)	.2 SOS & Pumping Plant (h)	.3 Water Treatment Plant (i)	.4 Trans & Distrib Plant (j)	.5 General Plant (k)
301	Organization						$XXXXXXX	$XXXXXXX	$XXXXXXX	$XXXXXXX
302	Franchises						$XXXXXXX	$XXXXXXX	$XXXXXXX	$XXXXXXX
303	Land & Land Rights	$3,187,998			$3,187,998	$XXXXXXX	$29,200	$368,719	$190,530	$2,599,548
304	Structures & Improvements	$82,179,522	$2,086,781		$84,266,303	$XXXXXXX	$16,826,206	$45,528,293	$9,505,387	$12,406,415
305	Collecting & Impounding Reserviors					$XXXXXXX				
306	Lake, River & Other Intakes	$1,463,171			$1,463,171	$XXXXXXX	$1,463,171			
307	Wells and Springs					$XXXXXXX				
308	Infiltration Galleries & Tunnels									
309	Supply Mains	$2,865,693			$2,865,693	$XXXXXXX	$2,865,693			
310	Power Generation Equipment	$1,406,079	$2,085,443		$3,491,522	$XXXXXXX		$3,491,522		
311	Pumping Equipment	$10,753,024	$423,431	$2,158	$11,174,297	$XXXXXXX	$4,077,127	$1,004,067	$6,093,104	
320	Water Treatment Equipment	$11,975,815	$393,937	$16,174	$12,353,578	$XXXXXXX		$12,353,578		
330	Distribution Reserviors & Standpipes	$9,643,680			$9,643,680	$XXXXXXX	$9,643,680			
331	Transmission & Distribution Mains	$135,140,109	$3,190,915	$688,616	$137,642,408	$XXXXXXX			$137,642,408	
333	Services	$23,529,305	$537,970	$159,375	$23,907,900	$XXXXXXX			$23,907,900	
334	Meters & Meter Installations	$8,562,362	$7,956,448	$201,489	$16,317,321	$XXXXXXX			$16,317,321	
335	Hydrants	$6,610,261	$248,884	$51,750	$6,807,395	$XXXXXXX			$6,807,396	
336	Backflow Prevention Devices					$XXXXXXX				
339	Other Plant & Misc. Equipment	$3,429,360		$71	$3,429,290				$3,429,289	
340	Office Furniture & Equipment	$3,164,607	$320,248	$42,221	$3,442,634	$XXXXXXX				$3,442,634
341	Transportation Equipment	$2,830,447	$267,648	$194,346	$2,903,749	$XXXXXXX				$2,903,749
342	Stores Equipment	$276,873			$276,873	$XXXXXXX				$276,873
343	Tools, Shop, & Garage Equipment	$203,571	$64,676		$268,247	$XXXXXXX				$268,247
344	Laboratory Equipment	$112,308	$31,424		$143,732	$XXXXXXX				$143,732
345	Power Operated Equipment	$864,721	$129,383	$69,664	$924,440	$XXXXXXX				$924,440
346	Communication Equipment	$330,360	$6,071,660	$5,427	$6,396,592	$XXXXXXX				$6,396,593
347	Miscellaneous Equipment	$597,702			$597,702	$XXXXXXX				$597,702
348	Other Tangible Plant					$XXXXXXX				
	Total Water Plant	$309,126,968	$23,808,847	$1,431,291	$331,504,524	0	$34,905,077	$62,746,179	$203,893,335	$29,959,933

Analysis of Accumulated Depreciation and Amortization by Primary Account

Acct. No. (a)	2010 Account (b)		Balance Beginning of Year c	Credits During the Year		Charges During The Year		Balance End of Year (h)
				Charges to Dep. Exp. (d)	Other Credits (e)	Plant Retirements (f)	Other Charges (g)	
301	Organization	$		$	$	$	$	$
302	Franchises							
303	Limited Term Interest in Land and Land Rights							
304	Structures & Improvements		20,756,008	2,583,553				23,339,561
305	Collecting & Impounding Reservoirs							
306	Lake River & Other Intakes		869,145	27,568				896,713
307	Wells & Srpings							
309	Supply Mains		530,077	58,466				588,543
310	Power Generating Equip.		18,748	57,071				75,819
311	Pumping Equipment		5,570,181	518,900		1,889		6,087,192
320	Water Treatment Equip.		4,575,822	426,262		16,046		4,986,039
330	Distribution Reservoirs & Standpipes		3,530,627	306,267				3,836,894
331	Transmissions & Distribution Mains		17,778,014	2,377,572				20,155,587
333	Services		7,857,888	591,050				8,448,938
334	Meters & Meter Installations		2,119,687	470,667		847		2,589,507
335	Hydrants		1,516,863	177,455				1,694,317
339	Other Plant & Misc. Equip.		2,667,216	271,022		72		2,938,166
340	Office Furniture & Equip.		1,915,655	267,632		42,186		2,141,101
341	Transportation Equipment		2,300,700	244,407		194,346		2,350,761
342	Service Equipment							
343	Tools, Shop & Garage Equip.		362,749	26,057				388,806
344	Shop Equipment		69,794	12,694				82,488
345	Power Operated Equip.		660,360	58,660		69,662		649,358
346	Telecommunications Equipment		262,867	11,837		5,427	(1)	269,277
347	SCADA							
348	Other Tangible Plant		593,856	534				594,391
	Totals	$	73,956,257	$ 8,487,676	$ -	$ 330,475	$ (1)	$ 82,113,459

ACCUMULATED AMORTIZATION (ACCT. 110)

Description	Total
Balance first of year	$ N/A
Credit during year:	
Accruals Charged to Account 110.1...	$
Accruals Charged to Account 110.2...	
Other Accruals (specify)	
Total Credits	$
Debits during year:	
Book Cost of Plant Retired	$
Other Debits (specify)	
Total Debits	$
Balance end of year	$

UTILITY PLANT ACQUISITION ADJUSTMENT (ACCTS. 114 - 115)

Report each acquisition adjustment and related accumulated amortization separately.
For any acquisition adjustment approved by the Commission, include the Order Number.

ACCOUNT NAME	TOTAL
Acquisition Adjustments (114)	
Original District 9-14-55	$ 263,366
District # 2 & 3 12-31-73	18,712
Mentor District 9-1-76	10,741
City of Cold Spring	228,253
City of Silver Grove	24,853
Newport Water Works	4,970,211
Total Plant Acquisition Adjustments	$ 5,516,136
Accumulated Amortization (115)	
Original District 9-14-55	$ 263,366
District # 2 & 3 12-31-73	18,712
Mentor District 9-1-76	10,741
City of Cold Spring	228,253
City of Silver Grove	24,853
Newport Water Works	1,707,220
Total Accumulated Amortization	$ 2,253,145
Net Acquisition Adjustments	$ 3,262,991

Investments and Special Funds (Acct. 123-127)

Report hereunder all investments and special funds carried in Account 123-127.

Description of Security or Special Fund (a)	Face or Par Value (b)	Year-End Book Cost c
Investment In Associated Companies (Acct. 123):		
	$	$
Total Investment in Asso. Companies		$
Utility Investments (Acct. 124):		
IRR Account	$	$ 6,874,835
Debt Service Account		10,871,257
Debt Service Reserve Account		15,577,413
Total Utility Investments		$ 33,323,505
Other Investments (Acct. 125):		
Boone County/Florence KY Settlement	$	$ 1,601,840
Total Other Investments:	$	$ 1,601,840
Special Funds (Acct. 126 & 127):		
Prepayment Reserve		
Total Special Funds		$ -

ACCOUNTS AND NOTES RECEIVABLE - NET (ACCOUNTS 141 - 144)

Report hereunder all accounts and notes receivable included in Accounts 141,142,and 144. Amounts included in Accounts 142 and 144 should be listed individually.

Description			Total
ACCOUNTS & NOTES RECEIVABLE:			
Customer Accounts Receivable (Acct. 141)			$ 5,097,814
Other Accounts Receivable (Acct. 142)			
Assessments	$	92,634	
Other		47,853	
			140,487
Notes Receivable (Acct. 144)			
	$		
Total Accounts and Notes Receivable			$ 5,238,301
Accumulated Provision for Uncollectable Accounts (Acct. 143)			
Balance first of year	$	-	
Add: Provision for uncollectables for current year	$		
Collections fo accounts previously written off			
Utility accounts			
Others			
Total Additions	$		
Deduct accounts written off during year:			
Utility Accounts	$		
Other			
Total accounts written off	$		
Balance end of year			$ -
Total Accounts and Notes Receivable			$ 5,238,301

Materials and Supplies (151 - 153)

Account Name	Total
Plant Materials and Supplies (Account 151)	$ 1,343,411
Merchandise (Account 152)	
Other Materials and Supplies (Account 153)	
Total Materials & Supplies	$ 1,343,411

Prepayments (Acct. 162)

Description	Total
Prepaid Insurance	$ 235,130
Prepaid Rents	
Prepaid Interest	
Prepaid Taxes	
Other Prepayments (Specify) Prepaid Antenna Rent Sprint	(9,000)
Expenses/Services	$ 216,318
	-
Total Prepayments	$ 442,448

Miscellaneous Deferred Debits (Acct. 186)

2010 Description	Total
Miscellaneous Deferred Debits (Acct. 186):	
Deferred PSC Assessment	32,489
Deferred Rate Case Expense 2010	108,169
Other Deferred Debits	4,405,462
Total Miscellaneous Deferred Debits	$ 4,546,120

Unamortized Debt Discount & Expense & Premium on Debt (Accts. 181 & 251)

Report the net discount & expense or premium separately for each security issue.

Description	Amount Written Off During Year	Year-End Balance
Unamortized Debt Discount & Expense (Acct. 181)		
Bond Issue Cost 1997	$ 4,915	$ 58,170
Bond Discount 1997	6,735	79,698
Bond Discount 1998	7,570	135,630
Bond Issue Costs 1998	3,148	56,398
Cost of Issue 2001 Bond	3,699	58,584
Discount 2001 Bond	13,038	206,443
Cost of Issue 2002 A	13,731	220,840
Bond Discount 2002 A	27,209	437,612
Cost of Issue 2002 B	9,300	64,714
Cost of Issue 2003 A	1,620	32,690
Bond Discount 2003 A	1,088	22,928
Cost of Issue 2003 B	11,722	203,940
Bond Discount 2003 B	8,520	147,775
Cost of Issue 2003 C	14,938	143,138
Discount 2003 C	7,404	67,894
Cost of issue 2004A Bonds	3,250	61,200
Discount 2004A Bond	7,920	149,062
Bond Discount 2006	6,994	145,130
Cost of Issue Bond 2006	8,640	179,280
Discount 2007 BAN		-
Cost of Issue BAN 2007	-	-
Cost of Issue 2009	5,173	119,847
Bond Discount 2009	12,800	296,535
BAN Issue Cost 2009	33,820	31,002
BAN Discount 2009	137,781	126,299
Total Unamortized Debt Discount & Expense	**$ 351,015**	**$ 3,044,809**
Unamortized Premium on Debt (Acct. 251):		$
Premium on 2002 B Bond	4,927	34,310
Total Unamortized Premium on Debt	$ 4,927	$ 34,310

EXTRAORDINARY PROPERTY LOSSES (ACCT. 182)

Report each item separately.

Description	Total
Extraordinary Property Losses (Acct. 182) :	
N/A	$
	$
	$
	$
Total Extraordinary Property Losses	$

ADVANCES FOR CONSTRUCTION (ACCT. 252)

DESCRIPTION N/A	TOTAL
Balance first of year.....	$
Add credits during year.....	$
Deduct charges during year.....	$
Balance end of year.....	$

Long Term Debt (Acct. 224)

Description of Obligation And Amount of Original Issue (a)	Date of Issue (b)	Date of Maturity (c)	Interest Expense For Year Rate (d)	Interest Expense For Year Amount (e)	Principal per balance Sheet Date (f)
				$	$
Notes Payable City of Taylor Mill	Mar-2004	7/1/2018	0	0	$ 1,275,000
Kentucky Infrastructure Authority Loans					
-KIA F06-03 MPTP Project	June 2008	2028	3.0%	121,788	$ 3,630,244
- KIA F08-01 Various Capital Projects	June 2009	2029	1.0%	154,469	$ 3,067,771
- KIA F08-07 AMR Project	June 2009	2019	3.0%	29,627	$ 6,000,000
- KIA F09-02 GAC MPTP	June 2010	2030	2.0%		3,478,784
Total				**$ 305,883**	**$ 17,451,799**

Account 221, BONDS

Line No.	Par Value of Actual Issue	Cash Realized on Actual Issue	Par Value of Amount Held by or for Respondent	Actually Outstanding at Close of year	Interest During Year	
					Accrued	Actually Paid
	1	2	3	4	5	6
1	11,225,000	11,131,694		1,855,000	91,972	111,269
2	11,355,000	11,141,619		8,430,000	410,992	416,830
3	2,287,000	2,287,000		2,054,000	103,217	103,475
4	16,325,000	15,835,250		14,520,000	697,535	698,878
5	45,485,000	44,121,624		42,440,000	2,077,634	2,086,353
6	10,575,000	10,525,204		5,840,000	238,566	250,675
7	1,615,000	1,583,553		1,360,000	60,136	60,686
8	30,270,000	30,068,115		24,110,000	933,716	944,487
9	23,790,000	23,532,357		14,995,000	583,719	600,031
10	10,455,000	10,195,116		8,735,000	368,057	371,869
11	29,000,000	28,736,444		26,455,000	1,100,671	1,113,588
12	29,290,000	27,430,236		27,645,000	1,521,866	1,531,944
Total	221,672,000	216,588,212	-	178,439,000	8,188,081	8,290,085

Schedule of Bond Maturities

Line No.	Bond Numbers	Maturity Date	Interest Rate	Principal Amount	Amount Paid	Remaining Bonds Outstanding
	7	8	9	10	11	12
1						
2		**See Attachments 23.1 Through 23.11**				
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Northern Kentucky Water Service District Bond Issue: 11,225,000 , Dated September 1, 1997					Attachment 23.1
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	1998	4.700%	210,000.00	210,000.00	
Registered	1999	4.700%	580,000.00	580,000.00	
Registered	2000	4.700%	610,000.00	610,000.00	
Registered	2001	4.700%	640,000.00	640,000.00	
Registered	2002	4.700%	670,000.00	670,000.00	
Registered	2003	4.700%	700,000.00	700,000.00	
Registered	2004	4.700%	735,000.00	735,000.00	
Registered	2005	4.700%	770,000.00	770,000.00	
Registered	2006	4.700%	810,000.00	810,000.00	
Registered	2007	4.700%	850,000.00	850,000.00	
Registered	2008	4.750%	890,000.00	890,000.00	
Registered	2009	4.750%	930,000.00	930,000.00	
Registered	2010	4.750%	975,000.00	975,000.00	
Registered	2011	4.750%	1,025,000.00		1,025,000.00
Registered	2012	4.750%	60,000.00		60,000.00
Registered	2013	4.750%	60,000.00		60,000.00
Registered	2014	4.750%	65,000.00		65,000.00
Registered	2015	4.750%	70,000.00		70,000.00
Registered	2016	4.750%	70,000.00		70,000.00
Registered	2017	4.750%	75,000.00		75,000.00
Registered	2018	4.750%	80,000.00		80,000.00
Registered	2019	4.750%	80,000.00		80,000.00
Registered	2020	4.750%	85,000.00		85,000.00
Registered	2021	4.750%	90,000.00		90,000.00
Registered	2022	4.750%	95,000.00		95,000.00
TOTALS			**11,225,000.00**	**9,370,000.00**	**1,855,000.00**

Northern Kentucky Water Service District Bond Issue: 11,355,000 , Dated December 1, 1998					Attachment 23.2
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	02/01/1999	4.700%	250,000.00	250,000.00	
Registered	02/01/2000	4.700%	200,000.00	200,000.00	
Registered	02/01/2001	4.700%	200,000.00	200,000.00	
Registered	02/01/2002	4.700%	210,000.00	210,000.00	
Registered	02/01/2003	4.700%	220,000.00	220,000.00	
Registered	02/01/2004	4.700%	230,000.00	230,000.00	
Registered	02/01/2005	4.700%	240,000.00	240,000.00	
Registered	02/01/2006	4.700%	255,000.00	255,000.00	
Registered	02/01/2007	4.700%	265,000.00	265,000.00	
Registered	02/01/2008	4.750%	280,000.00	280,000.00	
Registered	02/01/2009	4.750%	280,000.00	280,000.00	
Registered	02/01/2010	4.750%	295,000.00	295,000.00	
Registered	02/01/2011	4.750%	310,000.00		310,000.00
Registered	02/01/2012	4.750%	325,000.00		325,000.00
Registered	02/01/2013	4.800%	340,000.00		340,000.00
Registered	02/01/2014	4.850%	360,000.00		360,000.00
Registered	02/01/2015	4.875%	375,000.00		375,000.00
Registered	02/01/2016	4.875%	395,000.00		395,000.00
Registered	02/01/2017	4.875%	415,000.00		415,000.00
Registered	02/01/2018	4.875%	435,000.00		435,000.00
Registered	02/01/2019	4.875%	455,000.00		455,000.00
Registered	02/01/2020	4.875%	480,000.00		480,000.00
Registered	02/01/2021	4.875%	505,000.00		505,000.00
Registered	02/01/2022	4.875%	530,000.00		530,000.00
Registered	02/01/2023	4.875%	555,000.00		555,000.00
Registered	02/01/2024	4.875%	585,000.00		585,000.00
Registered	02/01/2025	4.875%	610,000.00		610,000.00
Registered	02/01/2026	4.875%	645,000.00		645,000.00
Registered	02/01/2027	4.875%	675,000.00		675,000.00
Registered	02/01/2028	4.875%	435,000.00		435,000.00
TOTALS			**11,355,000.00**	**2,925,000.00**	**8,430,000.00**

Northern Kentucky Water Service District FmHA Load $2,287,000 - 2000					Attachment 23.3
Year	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
2000			0.00	0.00	0.00
2001			0.00	0.00	0.00
2002			21,000.00	21,000.00	0.00
2003			22,000.00	22,000.00	0.00
2004			24,000.00	24,000.00	0.00
2005			24,000.00	24,000.00	0.00
2006			26,000.00	26,000.00	0.00
2007			27,000.00	27,000.00	0.00
2008			28,000.00	28,000.00	0.00
2009			30,000.00	30,000.00	0.00
2010			31,000.00	31,000.00	0.00
2011			33,000.00		33,000.00
2012			34,000.00		34,000.00
2013			36,000.00		36,000.00
2014			38,000.00		38,000.00
2015			40,000.00		40,000.00
2016			42,000.00		42,000.00
2017			44,000.00		44,000.00
2018			46,000.00		46,000.00
2019			49,000.00		49,000.00
2020			51,000.00		51,000.00
2021			54,000.00		54,000.00
2022			56,000.00		56,000.00
2023			59,000.00		59,000.00
2024			62,000.00		62,000.00
2025			65,000.00		65,000.00
2026			68,000.00		68,000.00
2027			72,000.00		72,000.00
2028			75,000.00		75,000.00
2029			79,000.00		79,000.00
2030			83,000.00		83,000.00
2031			87,000.00		87,000.00
2032			92,000.00		92,000.00
2033			96,000.00		96,000.00
2034			102,000.00		102,000.00
2035			107,000.00		107,000.00
2036			112,000.00		112,000.00
2037			118,000.00		118,000.00
2038			124,000.00		124,000.00
2039			130,000.00		130,000.00
Totals			**2,287,000.00**	**233,000.00**	**2,054,000.00**

Northern Kentucky Water Service District					Attachment 23.4
Bond Iusse $16,325,000.00 Dated 10-23-2001					
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	2/1/2002	2.700%	285,000.00	285,000.00	
Registered	2/1/2003	3.000%	235,000.00	235,000.00	
Registered	2/1/2004	3.250%	240,000.00	240,000.00	
Registered	2/1/2005	3.450%	230,000.00	230,000.00	
Registered	2/1/2006	3.600%	215,000.00	215,000.00	
Registered	2/1/2007	3.750%	200,000.00	200,000.00	
Registered	2/1/2008	3.900%	170,000.00	170,000.00	
Registered	2/1/2009	4.000%	155,000.00	155,000.00	
Registered	2/1/2010	4.100%	75,000.00	75,000.00	
Registered	2/1/2011	4.200%	80,000.00		80,000.00
Registered	2/1/2012	4.350%	80,000.00		80,000.00
Registered	2/1/2013	4.450%	735,000.00		735,000.00
Registered	2/1/2014	4.550%	770,000.00		770,000.00
Registered	2/1/2015	4.670%	810,000.00		810,000.00
Registered	2/1/2016	4.750%	845,000.00		845,000.00
Registered	2/1/2017	4.820%	890,000.00		890,000.00
Registered	2/1/2018	4.850%	930,000.00		930,000.00
Registered	2/1/2019	4.900%	980,000.00		980,000.00
Registered	2/1/2020	4.950%	1,030,000.00		1,030,000.00
Registered	2/1/2021	5.000%	1,080,000.00		1,080,000.00
Registered	2/1/2022	5.000%	1,135,000.00		1,135,000.00
Registered	2/1/2023	5.000%	1,190,000.00		1,190,000.00
Registered	2/1/2024	5.100%	1,255,000.00		1,255,000.00
Registered	2/1/2025	5.100%	1,320,000.00		1,320,000.00
Registered	2/1/2026	5.100%	1,390,000.00		1,390,000.00
TOTALS			**16,325,000.00**	**1,805,000.00**	**14,520,000.00**

Northern Kentucky Water Service District					Attachment 23.5
Bond Iusse $45,485,000.00 Dated 2/1/2002					
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	2/1/2003				
Registered	2/1/2003	4.50%	350,000.00	350,000.00	0.00
Registered	2/1/2004	4.50%	345,000.00	345,000.00	0.00
Registered	2/1/2005	4.50%	360,000.00	360,000.00	0.00
Registered	2/1/2006	4.50%	370,000.00	370,000.00	0.00
Registered	2/1/2007	4.50%	380,000.00	380,000.00	0.00
Registered	2/1/2008	4.50%	410,000.00	410,000.00	0.00
Registered	2/1/2009	4.50%	365,000.00	365,000.00	0.00
Registered	2/1/2010	4.50%	465,000.00	465,000.00	0.00
Registered	2/1/2111	4.50%	485,000.00		485,000.00
Registered	2/1/2012	4.50%	1,530,000.00		1,530,000.00
Registered	2/1/2013	4.50%	950,000.00		950,000.00
Registered	2/1/2114	4.50%	990,000.00		990,000.00
Registered	2/1/2115	4.65%	1,035,000.00		1,035,000.00
Registered	2/1/2116	4.75%	1,100,000.00		1,100,000.00
Registered	2/1/2117	4.75%	1,625,000.00		1,625,000.00
Registered	2/1/2118	4.75%	2,520,000.00		2,520,000.00
Registered	2/1/2119	4.75%	2,640,000.00		2,640,000.00
Registered	2/1/2020	5.00%	3,080,000.00		3,080,000.00
Registered	2/1/2021	5.00%	3,240,000.00		3,240,000.00
Registered	2/1/2022	5.00%	3,405,000.00		3,405,000.00
Registered	2/1/2023	5.00%	3,580,000.00		3,580,000.00
Registered	2/1/2024	5.00%	3,765,000.00		3,765,000.00
Registered	2/1/2025	5.00%	3,960,000.00		3,960,000.00
Registered	2/1/2026	5.00%	4,160,000.00		4,160,000.00
Registered	2/1/2027	5.00%	4,375,000.00		4,375,000.00
TOTALS			**45,485,000.00**	**3,045,000.00**	**42,440,000.00**

Northern Kentucky Water Service District					Attachment 23.6
Bond Iusse $10,575,000.00 Dated 12/5/2002					
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	12/5/2002				
Registered	2/1/2003	3.00%	535,000.00	535,000.00	0.00
Registered	2/1/2004	3.00%	455,000.00	455,000.00	0.00
Registered	2/1/2005	3.00%	490,000.00	490,000.00	0.00
Registered	2/1/2006	3.00%	530,000.00	530,000.00	0.00
Registered	2/1/2007	3.50%	580,000.00	580,000.00	0.00
Registered	2/1/2008	3.50%	625,000.00	625,000.00	0.00
Registered	2/1/2009	3.50%	745,000.00	745,000.00	0.00
Registered	2/1/2010	3.75%	775,000.00	775,000.00	0.00
Registered	2/1/2111	4.00%	805,000.00		805,000.00
Registered	2/1/2012	4.00%	835,000.00		835,000.00
Registered	2/1/2013	4.00%	870,000.00		870,000.00
Registered	2/1/2114	4.00%	900,000.00		900,000.00
Registered	2/1/2115	4.00%	930,000.00		930,000.00
Registered	2/1/2116	4.00%	965,000.00		965,000.00
Registered	2/1/2117	4.00%	535,000.00		535,000.00
TOTALS			**10,575,000.00**	**4,735,000.00**	**5,840,000.00**

Northern Kentucky Water Service District					Attachment 23.7
Bond Issue : $1,615,000.00 Dated 3/13/2003					
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	2/1/2004	1.20%	35,000.00	35,000.00	0.00
Registered	2/1/2005	1.38%	35,000.00	35,000.00	0.00
Registered	2/1/2006	1.75%	35,000.00	35,000.00	0.00
Registered	2/1/2007	2.20%	35,000.00	35,000.00	0.00
Registered	2/1/2008	2.60%	35,000.00	35,000.00	0.00
Registered	2/1/2009	3.00%	40,000.00	40,000.00	0.00
Registered	2/1/2010	3.30%	40,000.00	40,000.00	0.00
Registered	2/1/2111	3.55%	40,000.00		40,000.00
Registered	2/1/2012	3.37%	40,000.00		40,000.00
Registered	2/1/2013	3.85%	45,000.00		45,000.00
Registered	2/1/2114	3.95%	45,000.00		45,000.00
Registered	2/1/2115	4.05%	45,000.00		45,000.00
Registered	2/1/2116	4.15%	50,000.00		50,000.00
Registered	2/1/2117	4.25%	50,000.00		50,000.00
Registered	2/1/2118	4.50%	55,000.00		55,000.00
Registered	2/1/2119	4.50%	55,000.00		55,000.00
Registered	2/1/2020	4.50%	60,000.00		60,000.00
Registered	2/1/2121	4.50%	60,000.00		60,000.00
Registered	2/1/2022	4.50%	65,000.00		65,000.00
Registered	2/1/2023	4.55%	65,000.00		65,000.00
Registered	2/1/2024	4.55%	70,000.00		70,000.00
Registered	2/1/2025	4.55%	75,000.00		75,000.00
Registered	2/1/2026	4.55%	75,000.00		75,000.00
Registered	2/1/2027	4.55%	80,000.00		80,000.00
Registered	2/1/2028	4.60%	85,000.00		85,000.00
Registered	2/1/2029	4.60%	85,000.00		85,000.00
Registered	2/1/2030	4.60%	90,000.00		90,000.00
Registered	2/1/2031	4.60%	95,000.00		95,000.00
Registered	2/1/2032	4.60%	30,000.00		30,000.00
TOTALS			**1,615,000.00**	**255,000.00**	**1,360,000.00**

Northern Kentucky Water Service District					Attachment 23.8
Bond Issue : $30,270,000.00 Dated 8/1/2003					
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	2/1/2004	2.00%	825,000.00	825,000.00	0.00
Registered	2/1/2005	2.00%	845,000.00	845,000.00	0.00
Registered	2/1/2006	2.00%	860,000.00	860,000.00	0.00
Registered	2/1/2007	2.00%	880,000.00	880,000.00	0.00
Registered	2/1/2008	2.25%	895,000.00	895,000.00	0.00
Registered	2/1/2009	2.75%	915,000.00	915,000.00	0.00
Registered	2/1/2010	3.00%	940,000.00	940,000.00	0.00
Registered	2/1/2111	3.13%	965,000.00		965,000.00
Registered	2/1/2012	3.13%	995,000.00		995,000.00
Registered	2/1/2013	3.13%	1,030,000.00		1,030,000.00
Registered	2/1/2114	3.25%	1,060,000.00		1,060,000.00
Registered	2/1/2115	3.50%	1,095,000.00		1,095,000.00
Registered	2/1/2116	4.00%	1,135,000.00		1,135,000.00
Registered	2/1/2117	4.00%	1,175,000.00		1,175,000.00
Registered	2/1/2118	4.00%	1,225,000.00		1,225,000.00
Registered	2/1/2119	4.13%	1,275,000.00		1,275,000.00
Registered	2/1/2020	4.13%	1,325,000.00		1,325,000.00
Registered	2/1/2121	4.13%	1,380,000.00		1,380,000.00
Registered	2/1/2022	4.13%	1,440,000.00		1,440,000.00
Registered	2/1/2023	4.13%	1,500,000.00		1,500,000.00
Registered	2/1/2024	4.13%	1,565,000.00		1,565,000.00
Registered	2/1/2025	4.13%	1,630,000.00		1,630,000.00
Registered	2/1/2026	4.13%	1,700,000.00		1,700,000.00
Registered	2/1/2027	4.13%	1,770,000.00		1,770,000.00
Registered	2/1/2028	4.13%	1,845,000.00		1,845,000.00
TOTALS			**30,270,000.00**	**6,160,000.00**	**24,110,000.00**

Northern Kentucky Water Service District					Attachment 23.9
Bond Issue : $23,790,000.00 Dated 12/18/2003					
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	2/1/2004	2.00%	1,430,000.00	1,430,000.00	0.00
Registered	2/1/2005	2.00%	1,160,000.00	1,160,000.00	0.00
Registered	2/1/2006	2.00%	1,180,000.00	1,180,000.00	0.00
Registered	2/1/2007	2.25%	1,215,000.00	1,215,000.00	0.00
Registered	2/1/2008	2.50%	1,235,000.00	1,235,000.00	0.00
Registered	2/1/2009	2.75%	1,270,000.00	1,270,000.00	0.00
Registered	2/1/2010	3.00%	1,305,000.00	1,305,000.00	0.00
Registered	2/1/2111	3.25%	1,350,000.00		1,350,000.00
Registered	2/1/2012	3.50%	1,395,000.00		1,395,000.00
Registered	2/1/2013	3.50%	1,445,000.00		1,445,000.00
Registered	2/1/2114	4.00%	1,505,000.00		1,505,000.00
Registered	2/1/2115	4.00%	1,565,000.00		1,565,000.00
Registered	2/1/2116	4.00%	1,625,000.00		1,625,000.00
Registered	2/1/2117	4.00%	1,690,000.00		1,690,000.00
Registered	2/1/2118	4.00%	1,595,000.00		1,595,000.00
Registered	2/1/2119	4.13%	1,665,000.00		1,665,000.00
Registered	2/1/2020	4.25%	1,160,000.00		1,160,000.00
TOTALS			**23,790,000.00**	**8,795,000.00**	**14,995,000.00**

Northern Kentucky Water Service District					Attachment 23.10
Bond Issue	$10,455,000.00	11/18/2024			
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	2/1/2005	2.000%	270,000.00	270,000.00	0.00
Registered	2/1/2006	2.000%	275,000.00	275,000.00	0.00
Registered	2/1/2007	2.125%	285,000.00	285,000.00	0.00
Registered	2/1/2008	2.375%	290,000.00	290,000.00	0.00
Registered	2/1/2009	2.625%	295,000.00	295,000.00	0.00
Registered	2/1/2010	3.000%	305,000.00	305,000.00	0.00
Registered	2/1/2111	3.000%	315,000.00		315,000.00
Registered	2/1/2012	3.250%	325,000.00		325,000.00
Registered	2/1/2013	3.375%	335,000.00		335,000.00
Registered	2/1/2014	3.500%	345,000.00		345,000.00
Registered	2/1/2015	4.000%	360,000.00		360,000.00
Registered	2/1/2016	4.000%	375,000.00		375,000.00
Registered	2/1/2017	4.000%	390,000.00		390,000.00
Registered	2/1/2018	4.000%	405,000.00		405,000.00
Registered	2/1/2019	4.000%	425,000.00		425,000.00
Registered	2/1/2022	4.500%	1,385,000.00		1,385,000.00
Registered	2/1/2024	4.500%	1,035,000.00		1,035,000.00
Registered	2/1/2026	4.000%	1,135,000.00		1,135,000.00
Registered	2/1/2029	4.500%	1,905,000.00		1,905,000.00
TOTALS			**10,455,000.00**	**1,720,000.00**	**8,735,000.00**

Northern Kentucky Water Service District					Attachment 23.11
Bond Issue	9/1/2006	$29,000,000.00			
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	2/1/2007	4.000%	300,000.00	300,000.00	0.00
Registered	2/1/2008	4.000%	720,000.00	720,000.00	0.00
Registered	2/1/2009	4.000%	750,000.00	750,000.00	0.00
Registered	2/1/2010	4.000%	775,000.00	775,000.00	0.00
Registered	2/1/2111	4.000%	805,000.00		805,000.00
Registered	2/1/2012	4.000%	835,000.00		835,000.00
Registered	2/1/2013	4.000%	870,000.00		870,000.00
Registered	2/1/2114	4.000%	900,000.00		900,000.00
Registered	2/1/2115	4.000%	940,000.00		940,000.00
Registered	2/1/2116	4.000%	980,000.00		980,000.00
Registered	2/1/2117	4.000%	1,020,000.00		1,020,000.00
Registered	2/1/2118	4.000%	970,000.00		970,000.00
Registered	2/1/2119	4.000%	1,010,000.00		1,010,000.00
Registered	2/1/2020	4.125%	1,320,000.00		1,320,000.00
Registered	2/1/2021	4.125%	1,205,000.00		1,205,000.00
Registered	2/1/2022	4.125%	1,255,000.00		1,255,000.00
Registered	2/1/2023	4.125%	1,420,000.00		1,420,000.00
Registered	2/1/2024	4.125%	1,375,000.00		1,375,000.00
Registered	2/1/2025	4.125%	1,440,000.00		1,440,000.00
Registered	2/1/2027	4.250%	3,075,000.00		3,075,000.00
Registered	2/1/2029	4.250%	3,360,000.00		3,360,000.00
Registered	2/1/2031	4.273%	3,675,000.00		3,675,000.00
TOTALS			**29,000,000.00**	**2,545,000.00**	**26,455,000.00**

Northern Kentucky Water Service District					Attachment 23.12
Bond Issue	01/06/09	$29,200,000.00			
Bond Number	Maturity Date	Interest Rate	Principle Amount	Amounts Paid	Outstanding
Registered	2/1/2009	3.750%	1,000,000.00	1,000,000.00	0.00
Registered	2/1/2010	3.750%	645,000.00	645,000.00	0.00
Registered	2/1/2111	3.750%	670,000.00		670,000.00
Registered	2/1/2012	3.750%	695,000.00		695,000.00
Registered	2/1/2013	3.750%	720,000.00		720,000.00
Registered	2/1/2114	4.000%	750,000.00		750,000.00
Registered	2/1/2115	4.125%	780,000.00		780,000.00
Registered	2/1/2116	4.250%	815,000.00		815,000.00
Registered	2/1/2117	4.750%	850,000.00		850,000.00
Registered	2/1/2118	5.000%	895,000.00		895,000.00
Registered	2/1/2119	5.000%	940,000.00		940,000.00
Registered	2/1/2020	5.125%	990,000.00		990,000.00
Registered	2/1/2021	5.250%	1,040,000.00		1,040,000.00
Registered	2/1/2022	5.375%	1,100,000.00		1,100,000.00
Registered	2/1/2023	5.500%	1,160,000.00		1,160,000.00
Registered	2/1/2024	5.700%	1,225,000.00		1,225,000.00
Registered	2/1/2025	5.775%	1,300,000.00		1,300,000.00
Registered	2/1/2027	5.750%	1,375,000.00		1,375,000.00
Registered	2/1/2029	6.000%	1,460,000.00		1,460,000.00
Registered	2/1/2031	6.000%	1,550,000.00		1,550,000.00
Registered	2/1/2029	6.000%	1,645,000.00		1,645,000.00
Registered	2/1/2030	6.000%	1,745,000.00		1,745,000.00
Registered	2/1/2031	6.000%	1,855,000.00		1,855,000.00
Registered	2/1/2032	6.500%	1,975,000.00		1,975,000.00
Registered	2/1/2033	6.500%	2,110,000.00		2,110,000.00
TOTALS			**29,290,000.00**	**1,645,000.00**	**27,645,000.00**

Notes Payable (Acct. 232 & 234)

2010 a	Nominal Date of Issue b	Date of Maturity c	INTEREST Rate d	INTEREST Amount of payment e	Principal Amount per Balance Sheet f
Account 232 - Note Payable					
Campbell Co. Fiscal Court			0.00%	$	$ 100,000
BAN 2009			2.50%		29,160,000
Total Account 232				$	$ 29,260,000
Account 234 - Notes Payable To Associated Companies		N/A		$	$
T l Account 234				$	$

Accounts Payable to Associated Companies (Acct. 233)

Show Payable to Each Associated Company Separately	Amount
	$
N/A	
Total	$

TAXES ACCRUED (ACCOUNT 236)

ACCT. NO. (a)	2010 DESCRIPTION (b)	TOTAL ©
	Balance first of year	$ -
	Accruals Charged:	
408.1	Utility regulatory assessment fees	
408.11	Property taxes	
408.12	Payroll taxes	597,489
408.13	Other taxes and licenses	
408.2	Taxes other than income, other income and deductions	
	Total taxes accrued	$ 597,489
	Taxes paid during year:	
408.1	Utility regulatory assessment fees	
408.11	Property taxes	
408.12	Payroll taxes	597,489
408.13	Other taxes and licenses	
408.2	Taxes other than income, other income and deductions	
	Total taxes paid	$ 597,489
	Balance end of year	$ -

ACCRUED INTEREST (ACCOUNT 237)

DESC. DEBT (a)	BALANCE BEGINNING OF YEAR (b)	INTEREST ACCRUED DURING YEAR (c)	INTEREST PAID DURING YEAR (d)	BALANCE END OF YEAR (e)
Acct. No. 237.1 - Accured Interest on Long-term Debt				
Series 1997	56,011	91,972	111,269	36,714
Series 1998	176,598	410,992	416,830	170,760
2000 RUS Loan	17,372	103,217	103,475	17,114
Series 2001	291,873	697,535	698,878	290,530
Series 2002 A	874,923	2,077,634	2,086,353	866,204
Series 2002 B	110,503	238,566	250,675	98,394
Series 2003 A	25,561	60,136	60,686	25,011
Series 2003 B	398,922	933,716	944,487	388,151
Series 2003 C	258,169	583,719	600,031	241,857
Series 2004 A	156,852	368,057	371,869	153,040
Series 2006	470,453	1,100,671	1,113,588	457,536
Series 2009	643,349	1,521,866	1,531,944	633,271
Total Acct No. 237.1	$ 3,480,586	$ 8,188,081	$ 8,290,085	$ 3,378,582
Acct. No. 237.2 - Accured Interest on Other Liabilities:				
2009 BAN # 1-4 KIA	$ 99,066	780,510	765,255	$ 114,321
		-		-
Total Acct No. 237.2	$ 99,066	$ 780,510	$ 765,255	$ 114,321
Total Acct No 237	$ 3,579,652	$ 8,968,591	$ 9,055,341	$ 3,492,903

Gross interest expense	9,091,367
Less Surcharges	(596,144)
Less Capitalized Interest	(980,700)
Interest Expense	7,514,523

Miscellaneous Current & Accrued Liabilities (Account 242)

2010 Description (a)	Balance End of Year (b)
Accrued Payroll Taxes & Misc	$ 98,272
Accrued Payroll	146,422
Accrued Sales Taxes	95,036
Accrued Pension	174,138
Accrued Vacation/Sick	806,391
Subdistrict Surcharges Payable	656,119
Total Miscellaneous Current & Accrued Liabilities.....	$ 1,976,378

Regulatory Commission Expense (Accounts 666 and 667)

2010 DESCRIPTION OF CASE (DOCKET #) (a)	TOTAL INCURRED DURING YEAR (b)	AMOUNT TRANSFERRED TO ACCOUNT # 186.1 (c)	EXPENSED DURING YEAR	
			ACCT. (d)	AMOUNT (e)
Rate Case 2005-0148	$ -	$ -	667	$ 181
Rate Case 2007			667	$ 36,914
Rate Case 2010	$ 99,085	$ 108,169	667	-

WATER OPERATING REVENUE

Acct No. (a)	2010 Description (b)	Beginning Year No. Customer (c)	Year End Number Customers (d)	Amounts (e)
	Operating Revenues:			
460	Unmeter Water Revenue			$
461	Meter Water Revenue:			$
461.1	Sales to Residential Customers	73,819	73,877	$ 25,358,536
461.2	Sales to Commercial Customers	4,326	4,269	$ 6,333,852
461.3	Sales to Industrial Customers	112	109	$ 3,387,672
461.4	Sales to Public Authorities	492	481	$ 2,169,474
461.5	Sales to Multiple Family Dwellings	1,634	1,633	$ 3,365,435
461.6	Sales through Bulk Loading Stations			$ 85,092
	Total Metered Sales	80,383	80,369	$ 40,700,061
462	Fire Protection Revenue:			$
462.1	Public Fire Protection			$
462.2	Private Fire Protection	0	0	$ 67,256
	Total Fire Protection Revenue	0	0	$ 67,256
464	Other Sales to Public Authorities			$
465	Sales to			$
466	Sales for Resale	3	3	$ 1,351,489
467	Interdepartmental Sale			$
	Total Sales of Water	80,386	80,372	$ 42,118,805
	Other Water Revenues:			
469	Guaranteed Revenues			$
470	Forfeited Discounts			$ 765,655
471	Miscellaneous Service Revenues			$
472	Rents from Water Property			$ 525,784
473	Interdepartmental Rents			$
474	Other Water Revenues			$ 328,517
	Total Other Water Revenues			$ 1,619,955
	Total Water Operating Revenues			$ 43,738,760

WATER UTILITY ENSE ACCOUNTS

Acct No (a)	2010 Account Name (b)	Current Year (c)	WATER EXPENSE ACCOUNT MATRIX .1 Source of Supply & Pumping Expense-Operation (d)	.2 Source of Supply & Pumping Expense-Maintenance. (e)	.3 Water Treatment Expense-Operation (f)	.4 Water Treatment Expense-Maintenance. (g)	.5 Trans & Distribution. Expense-Operation (h)	.6 Trans & Distribution. Expense-Maintenance. (i)	.7 Customer Accounts Expense (j)	.8 Adminis-Trative & General Expenses (k)
601	Salaries & Wage - Employees	$8,200,584			$1,447,205	$831,251	$904,427	$2,432,151	$1,556,587	$1,028,963
603	Salaries & Wage - Officers	$36,000								$36,000
604	Employee Pensions & Benefits	$3,740,846			$672,925	$130,942	$861,109	$922,508	$666,771	$486,591
610	Purchased Water									
615	Purchased Power	$2,434,987	$697,838		$312,863		$1,277,079			$147,207
616	Fuel for Power Production	$0								
618	Chemicals	$1,796,456			$1,796,456					
620	Materials & Supplies	$1,969,745			$215,340	$215,440	$151,090	$1,015,914	$233,356	$138,605
631	Contractual Services - Accounting	$26,635					$2,600			$24,035
633	Contractual Services - Engineering	$138,093			$6,052		$35,799		$4,952	$91,290
634	Contractual Services - Mgt. Fees	$77,059								$77,059
635	Contractual Services - Water Testing	$2,962,520	$2,681	$9,200	$383,075	$229,526	$96,396	$1,071,289	$305,312	$865,041
636	Contractual Services - Other	$0								
641	Rental of Bldg./Real Property	$0								
642	Rental of Equipment	$4,364						$4,364		
650	Transportation Expenses	$544,361			$52,659		$41,690	$359,108	$83,841	$7,063
656	Insurance - Vehicles	$33,631			$5,509		$18,724		$7,778	$1,620
657	Insurance - General Liability	$273,275			$87,778		$144,351		$27,431	$13,715
658	Insurance - Workers Compensation	$57,531			$15,342		$22,541		$13,845	$5,803
659	Insurance - Other	$104,808			$53,605					$51,203
660	Advertising Expenses	$13,316								$13,316
666	Regulatory Commission Expense -	$0								
	Amortization of Rate Case Expenses	$0								
667	Regulatory Commission Expense - Other	$102,027								$102,027
668	Water Resource Conservation	$0								
670	Bad Debt Expense	$575,520							$575,520	
675	Miscellaneous Expenses	$62,331			$6,839		$7,332	$10,503	$4,983	$32,674
699	Taxes	$0								
	Total Water Utility Expenses	$23,154,089	$700,519	$9,200	$5,055,648	$1,407,159	$3,563,138	$5,815,837	$3,480,376	$3,122,212

Pumping and Purchased Water Statistics

2010 a	Water Purchased for Resale (Omit 000's) b	Water Pumped From Plants (Omit 000's) c	Total Water Pumped and Purchased (Omit 000's) d	Water Sold to Customers (Omit 000's) e
			-	
January		798,696.0	798,696.0	557,676.6
February		724,465.0	724,465.0	516,549.4
March		796,545.0	796,545.0	819,495.5
April		777,812.0	777,812.0	592,423.0
May		846,785.0	846,785.0	607,069.3
June		878,758.7	878,758.7	869,593.2
July		997,531.2	997,531.2	639,975.9
August		1,112,246.7	1,112,246.7	598,645.2
September		1,046,954.0	1,046,954.0	1,155,084.1
October		947,934.3	947,934.3	787,291.2
November		766,911.3	766,911.3	712,312.2
December		768,925.5	768,925.5	1,079,597.3
Total for year		10,463,564.7	10,463,564.7	8,935,712.9

Maximum gallons pumped by all methods in any one day: (Omit 000's) 8/30/2010	42,238.0
Minimum gallons pumped by all methods in any one day (Omit 000's): 11/26/2010	21,802.0

If water is purchased for resale, indicate the folloinwg:

Vendor: _____

Point of delivery: _____

If water is sold to other water utilities for redistribution, list names of such utilities below:

		Maximum Daily	Maximum Monthly
Pendleton County Water District @ KY17	000's	207	10,621
City of Walton	000's	542	18,708
Bullock Pen Water District	000's	481	43,757

Sales for Resale (466)

2010

Line	Company	Gallons(000's)	Avg. Rate (Cents)	Amount
1	Pendleton County Water Dist.	104,902.5	2.97/1,000gals	$313,846.38
2	City of Walton	180,083.2	2.97/1,000gals	$535,202.34
3	Bullock Pen Water District	168,711.4	2.97/1,000gals	$502,440.05
4				
5				
6				
7				
8				
Total		**453,697.1**		**$1,351,488.77**

WATER STATISTICS

Line	Item	Gallons (000's)
1	**WATER PRODUCED, PURCHASED, & DISTRIBUTED**	
2	Water Produced	10,463,564.7
3	Water Purchased	
4	**TOTAL PRODUCED AND PURCHASED**	**10,463,564.7**
5		
6	**WATER SALES:**	
7	Residential	5,669,549.1
8	Commercial	1,515,372.5
9	Industrial	928,878.4
10	Irrigation	
11	Resale	453,697.1
12	Other Sales	368,216
13	**TOTAL WATER SALES**	**8,935,712.9**
14		
15	**OTHER WATER USED (estimate portions not metered)**	
16	Utility/water treatment plant	199,654.0
17	Wastewater plant	
18	System flushing	246,783.2
19	Fire Department	4,541.7
20	Other (construction, flushing, disinfection, ect.)	42,625.3
21	**TOTAL OTHER WATER USED**	**493,604.2**
22		
23	**Water Loss:**	
24	Tank Overflows	
25	Line Breaks	109,449
26	Line Leaks	
27	Other	924,799
28	**Total Line Loss**	**1,034,248**
29		
30	Note: Line 13 + Line 21 + Line 28 Must Equal Line 4	**9,538,765.7**
31		
32	**UNACCOUNTED-FOR WATER LOSS PERCENTAGE**	
33	Line 26 divided by Line 4	9.88%

PLANT STATISTICS

Give the following information:

1 Number of fire hydrants, by size.
2 Number of private fire hydrants, by size.
3 Wheter water supply is river, impounded streams, well, springs, artificial lake or collector type well.
4 Wether supply is by gravity, pumping, or a combination .
5 Type, capacity, and elevation of resrviors at overflow and ground level.
6 Miles of main by size and kind.
7 Types of filters: gravity or pressure, number of units, and total rated capacity in gallons per minute.
8 Type of chlornators, number of units and capacity in pounds per 24 hours.
9 Station equipment. List each pump separately, giving type and capacity and H.P. of driving unit and character of driving unit (steam, electric, or internal combustion). State whether pump is high or low duty.
10 Quantity of fuel used: coal in pounds, gas in cu. ft., oil in gallons, and electric in KWH .
11 Give a description and total cost of any sizable additions or retirements to plant in service outside the normal system growth for the period covered by this report.
12 Capacity of clear well.
13 Peak month, in gallons of water sold.
14 Peak day, in gallons of water sold.

1) Kenton County **6,864;** Campbell County **2,874.**

2) 70.

3) Rivers: Ohio River and the Liking River.

4) Plants are pumped; Distribution is combination of pumped and gravity.

5) See attached **31A.**

6) See attached **31B.**

7) Fort Thomas Treatment Plant
12 - Gravity, each 560 sq. ft. - Rated at 5 gpm/ft2

Taylor Mill Treatment Plant
8 - Gravity, each 270 sq. ft. - Rated at 5 gpm/ft2

Memmorial Parkway Treatment Plant
8 - Gravity, each 612 sq. ft.
Actiflo 24gpm/ft2

8) See attached **31C**

9) See attached **31D**

10) **N/A**

11) None

PLANT STATISTICS Cont.

12) Fort Thomas Treatment Plant
1 - 3 million gallons
1 - 3 1/2 million gallons

Taylor Mill Treatment Plant
1 - 3 million gallons

Memorial Parkway Treatment Plant
1 - 1 million gallons

13) September 2, 2009 - 36,188,000gals

14) **N/A**

OATH

Common wealth of Kentucky):
County of Kenton): SS:

Jack Bragg, CPA makes oath and says

that he is Vice President of Finance of

Northern Kentucky Water District;

that it is his duty to have supervision over the books of account of the respondent and to control the manner in which such books are kept; that he knows that such books have, during the period covered by the foregoing report, been kept in good faith in accordance with the accounting and other orders of the Public Service Commission of Kentucky, effective during the said period; that he has carefully examined the said report and to the best of his knowledge and belief the entries contained in the said report have, so far as they relate to matters of account, been accurately taken from the said books of account and are in exact accordance therewith; that he believes that all other statements of fact contained in the said report are true; and that the said report is a correct and complete statement of the business and affairs of the above-named respondent during the period of time from and including

January 1, 2010 to and including December 31, 2010

Signature of official

Subscribed and sworn to before me, a NOTARY PUBLIC in and for the

State and County above named, this 28 day of March, 2011.

(Apply Seal Here)

My commission expires: 5-9-2011

(Signature of officer authorized to administer oath)

Water Storage Facilities
Northern Kentucky Water District

Attachment 31A

Storage Location	Address	City Location	Type Of Storage	Year In Service	Structure Height (Feet)	Base Elevation (Feet)	Top Elevation (Feet)	Overflow Elevation (Feet)	Normal Elevation (Feet)	Normal Elevation (Feet)	Diameter (Feet)	Capacity (Gallons)
Aqua Drive	100 Aqua Drive	Cold Spring	Hydropillar	1990	184	847		1017				2,000,000
Barrington Road	2 Barrington Road	Ft. Wright	Hydropillar	1969	141	916.5	1057.5	1046.7	1045.0	1040.0	74	1,000,000
Bromley	1674 Highwater Road	Bromley	Ground Storage	1966	103	670.0	773.0	764.0	763.0	750.0	75	3,000,000
Dayton Avenue	2816 Dayton St.	Dayton	Ground Storage	1930	50			829.0				500,000
Devon	US 25	Florence	Hydropillar	1991	156	939.5		1082.0		1042.0	100	2,000,000
Dudley Pike	796 Dudley Pike	Edgewood	Ground Storage	1964	59	831.0	889.5	876.0	874.0	866.0	140	5,000,000
Dudley Pike	796 Dudley Pike	Edgewood	Ground Storage	1990	59	831.0	889.5	876.0	874.0	866.0	140	5,000,000
Ft. Thomas Plant	700 Alexandria Pike	Ft. Thomas	Clearwell	1936	31	734.0	765.3	764.5	762.0	760.0		3,000,000
Ft. Thomas Plant	700 Alexandria Pike	Ft. Thomas	Clearwell	1990	35	730.0	778.5	764.5	763.5	757.5	130	3,500,000
Harrison Ave.	2361 Harrison Ave.	Bellevue	Ground Storage	1930	60			829.0				600,000
Ida Spence	Tower Place	Covington	Elevated Tank	1952	175	840.0	1015.0	1005.0	1003.0	1000.0	57	500,000
Independence	5585 Madison Pike	Independence	Hydropillar	1981	137	943.5		1080.0		1039.5	74	1,000,000
Industrial Park	Industrial Rd. & US 25	Florence	Hydropillar	1961	146	945.5	1091.5	1083.5	1081.0	1062.0	50	500,000
John's Hill Road	Knollwood Dr.	Highland Hts.	Elevated Tank	1959	113	904.0		1017.0				500,000
Kenton Lands Rd.	25 Kenton Lands Road	Erlanger	Elevated Tank	1953	158	896.0	1054.0	1045.0	1043.0	1033.0	50	500,000
Lumley Tank	R47 Lumley Ave.	Fort Thomas	Elevated Tank	1937	187	829.0		1017.0				275,000
Main St. Tank	Main St. & US 27	Alexandria	Elevated Tank	1962	152	863.0		1017.0				300,000
Memorial Pkwy. Plant	2055 Memorial Pkwy.	Fort Thomas	Clearwell					741.0				3,000,000
Old St. 4 Tank	Old St. Road #4	Claryville	Elevated Tank	1976	143	987.0		1017.0				1,000,000
Rossford Tank	Marion Dr.	Fort Thomas	Elevated Tank	1962	191	987.0		1017.0				300,000
South Newport Tank	Kentucky Drive	Newport	Elevated Tank	1972	155	810.0		965.0				1,000,000
Taylor Mill Plant	608 Grand Ave.	Taylor Mill	Clearwell		15	509.5	524.5	522.0	520.0	518.0		1,000,000
Taylor Mill Standpipe	5907 Taylor Mill Rd.	Taylor Mill	Standpipe		143	870.0		1010.0	130.0	110.0		329,000
Claryville Tank	Old St. Road #4	Alexandria	Elevated Tank	2008	152	867.0		1017.0			66	750,000
											Total storage owned by NKWSD:	**36,554,000**

Pipe Inventory

Length and Diameter by Material

Pipe	*Diameter, inches*	*Length, feet*	*Length, Miles*
Asbestos Cement(Transite)	2.00	1,481.79	0.28
Asbestos Cement(Transite)	3.00	6,415.23	1.22
Asbestos Cement(Transite)	4.00	40,856.49	7.74
Asbestos Cement(Transite)	6.00	104,515.56	19.79
Asbestos Cement(Transite)	8.00	8,018.34	1.52
Cast Iron	0.75	933.70	0.18
Cast Iron	1.00	800.03	0.15
Cast Iron	2.00	20,544.85	3.89
Cast Iron	3.00	2,389.27	0.45
Cast Iron	4.00	297,921.31	56.42
Cast Iron	6.00	1,198,835.21	227.05
Cast Iron	8.00	273,629.15	51.82
Cast Iron	10.00	71,711.29	13.58
Cast Iron	12.00	212,852.21	40.31
Cast Iron	16.00	53,812.58	10.19
Cast Iron	18.00	107.61	0.02
Cast Iron	20.00	55,702.94	10.55
Cast Iron	24.00	33,321.08	6.31
Cast Iron	30.00	11,851.63	2.24
Cast Iron	36.00	85.82	0.02
Concrete	8.00	20.00	0.00
Concrete	18.00	377.78	0.07
Concrete	20.00	27,615.23	5.23
Concrete	24.00	9,506.41	1.80
Concrete	30.00	176.97	0.03
Concrete	36.00	37,651.90	7.13
Copper	1.00	2,793.66	0.53
Copper	1.50	2,475.16	0.47
Copper	2.00	11,683.30	2.21
Ductile Iron	0.75	373.10	0.07
Ductile Iron	1.00	84.48	0.02
Ductile Iron	2.00	9,414.64	1.78
Ductile Iron	3.00	10,766.54	2.04
Ductile Iron	4.00	68,950.99	13.06
Ductile Iron	6.00	801,777.33	151.85
Ductile Iron	8.00	1,107,449.42	209.74
Ductile Iron	10.00	48,008.28	9.09
Ductile Iron	12.00	552,862.51	104.71
Ductile Iron	14.00	224.46	0.04
Ductile Iron	16.00	225,794.79	42.76
Ductile Iron	18.00	718.58	0.14
Ductile Iron	20.00	55,973.77	10.60
Ductile Iron	24.00	106,140.39	20.10
Ductile Iron	30.00	30,546.09	5.79
Ductile Iron	36.00	15,269.68	2.89
Ductile Iron	42.00	18,751.37	3.55
Galvanized	1.50	269.42	0.05
Lead	0.75	377.67	0.07
MS	1.00	5.48	0.00

Pipe Inventory

Length and Diameter by Material

Pipe	*Diameter, inches*	*Length, feet*	*Length, Miles*
Polyethylene	2.00	18,761.33	3.55
PVC	1.00	34.20	0.01
PVC	1.50	1,920.41	0.36
PVC	2.00	58,183.97	11.02
PVC	3.00	70,022.07	13.26
PVC	4.00	20,642.00	3.91
PVC	6.00	158,955.53	30.11
PVC	8.00	710,055.74	134.48
PVC	10.00	132.24	0.03
PVC	12.00	26,709.07	5.06
PVC	16.00	2,905.34	0.55
Steel	0.75	248.61	0.05
Steel	1.00	551.98	0.10
Steel	1.50	332.35	0.06
Steel	2.00	611.04	0.12
Steel	4.00	143.77	0.03
Steel	24.00	84.58	0.02
Total:		**6,612,139.73**	**1,252.30**

Northern Kentucky Water District
Chlorinators and Sodium Hypochlorite Feeders In System & Location

Attachment **31 C**

Location	# of Units	Form of Chlorine	Type	Capacity (ea.)
Bromley Pump Station	1	Sodium Hypochlorite	Jesco Pump	1.3 GPH
West Covington Pump Station	1	Sodium Hypochlorite	Jesco Pump	2.8 GPH
Bristow Road Pump Station	2	Sodium Hypochlorite	Jesco Pump	5 GPH
Dudley Pump Station	2	Sodium Hypochlorite	Jesco Pump	15 GPH
Fort Thomas Treatment Plant	8	Sodium Hypochlorite	Watson Marlow	150 GPH
Taylor Mill Treatment Plant	5	Sodium Hypochlorite	Watson Marlow	52 GPH
Memorial Pky Treatment Plant	4	Sodium Hypochlorite	Watson Marlow	100 GPH

PUMP STATION LOCATION	CITY LOCATED	NO. OF UNITS	PUMP TYPE	YEAR INSTALLED	HORSE POWER	VOLTS REQUIRED	PUMP CONTROL	RATING PER PUMP (GPM)	TDH (FEET)	SERVICE TYPE
Ohio River Raw	Brent	1	VT	2005	1250	4160	AUTO	9,455	430	HIGH
Water Pumping		2	VT	2005	1250	4160	AUTO	7,000	430	HIGH
Station #1		3	VT	2009	1250	4160	AUTO	9,200	430	HIGH
		4	VT	2007	1250	4160	AUTO	9,200	430	HIGH
(Feeds FTTP)		5	VT	1999	1250	4160	AUTO	8,400	430	HIGH
		6	VT	2005	1250	4160	AUTO	9,200	430	HIGH
Latonia Ave.	Covington	1	HC	2008	75	460	AUTO	900	250	HIGH
and 35th St.	(Const. 1953)	2	HC	2008	75	460	AUTO	900	250	HIGH
Bromley	Bromley	1	VT	2010	75	460	AUTO	650	300	HIGH
		2	VT	1986	75	460	AUTO	700	315	HIGH
		3	VT	1986	75	460	AUTO	700	340	HIGH
Licking River Raw	Taylor Mill	1	VT	1990	350	460	AUTO	7640	126	LOW
Water Pumping		2	VT	1971	250	460	AUTO	6250	126	LOW
Station		3	VT	1993	150	460	AUTO	4900	126	LOW
Taylor Mill	Taylor Mill	1	VT	1981	600	2300	AUTO	6945	250	HIGH
Treatment		2	VT	1994	450	2300	AUTO	8500	145	HIGH
Plant		3	VT	1997	700	2300	AUTO	5600	385	HIGH
		4	VT	2008	1250	2300	AUTO	7700	392	HIGH
		5	VT	1974	1250	2300	AUTO	6945	365	HIGH
		6	VT	1982	600	2300	AUTO	6945	250	HIGH
Dudley Pike	Edgewood	1	VT	2009	250	440	AUTO	2500	277	HIGH
1040 System		2	VT	2009	250	440	AUTO	2500	277	HIGH
		3	VT	1965	250	440	AUTO	2825	270	HIGH
		4	VT	1979	250	440	AUTO	2222	375	HIGH
Dudley Pike	Edgewood	5	VT	1989	600	460	AUTO	6000	282	HIGH
1080 System		6	VT	1990	600	460	AUTO	6000	282	HIGH
		7	VT	1990	600	460	AUTO	6000	282	HIGH
		8	VT	2006	600	460	AUTO	5000	282	HIGH
Richardson Rd.	Independence	1	VT	2011	350	460	AUTO	2700	324	HIGH
		2	VT	2006	400	460	AUTO	2500	515	HIGH
		3	VT	1998	400	460	AUTO	2100	515	HIGH
Hands Pike	Covington	1	VT	1983	75	460	AUTO	500	426	HIGH
		2	VT	2009	75	460	AUTO	500	426	HIGH
West Covington	Covington	1	VC	1996	40	460	AUTO	2000	60	LOW
		2	VC	1987	40	460	AUTO	2000	60	LOW
Bristow Rd.	Independence	1	VT	2002	75	460	AUTO	2900	65	LOW
		2	VT	2002	75	460	AUTO	2900	65	LOW
(Peerless Pumps)		3	VT	2002	75	460	AUTO	2900	65	LOW
Waterworks Rd	Fort Thomas	1	VT	2000	500	480	AUTO	4200	372	HIGH
Pump Stn.		2	VT	2000	500	480	AUTO	4200	372	HIGH
Variable Speed		3	VT	2000	500	480	AUTO	4200	372	HIGH
US 27 10 MGD	670 Alex. Pk.	1	VT	1990	350	460	AUTO	3500	300	HIGH
	Fort Thomas	2	VT	1990	350	460	AUTO	3500	300	HIGH
		3	VT	1990	350	460	AUTO	3500	300	HIGH
		4	VT	2006	350	460	AUTO	3500	308	HIGH
		5	VT	2006	350	460	AUTO	3500	308	HIGH
		6	VT	2006	350	460	AUTO	3500	308	HIGH
Ripple Creek	Cold Spring	1	VC	1991	75	460	AUTO	2050	100	LOW
		2	VC	2009	75	460	AUTO	2050	100	LOW
		3	VC	2008	75	460	AUTO	2500	90	LOW
Ohio River Raw	Fort Thomas	1	VT	1985	800	2400	AUTO	6000	400	HIGH
Water Pumping		2	VT	2003	800	2400	AUTO	6000	400	HIGH
Station #2		3	VT	2002	600	2400	AUTO	5500	380	HIGH
(Feeds MPTP)										
Memorial Parkway	Fort Thomas	1	VC	2008	75	460	AUTO	3472	64	LOW
Treatment Plant		2	VC	2008	200	460	AUTO	6944	64	LOW
Raw Water Pumps		3	VC	2008	200	460	AUTO	6944	64	LOW
Carothers Rd.	Newport	1	VT	1996	150	440	AUTO	1800	263	HIGH
Pump Stn.		2	VT	1996	150	440	AUTO	1800	263	HIGH

Case No. 2011-____
Exhibit ____F____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

SCHEDULE OF MORTGAGES, BONDS, NOTES, AND OTHER INDEBTEDNESS

Northern Kentucky Water District
Schedule of Outstanding Debt
As of February 28, 2011

Description		Amount
Bonds		
1997		830,000
1998		8,120,000
2000 Rural Development Loan		2,021,000
2001		14,440,000
2002 A		41,955,000
2002 B		5,035,000
2003 A		1,320,000
2003 B		23,145,000
2003 C		13,645,000
2004		8,420,000
2006		25,650,000
2009		26,975,000
Total Bonds	**$**	**171,556,000**
Notes		
KIA Loans		11,273,080
Taylor Mill purchase note	$	1,275,000
Deferred note payable		100,000
BAN 2009		29,160,000
Total Notes	**$**	**41,808,080**
Total Debt	**$**	**213,364,080**

Case No. 2011-____
Exhibit ____G____

NORTHERN KENTUCKY WATER DISTRICT

Project
Taylor Mill Treatment Plant
Advanced Treatment Improvements

Kenton County
184-0457

CURRENT BALANCE SHEET AND INCOME STATEMENT

Northern Kentucky Water District
Balance Sheet
As of February 28, 2011

	2011	2010
ASSETS		
CURRENT ASSETS		
Cash and Cash Equivalents	$12,837,734	$13,088,737
Accured Interest Receivable	13,002	46,048
Accounts Receivable		
Customers	3,323,803	3,465,597
Unbilled Customers	5,400,000	4,700,000
Other	42,768	51,722
Assessments Receivable	92,634	87,322
Inventory Supplies for New Installation and Maintenance, at Cost	1,244,207	1,164,761
Prepaid Items	319,831	324,912
TOTAL CURRENT ASSETS	23,273,979	22,929,099
RESTRICTED ASSETS		
Boone/Florence Settlement Account	1,604,064	1,998,798
Bond Proceeds Fund	20,041,667	25,852,215
Debt Service Reserve Account	15,957,522	16,441,761
Debt Service Account	2,803,261	2,144,883
Improvement, Repair & Replacement	4,254,713	9,652,595
TOTAL RESTRICTED ASSETS	44,661,227	56,090,252
NONCURRENT ASSETS		
Miscellaneous Deferred Charges	7,412,589	8,272,016
Capital assets:		
Land, System, Buildings and Equipment	337,152,194	315,033,349
Construction in Progress	40,626,099	38,891,537
Total capital assets before accumulated depreciation	377,778,293	353,924,886
Less Accumulated Depreciation	(85,950,124)	(78,145,058)
Total capital assets before accumulated depreciation	291,828,169	275,779,828
TOTAL NONCURRENT ASSETS	299,240,758	284,051,844
TOTAL ASSETS	367,175,964	363,071,195

Northern Kentucky Water District
Balance Sheet
As of February 28, 2011

	2011	2010
LIABILITIES AND RETAINED EARNINGS		
CURRENT LIABILITIES		
Current Portion of Long Term Debt	$7,919,844	$7,211,736
Accounts Payable	1,325,546	1,509,260
Accured Payroll & Liabilities	226,034	337,792
Other Accrued Liabilities	74,375	73,679
TOTAL CURRENT LIABILITIES	9,545,799	9,132,467
CURRENT LIABILITIES PAYABLE FROM RESTRICTED ASSETS		
Accounts Payable	2,362,062	1,472,252
Accured Interest Payable	962,560	929,537
TOTAL CURRENT LIABILITIES PAYABLE FROM RESTRICTED ASSETS	3,324,622	2,401,789
LONG-TERM DEBT		
Long-Term Portion of Bonded Indebtedness	180,096,204	182,272,332
Bond Anticipation Notes Payable	29,160,000	29,160,000
Note Payable - Taylor Mill	1,100,000	1,275,000
Deferred Note Payable	100,000	100,000
TOTAL LONG-TERM DEBT	210,456,204	212,807,332
TOTAL LIABILITIES	223,326,625	224,341,588
Unrestricted Retained Earnings	114,998,347	109,878,616
TOTAL NET ASSETS	143,849,339	138,729,608
TOTAL LIABILITIES AND NET ASSETS	367,175,964	363,071,196

Northern Kentucky Water District
Revenue Budget to Actual
For the Two Months Ending February 28, 2011

Acct. #	Description	February Actual	February Budget	Variance	YTD Actual	YTD Budget	Variance
	Revenue						
(461 TO 466...	Water Sales	$2,546,037	$2,598,096	2%	$5,536,495	$5,539,334	0%
(470 TO 470)	Forfeited Discounts	49,306	69,400	29%	128,520	149,031	14%
(4720001000...	Rents from Water Property	39,083	33,000	(18%)	75,042	58,000	(29%)
(471 TO 471...	Other Water Revenues	25,585	19,979	(28%)	46,760	44,856	(4%)
	Total Operating Revenues	2,660,011	2,720,475	2%	5,786,817	5,791,221	0%
	Non-Operating Income						
4190001000 ...	Interest Income	57,660	97,618	41%	130,479	194,812	33%
(474 TO 474...	Miscellaneous	3,829	7,241	47%	5,238	8,256	37%
	Total Non-Operating Income	61,489	104,859	41%	135,717	203,068	33%
	Total Revenues	2,721,500	2,825,334	4%	5,922,534	5,994,289	1%