COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF NORTHERN KENTUCKY WATER DISTRICT FOR APPROVAL OF CONSTRUCTION OF PRETREATMENT BUILDING IMPROVEMENTS AT FORT THOMAS TREATMENT PLANT AND ISSUANCE OF A CERTIFICATE OF CONVENIENCE AND NECESSITY	)))))))	CASE NO. 2008- 188

APPLICATION FOR APPROVAL OF CONSTRUCTION

Northern Kentucky Water District (NKWD), by counsel, petitions for an order approving construction of pretreatment building improvements at its Fort Thomas treatment plant pursuant to KRS 278.020.

In support of the application, the following information is provided:

1. NKWD's office address is 2835 Crescent Springs Rd., Erlanger, KY 41018-0640. Its principal officers are listed in its current Annual Report on page 6, which is filed with the Commission as are its prior years Reports;

2. NKWD is a non-profit water district organized under Chapter 74 and has no separate articles of incorporation;

3. A description of NKWD's water system and its property stated at original cost by accounts is contained in its Annual Report, which is attached as Exhibit E.

4. NKWD serves retail customers in Kenton, Boone and Campbell Counties and sells water at wholesale to non-affiliated water distribution systems in Kenton, Boone, Pendleton and Campbell Counties.

5. It proposes to construct improvements to facilities at its Fort Thomas Treatment Plant as described in Exhibit A (Two copies of the Maps, Plans, Specifications and Bid Documents are provided as a separate bound document). The District is financing a portion of the engineering costs with $250,000 of proceeds from its 2007 Bond Anticipation Note (BAN). $4,000,000 has been approved for a State Revolving Fund (SRF) loan. At least $2,200,000 and possibly up to $2,850,000 will be used for the project, depending on the authorized use of the loan funds. Any unfunded amount up to $650,000 will be available from the contingencies remaining in BAN 2007 or provided from a BAN to be issued in 2008.

6. The construction is in the public interest and is required to allow NKWD to continue to provide adequate service to its customers. The project will provide safer, more efficient use of its facilities. The project, its cost, need and other details are contained in Exhibit A.

7. The total project cost is approximately $3,100,000, see Exhibits B and D.

8. Easements and rights of way are not required, see Exhibit B.

9. This service will not compete with any other utility in the area.

10. The proposed project, identified in Exhibit A, is scheduled to begin construction in August 2008 and be completed by August, 2009. Board approval of the project was given on May 15, 2008, attached as Exhibit C. Bid information is included with Exhibit B. Bids expire on July 27, 2008

11. No new franchises are required. The DOW permit is attached as Exhibit B.

12. Construction descriptions are in Exhibit A and Bid Documents. Facts relied on to justify the public need are included in the project descriptions in Exhibit A.

13. Maps of the area showing location of the proposed facilities are in Exhibit A.

14. The construction costs will be funded by the issuance of BANS and SRLF.

15. Estimated operating costs for operation and maintenance, depreciation and debt service after construction to the extent that there are any are shown in Exhibit D.

16. A description of the facilities and operation of the system are in Exhibit A.

17. A full description of the route, location of the project, description of construction and related information is in Exhibit A.

18. The start date for construction; proposed in-service date; and total estimated cost of construction at completion are included in Exhibits A and B.

19. CWIP at end of test year is listed in Exhibit E.

20. Plant retirements are listed in Exhibit B and E. No salvage values are included as booked.

21. The use of the funds and need for the facilities is justified based on a the engineering report included as Exhibit A

22. No rate adjustment is being proposed.

23. The following information is provided in response to 807 KAR 5:001 (8):

a. Articles of Incorporation – None. NKWD is a statutorily created water district under KRS Chapter 74;

24. The following information is supplied pursuant to 807 KAR 5:001(9):

a. Facts relied upon to show that the application is in the public interest: See Exhibit A.

25. The following information is provided as required by 807 KAR 5:001 (11):

a. A general description of the property is contained in the Annual Report, Exhibit E.

b. No stock is to be issued; No bonds are to be issued in this case;

c. There is no refunding or refinancing;

d. The proceeds of the financing are to construct the property described in Exhibit A

e. The par value, expenses, use of proceeds, interest rates and other information is not applicable because no bonds are being issued at this time.

26. The following exhibits are provided pursuant to 807 KAR 5:001 (11)(2):

a. There are no trust deeds. All notes, indebtedness and mortgages are included in Exhibits E and F.

b. Property is to be constructed is described in Exhibit A.

27. The following information is provided pursuant to 807 KAR 5:001(6):

a. No stock is authorized.

b. No stock is issued.

c. There are no stock preferences.

d. Mortgages are listed in Exhibit F.

e. Bonds are listed in Exhibit F.

f. Notes are listed in Exhibit F.

g. Other indebtedness is listed in Exhibit F.

h. No dividends have been paid.

i. Current balance sheet; income statement and debt schedule are attached as Exhibits F and G.

k The facilities being constructed will be reflected in USoA Accounts as

shown in Exhibit D.

For these reasons, the District requests authorization to construct the facilities and any other order or authorization that may be necessary to obtain Commission approval for construction.

SUBMITTED BY:

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Attorney for Northern
Kentucky Water District

NORTHERN KENTUCKY
WATER DISTRICT

Project

Fort Thomas Treatment Plant Pretreatment Improvements

Kenton County

184-411.502

Fort Thomas Treatment Plant Pretreatment Building Improvements

Project 184-411.502

ProjectDescription:

The proposed project involves the construction of a new building to house chemicals and feed equipment for treating the raw water storage reservoirs at the Fort Thomas Treatment Plant. The chemicals include powdered activated carbon and potassium permanganate for adsorption and oxidation of taste and odor forming compounds and other organic compounds and copper sulfate for algae control.

The existing building currently used to house these chemical feed systems was constructed in the 1880s. Operators must currently manually batch and adjust feed rates for these chemicals. The building was noted to have several deficiencies during a condition assessment in 2003 and the feed systems are undersized. The District explored renovating the existing building but it determined it was not suitable or practical for the intended use. In accordance with the requirements of the Kentucky Heritage Council, state level documentation of the existing structure will be gathered for historical purposes prior to building demolition.

Control of the new systems will be automated through the plant's existing Supervisory Control and Data Acquisition System (SCADA) system.

The estimated cost of the total project with engineering, construction, and contingencies is $3,100,000.

NORTHERN KENTUCKY WATER DISTRICT
Fort Thomas Treatment Plant Pretreatment Building Improvements
184-411.502

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80000 SERIES
30% P.C.W.

Case No. 2008-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

Project
Fort Thomas Treatment Plant Pretreatment Improvements

Kenton County
184-411.502

ENGINEERING REPORTS AND INFORMATION

Project Map

Preliminary Design Memorandum

Engineer's Opinion of Probable Total Construction Cost

Plans prepared by HDR Quest titled "Fort Thomas Treatment Plant Pretreatment Building Improvements" dated March, 2008

Specifications prepared by HDR Quest titled "Fort Thomas Treatment Plant Pretreatment Building Improvements" dated March, 2008

Case No. 2008-____
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NORTHERN KENTUCKY WATER DISTRICT

Project
Fort Thomas Treatment Plant Pretreatment Improvements

Kenton County
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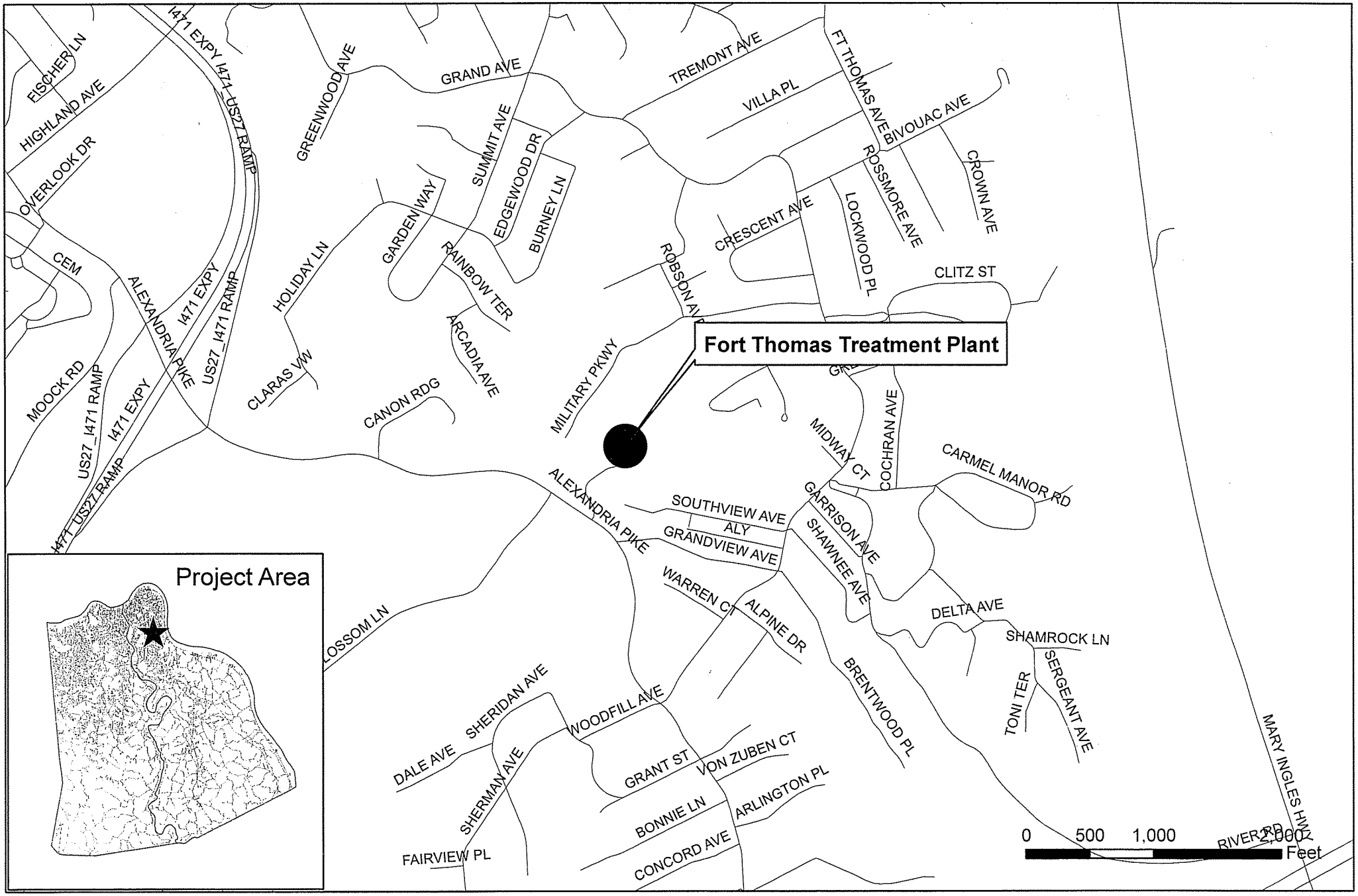
Project Map



Fort Thomas Treatment Plant

Case No. 2008-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

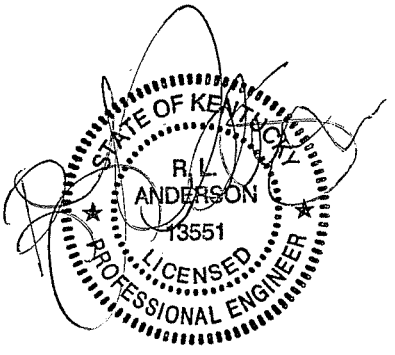
Project
Fort Thomas Treatment Plant Pretreatment Improvements

Kenton County
184-411.502

Preliminary Design Memorandum

Preliminary Engineering Report
Fort Thomas Treatment Plant
Pretreatment SCADA Phase 3 Improvements
Northern Kentucky Water District

December 2007



Prepared by:

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HDR|Quest

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Section 4 - Recommended Design Criteria (continued)

Attachments

Preliminary Engineering Report
FTTP Pretreatment SCADA Phase 3 Improvements
Northern Kentucky Water District
Section 1 - Background/Purpose

Background

The Fort Thomas Treatment Plant (FTTP) is rated at 44 million gallons per day (MGD) and has two pre-sedimentation basins (North Reservoir and South Reservoir) on site. The combined capacity of the reservoirs is 72 million gallons and periodically chemicals are fed at the influent to both reservoirs for algae, organics, and taste and odor control. Potassium permanganate is the only chemical currently fed at the raw water pump station prior to entering the reservoirs. The chemical storage and feed equipment for dosing the reservoirs at the FTTP is housed in the Copper Building and Carbon Silo on the northeast end of the property.

Raw water flows into the FTTP via three existing raw water lines: 1) 30-inch line which runs below the Copper Building and has an open segment where chemicals are injected; 2) 30-inch line approximately 30' north of the Copper Building; 3) 42-inch line approximately 30' north of the Copper Building.

The Copper Building is a two-story brick building constructed in 1891 and houses the potassium permanganate and copper sulfate feed equipment which is much newer. The building is considered to be in unsatisfactory condition, with evidence of differential settlement based on the cracking in the brick walls. There are 4 steps into the building that are not conducive to receiving dry chemical deliveries. The ventilation and lighting systems in the building are poor.

The manually-operated copper sulfate feed system is located on the second floor of the building and consists of a dry feeder, mixing tank and mixer. Copper sulfate storage involves using a hoist to store the product on the second floor of the building. Capacity or size information is not known as the system is not easily accessible. The copper sulfate is fed to the reservoirs by gravity.

The potassium permanganate feed system, installed in 1992, is situated on the ground floor of the Copper Building and consists of a 1,750 gallon mixing tank and two Milton Roy "YB1M60ALIDD" 195 gph, 0.75 HP metering pumps. The system is contained for spills. The chemical is delivered in drums and uses water to educt the permanganate from the drum to the mixing tank. This system is not flow paced and serves as the secondary system to the one at the raw water pump station.

The powdered activated carbon (PAC) system is located in the Carbon Silo adjacent to the Copper Building. The system was installed in 1993 and consists of the silo and two Warman "B005-MM10" centrifugal pumps. The silo can hold approximately 28.5 tons and is considered to be undersized.

Following automation of chemical storage and feed facilities at the Taylor Mill and Ft. Thomas plants, Northern Kentucky Water District (NKWD) upgraded the distribution Supervisory Control and Data Acquisition (SCADA) system in 2004 at all the tanks and pumps stations. The SCADA system uses Allen-Bradley ControlLogix Programmable Logic Controller (PLC) for pump stations and treatment plants and Wonderware Version 8.02 for the interface.

For pictures of the existing facilities, refer to Attachment A.

Purpose

NKWD owns and operates multiple facilities for supplying water to nearly 80,000 residential, commercial, industrial and wholesale customers in Northern Kentucky. NKWD has completed several major projects at these facilities over the last 10 years to automate the control of portions of the treatment and distribution system operations. This project will automate one of the remaining, manually-operated components of NKWD's operations – the FTTP chemical pre-treatment facility. It will also replace the existing chemical feed equipment and provide a common raw water line for chemical injection.

Section 2 - Project Requirements/Resources

Project Requirements

The design will address the following key components:

- Evaluate re-use versus construction of a new building for feeding copper sulfate and potassium permanganate to the pre-sedimentation reservoirs at the FTTP. Determine if age of the existing Copper Building has any historical significance. Location and style of a new building will be explored with NKWD to ensure that the building will be less obtrusive and to create the historical feel of the existing building.
- Evaluate construction of a new carbon silo to supplement the existing one at FTTP. Determine if the existing feed equipment can be re-used and improvements to rehabilitate the silo for continued service can be maintained.
- Evaluate the need for locating a PLC at the pre-treatment facility for interface with the new chemical feed systems. Also, consider the method of communication between the new PLC and the FTTP SCADA network.
- Evaluate the current version of Wonderware that is on the market and comment on an upgrade.

Resources

Information necessary to evaluate the requirements for this project have been obtained from the following:

- NKWD/Quest Professional Services Agreement, Exhibit A
- July/2002 Property Survey by Gregory C. Schultz
- 42" Water Intake Line "As-Built Drawings" by Viox & Viox
- Project 87-5 Drawings by Burgess & Niple
- Wonderware Demonstration by ATR Distributing on November 1, 2006
- Site visit on November 7, 2006
- Project review meetings (refer to Attachment B for meeting minutes)
- Means Cost Estimating Guide

Copper Building

The existing structure was constructed approximately in the year 1860. Most of the original components still remain. It is a two-story building. The first level has a concrete floor slab and the upper level is a wooden floor. Building area is approximately 900 square feet, with only 600 square feet of usable space. Structure is supported by load-bearing, uninsulated, brick walls and wood framed roof with slate roof tile. The exterior brick seems to be in good condition; however, in some areas the mortar needs to be tuck pointed. The original glass windows were replaced around 1990 with glass block.

The existing Copper Building was evaluated to determine if it could be modified to accommodate the new chemical feed systems. Based on our review of the structural integrity of the building, it has been determined that it cannot be reused without significant code required modifications because it does not meet the structural criteria for the current Kentucky Building Code. Some of the key issues include:

- Brick masonry walls that appear to be non-reinforced.
- Second floor wooden structure that provides lateral stability for the walls, therefore, it would have to remain or be replaced.
- Concrete structure below the copper sulfate feeder that would be cost prohibitive to remove and if left in place, would significantly impact the working space available for the new chemical feeders.
- Random wall cracks and damaged or missing bricks (see pictures in Attachment A).
- It is anticipated that the new chemical feed systems will require at least 2100 square feet of space. The usable space in the Copper Building is less than 1000 square feet which means the building would require an addition.
- Since only one of the three raw water lines run below the existing building, there would still have to be multiple chemical injection points.

For additional input regarding the building investigation, refer to the structural engineer's report in Attachment C.

For a layout of the Copper Building, refer to Attachment D.

Historical Significance

The following summarizes our efforts thus far to determine the historical significance (if any) of the Copper Building.

- Discussion with Karen Buckley with the City of Fort Thomas:
  - They are not aware of any guidelines to determine a building's historical significance.
  - They confirmed that the building is currently not listed on the National Register of Historic Places.
  - The city is considering delineating an area of the city as a historic area and the Copper Building may be inside this area. They will verify this and get back with us. They do not know at this time the ramifications if the building falls within the delineated historic area.

- Discussion with Marty Perry with the Kentucky Heritage Council (KHC):
  - A third party could attempt to put the building on the National Register of Historic Places without the owner's consent, but this is difficult to do. This still does not necessarily limit what can be done to the building, including removing it.
  - There are no state laws allowing local zoning boards to use the Registry to restrict actions to the building.
  - If a federal agency is involved in any way on this project, i.e. funding and permit review, then this would trigger a historic review by the KHC. They would make a recommendation to the federal agency involved as to what should be done.
  - If any state or local funding is involved, no review by KHC is required.
  - If the building is placed on the National Register, and NKWD chooses to rehabilitate or renovate the building, a percentage of the external building structure costs could be reimbursable through a program sponsored by the National Register.
  - The improvements to the building that would be eligible for funding are cosmetic in nature and would not include improvements to accommodate any chemical feed systems.
  - Local zoning boards and/or building permit departments may still review and limit what NKWD is allowed to do if local residents intervene, regardless of the status of the building as a historic structure.

Site Layouts

Four site layouts were considered for the new pre-treatment facilities. Refer to Site Layout Alternatives in Attachment E, for details. Criteria used in this evaluation included:

- Construction cost.
- NKWD would prefer to not relocate the existing fence.
- Maintain a minimum of 10-foot separation between the new pre-treatment building and the fence.
- The building should be parallel to Military Parkway.
- Coordinate building location with existing pedestrian gate. Consider relocating gate near vehicular gate.
- Combine the three raw water lines into a single line to accommodate a single point of feed for the chemical feeders.
- The building location will be impacted by the depth of the existing raw water lines. The approximate depth of the three existing lines are listed below:

  - 42-inch water line, 20 feet deep.
  - New 30-inch water line, 4 feet deep.
  - Old 30-inch water line, 4 feet deep.

- After the lines are combined into a single line, the depth of the new line will need to be reduced in order to be routed below the new building. This will require some 45 degree angles and laying length which will impact the building location.
- Minimize the length of chemical feed lines between the feeders and the injection point. This is especially true for carbon since this line tends to clog.
- Minimize site re-grading and retaining walls.
- Maintain adequate traffic flow in the area for NKWD personnel as well as chemical delivery vehicles.
- Consider layout as to how it blends into the surrounding community.

Building Layout

The new pre-treatment building should be designed to include the following key elements:

- Janitor closet/storage area.
- Rest room.
- Electrical Room.
- Two copper sulfate feed and storage systems.
- Two potassium permanganate chemical wetting and feed systems with a single bulk storage tank.
- Powder activated carbon (PAC) wetting and feed systems along with silo bulk storage.
- Provide space for future chemical feed system (if available without increasing the size of the building).
- Provide area for chemical storage.
- Route a 60-inch raw water line through a pipe tunnel below the building. Provide access to the pipe tunnel from the building.

- Provide chemical injection points in the 60-inch raw water line.
- Provide door entry on two sides.
- The exterior architectural features of the building are to match the historical features of the area.

As an alternate to an above ground pretreatment building, consider utilizing a bunker type facility built back into the side of the hill. The advantages to this type of construction are that it would be less noticeable to the neighborhood and would eliminate issues associated with conventional type roofs.

Chemical Feed Systems

The chemical feed system design is to be based on providing bulk storage and chemical feed systems at the FTTP pretreatment facility for flow ranges of 12.0 MGD to 60.0 MGD. Provisions shall be made in the new pre-treatment facility to accommodate the following chemical feed systems:

- Copper Sulfate.
- Potassium Permanganate.
- Powder Activated Carbon.

Copper Sulfate

Some of the considerations for the copper sulfate system include:

- Copper sulfate is primarily used at FTTP to control algae growth in the reservoirs.
- Existing chemical preparation and feed system are manually operated and the product is fed by gravity to the pre-settling reservoirs.
- Chemical handling and storage at the existing Copper Building is deficient and not conducive to regular maintenance.
- Capacity of existing system is not defined. System should be replaced in a new facility.
- The normal dose during the period of application was identified as 100 pounds per day (lb/d). The maximum dosage during the period was 150 lb/d.
- This chemical is delivered to FTTP in pallets of dry bags (most dry bags weigh 50 pounds depending on manufacturer). The dry feed is then wetted and injected into the raw water line.

Potassium Permanganate

Some of the design considerations for the potassium permanganate (KMNO4) system include:

- The current system was installed in 1992 and consists of single eductor system with a single mixing tank and dual chemical feed pumps.
- Existing system is manually operated and can't be flow paced and therefore is only a secondary system.
- System needs to have a day tank or redundancy in the preparation system to offset mechanical failure.
- Product is delivered in 330 lb drums and that creates handling problems since existing Copper Building has no hoisting or handling available for this chemical.
- Provide adequate storage space for up to 14 KMNO4 drums.
- System needs to be capable of delivering full KMNO4 requirements without being manned.

Powder Activated Carbon (PAC)

The PAC system is comprised of the storage and delivery system components. Currently, the PAC system utilizes a carbon steel silo built in 1994 for storage and a dry feeder/mixing tank/metering pump arrangement for the purposes of delivery. These systems are still functional but are deteriorating in condition and have become a significant maintenance issue for NKWD.

The condition of the existing silo was evaluated as part of this project. A copy of Horizon Inspection's findings is attached to this report as Appendix J. The findings noted significant metal loss on both interior and exterior of the silo along with the need for specialized coating below the interior floor grating. These metal and coating repairs will lead to an overall rehabilitation of the tank in order to keep the silo in suitable condition for operation over the next several years. These improvements will need to be compared with the cost of a new silo to determine the best value for future PAC storage. One element of any silo rehabilitation or replacement that will be reviewed closely is the use of an aerator in lieu of a vibrator to provide a reliable supply of PAC to the screw auger. PAC has a tendency to compact and clump and vibration alone does not always provide enough agitation to produce the desired results.

The current PAC wetting and delivery system has been identified by the maintenance staff as problematic. Much of this problem is related to the control systems of the existing unit. Two options are available for the proposed wetting and delivery system. The first option is to utilize the same dry feeder/mixing tank/metering pump arrangement that is presently installed. This system would use a screw auger to feed the PAC to a mixing tank. A mixer would run continuously to keep the PAC in suspension and metering pumps would push the solution into the raw water line. Many of the problems related to this system occur when the mixer isn't used or the

chemical line velocity is low. The PAC is this able to come out of suspension and create clogging problems.

The eduction system utilizes the water pressure available at the site to dose the chemical. This system also uses a screw auger which feeds dry chemical into the wetting cone. In the wetting cone, water is added to produce a solution. This solution is then educted or pulled into the feed line as push water rushes through a jet pump assembly. In this manner, no mixing tank or metering pump is required and the solution goes directly from make-up process to the point of injection without any detention. This system has been effective for chemicals that show a tendency to come out of solution or suspension (such as PAC and KMNO4).

Some of the other PAC design considerations are:

- The existing carbon silo is approximately 12 years old. The silo itself is in good condition but is considered to be undersized by the operations staff.
- The existing feed system has not been very reliable and requires more than normal maintenance.
- The dust collector does not operate properly and needs to be replaced.
- The existing controls are complicated and difficult to trouble-shoot. There aren't any record drawings for the control panel.
- NKWD has problems with the carbon solution lines clogging.
- When carbon is being fed, the existing system will last about one month.
- The distance between the feeder and the injection point should be minimized to help prevent clogging.
- Route any drain lines to the sewer.
- Each of the PAC feed systems will be designed to deliver 20 to 22 mg/L of PAC when operating independently. When operating together, they would be capable of delivering 40 mg/L.
- The low feed volume for design of the PAC system is 5 mg/L. The system and eductor should provide good product feed control at this level.
- Piping interconnects should allow both PAC eductors to draw from either storage hopper.
- *Ten States Standards* requirements for carbon are as follows:

    - The required rate of feed of carbon in a WTP depends on the tastes and/or odor involved, but provisions should be made for adding from 5 mg/l to at least 40 mg/l.
    - Storage space should be provided for: (a) At least 30 days storage; (b) Convenient and efficient handling of chemicals; (c) Dry storage conditions and (d) A minimum storage volume of 1.5 times a truckload where purchased by truckload lot.

- Items for consideration when sizing a carbon silo:

  - Current silo = 28.5 tons (from NKWD proposal) = 57,000 lbs.; 57,000 lbs./32 lbs. per cu.ft. = 1,781 cu.ft.
  - Truck volume = 6,000 gal.; 6,000 gal. x 1.5 = 9.000 gal. silo = 1,203 cu.ft. = 38,500 lb.
  - 30-day storage at an average use = 10 mg/L x 8.33 x 32 MGD = 2,665 lb. of PAC on an average day = 2,665 lb. x 30 days ÷ 32 lb./cu.ft. = 2,499 cu.ft. of storage.

- The minimum recommended storage volume for the new PAC system is 80,000 lbs. (40 tons, or approximately 2,500 cu.ft.). This is approximately 40 percent more than NKWD has currently. Another option that will be considered is the re-use of the existing silo in combination with a second silo to add necessary storage.

Wonderware

The current Human-Machine Interface (HMI) interface software that NKWD uses is Wonderware InTouch Version 8.02. As part of this project, an assessment will be performed to consider if an upgrade to the latest version is justified. Specific areas of consideration include:

- Operator interface with Wonderware Intouch.
- Data archiving with Wonderware Industrial SQL.
- Trending and reporting with Wonderware Active Factory.
- Number of tags.
- Microsoft Windows operating system compatibility.

A demonstration with the local Wonderware representative, ATR Distributing was conducted on November 1, 2006. At that meeting the advantages to upgrading to the latest Version 9.5 were discussed as well as the new software platform that Wonderware has developed called Industrial Application Server (IAS). Since that meeting, Wonderware has upgraded the InTouch software to Version 10.0 Some key features of each system are:

- Wonderware InTouch Version 10.0 Upgrade:

  - Comprehensive graphic toolbox.
  - Every attribute of a graphic can be individually animated.
  - Expanded ready-to-use symbol library.
  - The ability to extend and customize applications to address specific system requirements.
  - The ability to switch from development mode to runtime mode.
  - Troubleshooting tools that include current alarm summaries and historical view of alarms.
  - Improved security.

- Moves beyond the simple tag databases into a more productive logical representation of equipment and processes.
- Separates application code from device communications so that both can be easily managed and updated.
- Version 10.0 is backwards capable with existing InTouch software applications.

- Currently, Wonderware has a special upgrade offer:

  - Receive a functional trade-in credit for existing InTouch licenses or a 50% discount on computer platform license for each existing InTouch software node.
  - Offer is valid through March 31, 2008.
  - User must sign-up for customer support to qualify for any discounts.

- IAS:

  - License will no longer be tied to the number of tags.
  - The system is more secure.
  - NKWD could migrate/upgrade one system or plant at a time.
  - It will allow you to store and forward information if system is down.
  - You can change and expand the system as a whole without disruption.
  - You can make centralized changes to the system as opposed to making individual changes at each site.

Copper Building

It is recommended that the existing Copper Building be demolished completely and that a new pre-treatment building be provided to house the chemical feed systems. Demolition of the existing building will include:

- Modification of some existing piping inside the building.
- NKWD will relocate the Copper Building camera and security systems to the new building.
- The Copper Building must remain operational until the new facility is ready for the switchover.
- The demolition of the building will include both existing chemical storage tanks.
- NKWD will remove the existing chemical feed pumps once the new chemical feed systems are operational.
- Removal and disposal of all other Copper Building components will be the responsibility of the Contractor.
- Site to be restored to match adjacent area.
- The existing wrought iron fence on the side of the building is to be removed and turned over to NKWD to use elsewhere.

Site Layout

The site layout for the new pre-treatment facility will address the following key issues:

- Intercept the three raw water lines and re-route into a single 60-inch line. Install a Tee in each line with manual butterfly valves to allow the flow to be diverted back through the existing lines if necessary. This will eliminate the need for any bypass piping.
- After the 60-inch line runs below the new pre-treatment building, split the flow back into the three existing raw water lines. Provide manual butterfly valves in each line.
- Provide vehicle parking and access to the building for chemical delivery trucks.

Building Versus Bunker Style Construction

NKWD requested that two types of construction be considered to house the chemical feed systems. One type would be a conventional type building with brick or stone veneer and shingled roof. The second type would be a

bunker style structure built into the side of a hill. The roof and sides would be below grade with the only visible part of the structure being the front. For some typical views, refer to Attachment H – Renderings.

After careful consideration of both options, it is recommended that a conventional type building be utilized. The justifications for these recommendations are as follows:

- Advantages of a conventional type building:
  - Conventional construction.
  - More economical to construct.
  - Ease of access to the building for chemical deliveries.
- Disadvantages of a bunker type facility:
  - More costly to build.
  - Unknown subsurface conditions that may impact cost.
  - Potential rock excavation and blasting in a neighborhood.
  - Building layout has utilized a tunnel for the 60-inch water line. A bunker facility may make the tunnel too deep to economically construct.
  - Moisture and humidity issues associated with underground structures may impact dry chemical feeders and storage.
  - In order to make the bunker fit into the side of the hill, the building's finished floor may require steps down at the entrance, which creates issues for chemical deliveries.
  - Waterproofing walls and providing adequate foundation drains would be issues.

Building Layout

The building was designed to accommodate the new chemical feed systems and appurtenances. Two recommended building layouts are shown in Attachment F. One includes an Activated Carbon Feed Room and the second layout excludes a carbon room by making the carbon feed system an integral part of the carbon silo. Other key design criteria include the following:

Architectural Considerations

The new building structure for NKWD will be designed to be practical and functional with emphasis on long service life with minimum maintenance requirements. The architectural features of the new building will include:

- Masonry block with brick veneer exterior finish similar to the Copper Building.
- The brick veneer will utilize features such as archways over doors and brick soldier courses.
- Single-story building with spread footings.

- No skylights will be provided.
- Concrete flooring throughout with a sealer.
- A single (unisex) restroom will be provided. No ADA requirements need to be met.
- Provide double-door access on the front and one side of the building.
- The building will not have any windows. Window outlines in the brick veneer will be utilized to give the impression of windows.
- The building layout will accommodate chemical deliveries on the side of the building.
- The space allocated for future use will be left open without any storage tank. Provide construction joints in the exterior wall adjacent to the future space so that the wall can be removed to install a chemical tank in the future.
- There will be no need for carbon storage inside the building since all carbon will be stored in the silo.
- No special seismic requirements are anticipated for the building.
- Building design will comply with the latest edition of codes and industry standards referenced herein:

    - Kentucky Building Code 2003 Edition.
    - National Fire Protection Association (NFPA) standards, including NFPA 101 Life Safety Code.

Building Code Classification

All facilities will be designed in accordance with applicable codes for life safety, fire protection, and occupational health and safety. The classification of the various facilities is outlined in the following table.

New Building
Building Classified Under KBC 2003
• Construction Type: Noncombustible unprotected – IIB
• Occupancy Type: F-1
• Number of Stories: 1
• Building Area: 2,280 SF (maximum 17,500 sq. ft.)
• Building Height: 20 ft. or less (maximum allowed 3 stories, 55 feet)
• Occupant Load: Unoccupied
Fire Rated Separation Required Between Following Areas and the Remainder of the Building
• 1 HR: Stairs
• 1 HR: Vestibules
• 1 HR: Electrical Room
• 1 HR: Basement and Ground Floor
Fire Protection Requirements
• Sprinklers (KBC Section 903.2.4): Required
• Fire Alarm System (KBC Section 907.2.5): Required
• Portable Fire Extinguishers (KBC Section 906.1): Required

Exterior Treatment and Materials

Structure exteriors will be designed to be practical and functional with emphasis on long service life with minimum maintenance requirements. Priority will be given to the use of local construction materials and techniques where practical and complementary to the existing structures.

Exterior Walls

Exterior facing walls will be designed of face brick. An additive alternate will be included in the bid documents to replace the brick with stone. Exterior materials will be selected to minimize maintenance requirements. Exterior wall assemblies will be designed to achieve a minimum "R = 16" value.

Roofs

The design arrangements of roofs, canopies, fascias, parapets, overhangs, or other roof elements will be in harmony with the massing and materials of the structures and to control runoff and direct drainage away from equipment, doorways, sidewalks, ramps, or other occupied areas. Sloped roof with asphalt shingled on pre-engineered metal framing system will be provided. Runoff will be directed to gutters and downspouts. Roof assemblies will be designed to achieve a minimum "R = 25" value.

Exterior Doors and Louvers

- Exterior doors, and louvers will be designed of extruded aluminum sections with factory-applied protective coatings. Sills, thresholds, flashing, and trim will be provided to prevent water penetration to the interior of the building. All doors and louvers will be provided with corrosion-resistant hardware, accessories, fasteners, and operating mechanisms. Exterior door glazing (small, if any) is to be tinted, insulated tempered glass and is to be in the top half only.
- Door units and hardware will be designed for heavy-duty usage. Locksets, security system and keying arrangements acceptable to the Owner will be provided.
- Where applicable, equipment and vehicle doors for motorized operation will be provided and controlled from an interior control panel. Doors with manual backup for emergency hand operation will be provided.
- Louver assemblies will be designed complete with bird screens, filters, dampers, blank-off panels, acoustical treatment, or other required features. Louver assemblies will be designed to prevent infiltration of rain and provide positive drainage to the exterior.

Interior Treatment and Materials

- Structure interiors will be designed to be practical and functional with emphasis on long service life with minimum maintenance requirements. Priority will be given to the use of local construction materials and techniques where practical, and final selection will be made during detailed design. Interior components and finishes will be designed of non-combustible materials with minimum flammability and smoke developed characteristics.
- Interior walls will be designed of concrete masonry units. Where required for fire separations, walls will be designed in accordance with recognized tested UL assemblies.
- Floor and base materials designed for long service life with minimum maintenance requirements will be provided. Hard surface seamless flooring material will be provided for areas subject to splashes, spills, or wet exposure. Bases of suitable material and height to protect wall finishes will be provided. Ceramic tile will be used as floor and base finish in washroom areas. Floors, ramps, and steps will be designed with non-slip finishes.
- Interior doors, frames, sidelights, transoms, and windows will be designed of steel or aluminum to the Owner's standard and final selection will be made during detailed design. Where required for fire or smoke separations, steel doors and frames, window frames, and appropriately sized glass units with labels from appropriate testing agencies will be provided.
- All doors will be designed with appropriate corrosion-resistant hardware. Locksets and keying system acceptable to the Owner will be provided. Clear tempered glazing will be provided for all interiors glazing not required to be labeled as a fire separation. Interior door glazing shall cover the top half of the door.
- Exterior door glazing shall be rectangular, approximately 4 feet to 6 feet wide by 24 inches to 30 inches tall.
- Ceilings will be designed to be integrated with the building services and lighting systems. Ceiling materials and finishes that enhance the acoustic properties of the spaces will be provided. Appropriate access will be provided to equipment concealed in the ceiling spaces.
- Provided a suspended ceiling only in the electrical room.
- Where practical, the design will include factory finishes of interior items. Field-applied finishes and protective coatings will be provided to all other building elements that are not supplied with factory-applied protective coatings. The use of factory- or field-applied coatings that provide long term service use with minimum maintenance will be considered wherever possible.
- Chemical resistant coating systems will be designed to provide a minimum 48-hour immersion protection against spills or leaks of stored chemicals in secondary containment areas. Coating systems will include primer, fiberglass mat, saturant, and two trowel-applied coats of vinyl ester resin with silica filter. Non-slip finish will be provided on all horizontal surfaces.

Safety Considerations

The safety features of the new building will include:

- Provide access to a single eye wash and emergency shower facility inside the building.
- Provide temper water for the eyewash/shower.
- Provide a flow sensor on the eyewash for alarm signal to SCADA.
- Provide exterior/interior visual alarms on the chemical batch tank to identify overflow or full.
- Provide quick-connect with locks for any chemical fill lines.
- NKWD will locate the two existing cameras from the Copper Building to the new building and provide one additional camera. NKWD will provide mounting brackets and instrumentation wiring as required. The Contractor will provide and install all the conduit and any power wiring. There will be a total of three cameras:

  - One existing camera to be relocated to monitor the front door.
  - One existing camera to be relocated to monitor the chemical delivery area.
  - One new camera to monitor the entrance gate and Military Parkway.

- Provide alarm/fire suppression system.
- Provide access control and entrance alarms on all doors.

Building Mechanical Considerations

The mechanical features of the new building will include:

- Building ventilation systems will be generously sized.
- HVAC duct work will be non-corrosive (Schedule 80 rigid PVC or fiberglass).
- Provide heat and air conditioning in the electrical room. The rest of the building will have heat and ventilation.
- Provide an outside air ventilation system for the pipe tunnel. The system will be activated once someone opens the hatch.
- Corrosion-resistant electric unit heaters will be placed through-out the building.
- Temperature control for heat and ventilation will be provided with thermostats located in key areas of the building.
- No sanitary drains and no hose down drains will be routed to daylight. A 6-inch to 12-inch drain line will be connected to the sanitary sewer in the area.
- Hose bibs will be included in each chemical area.
- Provide a sump pump in the pipe tunnel. Route sump pump to sanitary and add a quick connect discharge attachment.

Building Electrical Considerations

This section describes the guidelines for the design of electrical system for the new pretreatment building. The objective of the design is to maintain a safe, reliable and maintainable electrical distribution system. The electrical features of the new building will include:

- All electrical components, including transformers, conductors, and overcurrent devices will be sized for the new loads and any known future loads per NEC.
- Maintenance and operation will be considered during design. This includes standardizing the type of equipment specified to ease operations, minimize maintenance time, and minimize maintenance parts; providing equipment and design that is safe, operable, and easily maintainable; and minimizing capitol, operations, and maintenance costs.
- The applicable standards and codes include the following:

  - National Electrical Code (NEC)
  - Kentucky Building Code (KBC)
  - Life Safety Code (NFPA 101)
  - National Electrical Safety Code (NESC)
  - National Fire Protection Association (NFPA)
  - Insulated Cable Engineers Association (ICEA)
  - National Electrical Manufacturers Association (NEMA)
  - Institute of Electrical and Electronic Engineers (IEEE)
  - American National Standards Institute (ANSI)
  - The Occupational Safety and Health Act (OSHA)
  - American Society for Testing and Materials (ASTM)
  - Underwriters Laboratory (UL)

- Exposed conduits in chemical areas will be PVC Schedule 80. Other areas including exterior locations will be aluminum. Underground conduit will be PVC Schedule 40, concrete encased. Final connections to motors and other vibrating equipment will be with flexible conduit.
- Provide spare conduits where appropriate for future use.
- Conductors will be NEC Type THHN/THWN for sizes #14 through #1 AWG; NEC Type XHHN for sizes #2 and larger.
- Use separate conduits for power, control and dc circuits.
- System voltage will be 208Y/120 volt, three-phase.
- NEMA 1, gasketed enclosures will be used in locations where the area is relatively dry and clean; NEMA 4X stainless steel or plastic enclosures for electrical equipment outside and in corrosive areas; NEMA 7/9 enclosures for any hazardous areas.
- Surge/Lightning protection will be provided at main switchgear, panelboards, PLC cabinet, PC and at all instruments susceptible to lightning damage.

- In any space within the building, adequate lighting levels will be maintained. The footcandle level for maintained illumination will be as recommended by IES, Lighting Handbook.
- Fluorescent fixtures will be used in interior spaces. Consider placing these fixtures on the walls rather than hanging from the ceiling. Exterior lighting will be high pressure sodium. All fixtures must be accessible for re-lamping and maintenance.
- Provide appropriate night lighting.
- Provide emergency lighting and exit lights in each area as required by the current KBC.

I&C/SCADA Considerations

The I&C/SCADA features of the new building will include:

- Provide an Allen-Bradley ControlLogix PLC in the electrical room for control and interface with chemical feed systems.
- Provide a computer with HMI in the electrical room. Computer will be Dell, HP, or IBM.
- SCADA control panel will be designed similar to the panels recently provided as part of the MPTP Chemical Feed project.
- Conduits for telephones will be installed as part of this project.
- The PLC will be connected to the FTTP SCADA and SQL server system via a 12-fiber cable. A new underground conduit will be installed connecting the pretreatment building to the FTTP SCADA system in the Hypo Building. The new conduit will be routed along the access road on the north side of the reservoir.
- Level indicators on the chemical storage tank will be a non-contact, ultrasonic device. Acceptable manufacturers are Siemens Milltronics, Endress & Hauser and STI Magnetrol.
- Level alarms will be included to detect when liquid is present inside the chemical containment area sump pump pit. The alarm will be tied to SCADA.
- Level alarms will be included to identify when liquid is present in the pipe tunnel. A high level alarm will be set 4 inches above the finished floor and a high-high level alarm will be set 8 inches above the finished floor. Once the level alarm is acknowledged, the operator will have the option to remotely release the door locks to allow water to escape in the event the pipe tunnel floods the building.
- Speed and stroke control will be required for chemical feed pumps. Chemical feed pumps will be set up to receive run and speed commands from the SCADA system.
- SCADA tag names will be consistent with FTTP's existing system.
- High pressure sensors will be used to shut down the metering pumps.
- The copper sulfate feed lines will have a magnetic flow meter with an input flow signal to SCADA. Acceptable manufacturers are Krohne and Endress & Hauser.

- The carbon and potassium permanganate feed lines will have a flow meter and require special consideration because of the solution. One possibility is a non-contact type flow meter such as an ultrasonic.
- All new data collection, programs and alarms will reside in the new PLC with data transferred to FTTP SCADA. New HMI screens will be developed to reflect the new chemical feed systems.
- As a precaution to flooding the building in the event of a leak in the 60-inch line, an overflow pipe from the pipe gallery to the reservoir will be installed.
- Flow for the three existing raw water lines is currently monitored by FTTP. SCADA will sum the flows and transmit this signal to the Pretreatment Facility for flow pacing of the chemical feed systems.

Chemical Feed Systems

Provisions will be made in the new pretreatment facility to accommodate chemical feed systems for copper sulfate, potassium permanganate and powder activated carbon. Details related to each chemical system are provided below.

In general, the new chemical feed systems will address the following key issues:

- Provide a sample tap in the new 60-inch line for a future turbidity monitor. Provide two 2-inch and two 3/4-inch spare taps for future connections. The 3/4-inch taps shall be ahead of the chemical injection points.
- All chemical injection taps shall be 2-inch.
- In each chemical area, provide two 3-inch spare sleeves through the floor and into the pipe tunnel. Cap-off for future use.
- The number of metering pumps will include an in-service spare (N+1) for each chemical. A spare pump on the shelf will be provided depending on the budget.
- Speed and stroke adjustment control are required for each pump.
- Calibration columns will be included with each pump and read in milliliters (not ounces or gallons). Make provisions for flushing of the feed pumps during cleaning. Include in-line strainers. Flooded suction for all pumps is preferred.

Copper Sulfate

Copper sulfate is primarily used at FTTP to control algae growth in the pre-settling lagoons. During the period November 2005–October 2006, NKWD fed approximately 17,350 pounds of copper sulfate. This was dosed periodically based upon raw water conditions. The normal dose during the period of application was 100 pounds per day (lb/d). The maximum dosage

during the period was 150 lb/d. For the purposes of design, the average feed rate was modified to 1.0 mg/l (177 lb/d at 21.0 MGD average flow) with a maximum design feed rate of 4.3 mg/l (918 lb/d at 44.0 MGD maximum flow over a 14-hour period of operation). This chemical is delivered to FTTP in pallets of dry bags (most dry bags are 50 pounds depending on manufacturer). The dry feed is then wetted and injected into the raw water. Key elements of the copper sulfate storage, wetting and feed system are provided below:

- Copper sulfate feed system will include two dry chemical feeders with augers and a 50-gallon solution tank similar to an Acrison W 105 unit.
- The dry feeder will have a bin storage capacity of approximately 7.5 cubic feet (or 11 bags). This is sized to accommodate 3.2 days of chemical feed at an average dosage and flow rate.
- Two Milton Roy "MaxRoy B-Series" chemical feed pumps will be installed to dose the chemical.
- Storage for four pallets of dry copper sulfate will be provided inside the new building.

Potassium Permanganate

Potassium permanganate (KMNO4) is available for injection at two locations in the process train for FTTP. The first (and primary) injection point is at the Ohio River Pumping Station with a secondary point being applied in the raw water lines adjacent to the existing Copper Building. KMNO4 is used as a pre-oxidant to control the formation of disinfection by-products such as trihalomethanes (THM) and haloacetic acids (HAA). In addition, KMNO4 can neutralize zebra mussels and reduce or eliminate colonization in pipes and structures. KMNO4 is a dry powder that is delivered to FTTP in 330 pound drums. During the period between November 2005 and October 2006, NKWD used approximately 47,800 pounds of KMNO4. On days of operation, the average dosage was approximately 177 lb/d with the maximum day being approximately 300 lb/d. For the purposes of design, the average feed rate was identified as 0.5 mg/l (88 lb/d at average flow) and the maximum feed rate was 2.0 mg/l (735 lb/d). This chemical is mostly dosed at the river but the system at the reservoirs needs to be capable of handling the same dose rates. Key elements of the KMNO4 system are provided below:

- Two eductors that will draw dry KMNO4 into contact with the plant water in order to form a well-mixed solution.
- One 2,500 gallon fiberglass bulk storage tank with mixer. Mixer is to be flanged mounted on top of the tank. KMNO4 is usually wetted at a 3 percent solution (0.26 lb KMNO4/gal solution). Therefore, the batch tank will hold approximately 650 lbs (dry weight) of KMNO4. At the average dosage rate in primary duty, the tank would have approximately 7.3 days of storage.

- The batch storage tank will have a minimum of 4 feet of headroom on top of the tank for service (also provide handrails on top of tank). Tank will be provided with site tubes. Tubes will be rigid and resistant to etching.
- Two Milton Roy "MaxRoy B-Series" chemical feed pumps will be utilized.
- The concrete containment area will be complete with a sump pump arrangement that pumps to either a sanitary line or back into the batch tank.

Powder Activated Carbon (PAC)

PAC is used for taste and odor control and other purposes at FTTP. The Copper Building is presently the primary feed point for this chemical. PAC is delivered in bulk to FTTP and stored in a silo. The PAC feed system consists of a dry feeder with a mixing tank attached to it. Warman metering pumps deliver the mixed product to its application point. This system has several challenges as detailed in Section 3 and will need rehabilitation or re-construction as part of this project.

PAC Bulk Storage

The size and condition of the silo have been evaluated as part of this preliminary design (refer to Section 3 of this report). That evaluation revealed concerns about the size and condition of the existing silo. For additional information, refer to the inspection report in Attachment J. Three options have been identified and evaluated as part of this report to correct this deficiency. These options include the rehabilitation of the existing PAC silo, the construction of a second silo to supplement the existing silo and the construction of a new larger silo.

The rehabilitation of the existing 28.5 ton (~1,800 cubic feet) silo would be the lowest cost option. However, the adoption of this option would not increase the PAC storage capacity of the facility to the recommended 2,500 cubic feet (*10 State Standards*). In addition, this option will result in a silo with a single hopper and therefore a single feed system. This system does not have redundancy or back-up feeders and any mechanical failures would take PAC out of service.

The construction of a second silo would be the most expensive. It would provide redundancy but would require the refurbishment of the existing silo which is costly compared to new construction. This option would provide ample capacity for the PAC system.

The construction of a new 2,500 cubic foot silo coupled with the demolition of the old silo is the final option. The new silo would have a dual hopper design which would allow for two feed system to be hooked to a single

silo. This would provide redundancy for the PAC system (refer to Attachment G). The new silo would be sized to meet PAC demands at the maximum feed rates so that deliveries could be optimized. This option does include the demolition or de-commissioning of the existing silo. However, the cost associated with renovating that facility is higher than new construction.

The decision on the silo essentially boils down to silo capacity, redundancy and cost. The rehabilitation of the existing silo is the low cost option but provides neither redundancy nor the desired silo capacity. The construction of a supplemental silo easily provides the capacity and redundancy but appears to be the most expensive. The construction of a new silo (third option) is close in cost to the rehabilitation option but can provide the desired redundancy and capacity.

Therefore, we recommend that a new silo be constructed. However, we think that the bid form should also include both of the other options for addressing the carbon silo in order to fully evaluate the cost versus benefit of both of these options. Regardless of which option is ultimately selected, some key design criteria for the PAC Silo is provided below:

- Install a new, single 2,500 cu.ft. (minimum) carbon silo adjacent to the new pretreatment building as detailed in the previous section or rehabilitate the existing silo as detailed in a subsequent section.
- Consider including aeration system in lieu of vibrator in order to produce consistent dry chemical feed top screw auger.
- Silo (new) will need to incorporate explosion proof motors as required by Kentucky Division of Water.
- Silo (new) configuration will be reviewed to provide serviceability and a separate housing for controls may be incorporated.
- Multiple bulk bins (pants leg design) is desirable if a new silo is built in order to provide redundancy and a countermeasure to mechanical failure.

PAC Feed System

The dosing system used for the PAC will be an eductor/wetting cone system unless NKWD determines that their operational preference is for a mixing tank/metering pump system. Both systems will utilize volumetric dry feeders to deliver the dry PAC to the wetting/dosing system and would be located in the enclosure below the silo similar to the present configuration. The eductor system does not require a mixing tank or metering pumps and produces accurate dosing for hard-to-wet chemicals such as PAC. Key design elements of the PAC system include:

- Design feed rate for the PAC has been established as 10.0 mg/l average with a minimum of 5.0 mg/l minimum and a maximum of 22.0 mg/l per pump.
- Size the chemical feeders for a maximum raw water flow of 60.0 MGD.

- As much as possible, the design will minimize the distance between the feeder and injection point. Provide blow-outs and wyes for flushing out the carbon lines.
- Provide a water solenoid valve and timer to periodically flush out the lines.
- Do not provide drain lines to daylight. Connect drains to sewer.

As described above, we recommend replacing the existing carbon silo with a new unit, however, it is also prudent to look at several available options to determine the financial impact so that we can stay within budget. As such we believe it makes sense to bid multiple options for the silo portion of the project. Our proposed bidding approach for the silo is identified below;

- Base bid includes the complete rehabilitation of the existing carbon silo with improvements or replacement of the dust collector, controls, and new solution lines. It would also include replacement of the two Warman "B005-MM10" centrifugal pumps.
- Additive Alternate No. 1 - Install a second silo (1,200 cu.ft. minimum) and rehabilitate the existing carbon silo. Both silos would utilize wetting cone/eductor systems.
- Additive Alternate No. 2 - Remove the existing silo completely and replace with one new single silo as previously recommended. The new silo would use two wetting cone/eductor systems.

Opinion of Probable Cost

An opinion of probable cost for the four alternates is included in Attachment I. The cost includes labor, materials, contingency, miscellaneous job factors, bonding, insurance, overhead and profit. The following table summarizes the cost for each alternate.

Alternate	*Location*	*Base Cost Option*	*Additive Alternate No. 1*	*Additive Alternate No. 2*	*Additive Alternate No. 3*
A	West of Copper Building close to Military Parkway	$2,058,382	$437,552	$264,132	$56,348
B	West of Copper Building at base of hillside	$2,087,710	$437,552	$264,132	$56,348
C	West of Copper Building built into hillside	$2,178,422	$437,552	$264,132	$45,676
D	East of Copper Building	$2,187,750	$437,552	$290,812	$45,676

Remarks:
1. Base cost includes reduced building footprint (deletes Carbon Room) and rehabbing existing carbon silo.
2. Additive Alternate No. 1 includes rehabbing the existing carbon silo and adding a second silo.
3. Additive Alternate No. 2 includes demolition of carbon silo and installing a new silo.
4. Additive Alternate No. 3 replaces the brick façade with stone.

Wonderware

At the time of the ATR demonstration in November, 2007, there were not enough improvements to Version 9.5 to justify an upgrade. Now that Version 10.0 is on the market, the enhancements create a more powerful and versatile HMI that NKWD may take advantage of to monitor and control their SCADA system. It is recommended that NKWD consider upgrading to Version 10.0 by contacting the distributor ATR to establish a budget. If the cost precludes doing anything prior to March 31, 2008, then consider getting the cost into a future capital improvement budget.

Recommendations

As a result of this report, the following key recommendations shall become the basis of design:

- Demolition of the existing Copper Building.
- Conventional type building construction as opposed to a bunker style.
- Site Alternate B.
- Building layout that excludes a carbon room by making the carbon feed system an integral part of the carbon silo.
- Brick façade as the base bid with a stone façade as an additive alternate.
- Refurbish and relocate existing PAC silo as the base bid with a new silo as an additive alternate.

Attachment B

Project Meeting Minutes

CH2MHILL Quest Northern Kentucky Water District

FTTP Pretreatment SCADA Phase 3 Improvements

TO: Amy Kramer, NKWD

FROM: Larry Anderson, Quest

COPIES: Brent Tippey, Quest
Frank Duran, CH2MHILL

DATE: September 14, 2007

SUBJECT: 09/07/07 Meeting Minutes

Attendees: Amy Kramer, NKWD
Amy Matracia, NKWD
Bill Wulfeck, NKWD
Mike Greer, NKWD
Jeff Schuchter, NKWD
Gary Long, NKWD
Brent Tippey, Quest

Items of Discussion:

1. The Revised Sections 3 and 4 of the Preliminary Engineering Report were reviewed. The following additions/revisions were noted:
   - Page 3-4, remove the fifth bullet under Copper Sulfate section.
   - Page 3-8, revise the Wonderware discussion to identify deficiencies in existing Wonderware Software. Discuss if features of the new Wonderware 10 make software deserving of installation in this project or in the next few years.
   - Page 4-4, Review the "R" value identified under Roofs section to determine if a higher value should be specified.
   - Page 4-7, the last bullet under Building Mechanical Considerations, add the following to the existing statement:
     "Route Sump Pump to sanitary and add a quick connect discharge attachment."
   - Page 4-10, revise the maximum design feed rate of the Copper Sulfate system to be 4.3 mg/l based on operating the plant at 44MGD over a 14-hour period rather than a 24-hour period.

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- Page 4-12, add description of each alternative in the table to prevent confusion.
- Page 4-12, add section in report about silo options including concerns about continued use of existing silo only.
- Cost Estimates – review values associated with silo modifications now that Horizon report is complete and revise if needed.
- Add Horizon Silo Inspection Report as Appendix to report.
- Add Stone façade as option to the cost estimates.

2. Also discussed incorporating a float switch to activate the front door in the event of a building flood from line break. Could use a handicap type door to accomplish. Send signal to SCADA if energized.
3. Add a jockey pump to the eductor feed system to cover the possible need.
4. Move hatch on Building D option to KMNO4 Dry Eductor area.
5. Move sump in future chemical area away from rollover curb or open wall.
6. NKWD would like to make a recommendation at the October board meeting, so the report needs to be finished by the end of September.
7. The next planned meeting is after final design has been initiated.

Action Items:

Quest

1. Revise report based on review comments and submit.
2. Resubmit the entire report after revisions have been made and approved.
3. Submit a review package one week prior to the next meeting.

NKWD

1. Check-out references for carbon silo's with wetting cone/eductors.
2. Conduct internal meeting with Ron/Bari to discuss alternatives and associated cost.

CH2MHILL Quest Northern Kentucky Water District

FTTP Pretreatment SCADA Phase 3 Improvements

TO: Amy Kramer, NKWD

FROM: Larry Anderson, Quest

COPIES: Brent Tippey, Quest
Frank Duran, CH2MHILL

DATE: September 5, 2007

SUBJECT: 07/18/07 Meeting Minutes

Attendees: Amy Kramer, NKWD
Jim Dierig, NKWD
Bill Wulfeck, NKWD
Kevin Owen, NKWD
Jeff Schuchter, NKWD
Gary Long, NKWD
Brent Tippey, Quest
Larry Anderson, Quest

Items of Discussion:

1. The Preliminary Engineering Report was reviewed. The following comments were noted:
   - Section 3-4, third bullet from the top of page: The exterior architectural features of the new building should match the historical features in the area.
   - Section 4-1: Tank demo is part of contract.
   - Section 4-3: delete accessible by persons with disability.
   - NkWD will provide and install card readers and control cable. Contractor will provide conduit and power wiring.
   - Provide small window in exterior doors.
   - Provide A/C and suspended ceiling in electrical room only.
   - Provide emergency eyewash inside building only. Flow switch to be for eyewash and shower.
   - Do not provide audible alarm for tank levels.
   - Bulk tank should be referred to as chemical batch tank.
   - Provide interior visual alarm for tank level.

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- Surge/Lightning protection to be provided on everything.
- If 60-inch pipe breaks, consider options for overflow protection. Consider overflow pipe to reservoir and input signal to SCADA to release doors to keep building from flooding.
- Provide 2-2" spare taps in 60-inch line.
- Provide 2-3/4" taps prior to chemical injection point.
- NKWD prefers 2" chemical taps.
- Provide floor sleeves for future chemical lines.
- There is a 6"-8" water line in the area with a fire hydrant Military Parkway.
- Provide 4' clearance above batch tank.
- Milton Roy Centrac S pumps may work with carbon.
- Carbon metering pumps will not be installed inside the building.
- Consider reducing building size for Alternate D by eliminating carbon room and storage area.

2. Consider the cost and structural integrity to rehab the existing carbon silo tank. The exterior surface was recently painted.
3. Consider eliminating the metering pumps on carbon and use a wetting cone/eductor system to inject carbon solution into the raw water line. If push water is used, NKWD would prefer a 2" line.
4. It would not be practical to relocate the existing silo.
5. Site layout Alternate's A and C are no longer under consideration.
6. NKWD wants to proceed with subsurface information on Site Alternate D. The back-up layout is Alternate B.
7. If the existing carbon silo is re-used, it should last at least 15 years.
8. NKWD recently replaced the carbon metering pumps and the cost was $40,000.
9. Base bid should have a brick façade and rehab the existing carbon silo. Additive Alternate #1 would be to replace the brick with stone. Additive Alternate #2 would be a new silo.
10. The valves at Dudley and FTTP are on hold and may not be a part of this project because of budget.
11. NKWD would like to make a recommendation at the October board meeting, so the report needs to be finished by the end of September.
12. The next planned meeting is August 29, 2007 at 1:00pm.

Action Items:

<u>Quest</u>

1. Revise report based on review comments.
2. Have Thelen obtain subsurface information for Site Alternate D.
3. Contact carbon silo vendors/reps and get a reference list of users with wetting cone/eductor systems.
4. Evaluate the structural integrity of the carbon silo tank and submit a report.
5. Revise chapter 4 and resubmit. Resubmit the entire report after the next review meeting.
6. Submit a review package one week prior to the next meeting.

NKWD

1. Authorize HDR/Quest to proceed with tank investigation study.
2. Check-out references for carbon silo's with wetting cone/eductors.
3. Conduct internal meeting with Ron/Bari to discuss alternatives and associated cost.

CH2MHILL Quest Northern Kentucky Water District

FTTP Pretreatment SCADA Phase 3 Improvements

TO: Amy Kramer, NKWD

FROM: Larry Anderson, Quest

COPIES: Brent Tippey, Quest
Frank Duran, CH2MHILL

DATE: January 19, 2007

SUBJECT: 01/17/07 Meeting Minutes

Attendees: Amy Kramer, NKWD
Jim Dierig, NKWD
Bill Wulfeck, NKWD
Kevin Owen, NKWD
Mike Casebolt, NKWD
Jeff Schuchter, NKWD
Scott Rymarquis, NKWD
William Stewart, NKWD
Brent Tippey, Quest
Larry Anderson, Quest

Items of Discussion:

1. The Preliminary Engineering Report was reviewed. The following comments were noted:
   - Report to include recommendation to not re-use the Copper Building.
   - Any improvements to the Copper Building that would be eligible for historical funding would be cosmetic in nature and would not include any improvements to accommodate the chemical feed systems.
   - The feed rate for a single PAC metering pump to be 5 mg/l to 20 mg/l. The total system to be capable of 5 mg/l to 40 mg/l.
   - The new carbon silo would have a divider wall and two hoppers.
   - The average PAC feed rate is 10-12 mg/l at 32 MGD of raw water flow. Revise the design considerations for carbon based on this feed rate/flow. Delete the "Theoretical Max" calculations
   - The carbon storage capacity to be shown in cubic feet or pounds.

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LEXINGTON, KENTUCKY 40509
859/223-3755 FAX 859/223-3150

- The existing wrought iron fencing around the Copper Building Basin is to be salvaged and turned over to NKWD.
- The chemical feed systems will be flow paced based on the existing flow meters for each of the 3 raw water lines. SCADA will sum the flows and send a signal to the Pretreatment Building for flow pacing.
- The Contractor to provide mounting brackets, conduit and wiring for 3 camera locations. NKWD will install the cameras and make final connections.
- The pipe tunnel access hatch along the west wall is to be moved away from the doors.
- Provide outside air ventilation in the pipe tunnel. A limit switch on the access hatch will activate the system.
- Delete the flow meter and goose neck on the 60-inch line.
- Provide a sump pump in the pipe tunnel with two level alarms – one at 4" above finished floor and the other at 8" above finished floor.
- Do not run sump drains to daylight. Provide 6"-12" drain lines.
- Provide space in the building for 4 copper sulfate skids.
- Provide space in the building for 12 -15 potassium permanganate drums.
- Increase the "R-Values" for the building walls.
- Provide A/C unit for the electrical room. Provide electric heat and ventilation in the rest of the building.
- Evaluate the potential use of gas heat for the building.
- Provide small windows in the upper half of the exterior doors.
- Do not provide any exterior windows. Add features in the wall that look like windows.
- Provide a flow switch for the eye wash station.
- Provide tempered water for the eye wash station.
- The flow meters for potassium permanganate and carbon should have similar corrosion considerations.
- All data will come to the FTTP SQL Server as well as SCADA.
- Add a mixer for the potassium permanganate bulk tank. Delete the day tank and transfer pumps.
- The metering pumps for potassium permanganate and copper sulfate will be Milton Roy MaxRoy B-Series pumps.
- The metering pumps for carbon will be Milton Roy Centrac S pumps.
- Provide blind flange on 6" line for future feed to the south reservoir.
- If existing silo is re-used, provide adequate access.
- The existing 42" raw water line is approximately 20' deep. The two 30" lines are approximately 4' deep.
- Copper sulfate comes in 50 lb bags.

2. A date for the next meeting has not been determined yet.

Action Items:

Quest

1. Revise report based on review comments.
2. Add photographs of Copper Building deterioration to the report.
3. The report to include renderings of the building that show brick or stone façades.
4. The report to include a section view of the pipe tunnel.
5. The report to include cost estimates for each alternative.
6. Add a discussion in the report for one versus two carbon silos.
7. Provide size of new carbon silo.
8. Verify that the carbon metering pumps will pump over the entire range of 5 mg/l to 40 mg/l.
9. Submit revised report one week prior to next meeting.

NKWD

1. Review report prior to next meeting.

CH2MHILL Quest Northern Kentucky Water District

FTTP Pretreatment SCADA Phase 3 Improvements

TO: Amy Kramer, NKWD

FROM: Larry Anderson, Quest

COPIES: Brent Tippey, Quest
Frank Duran, CH2MHILL

DATE: December 20, 2006

SUBJECT: 12/06/06 Meeting Minutes

Attendees: Amy Kramer, NKWD
Jim Dierig, NKWD
Bill Wulfeck, NKWD
Amy Matracia, NKWD
Kevin Owen, NKWD
Mike Casebolt, NKWD
Gary Long, NKWD
Jeff Schuchter, NKWD
Brent Tippey, Quest
Larry Anderson, Quest

Items of Discussion:

1. Existing Copper Building
   - The structural engineer has surveyed the building and determined that it cannot be modified as necessary to accommodate the new chemical feed systems.
   - Some piping inside the building will need to be modified and/or capped even if the building is not re-used.
   - Since the building cannot be re-used, the preference would be to demolish it, however, it must be confirmed if the building has any historical significance.
   - NKWD would like to relocate the Copper Building camera and security system to the new building. NKWD will be responsible for removal and relocation of equipment. Contractor to coordinate relocation during construction.
   - The Copper Building cannot be demolished until the new chemical feed systems are ready for the switchover.

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- The demo of the building will include the existing chemical tank.
- NKWD will remove the existing chemical feed pumps once the new chemical feed systems are operational.
- Any equipment not previously mentioned above is to be removed by the Contractor as part of the building demolition.

2. Site Layout
   - Four site layouts were considered.
   - NKWD would prefer to not relocate the existing fence and does not want the building within 10' of the fence. Therefore, Layout "A" was discarded.
   - The building should be parallel to Military Parkway.
   - Coordinate building location with existing pedestrian gate. Consider relocating gate beside vehicular gate.
   - Confirm depth of existing pipes.
   - The revised piping layout calls for the 3 existing raw water lines to be combined into (1) 60" pipe that would run through a 14' wide pipe tunnel below the building. The 60" pipe will have a flow meter and chemical injection points. The preferred meter would be a Venturi. The laying length on a Venturi this large would be approximately 14'.
   - The Venturi should be sized for flow ranges of 12 MGD to 60 MGD.
   - The proposed layout calls for a bypass around the Venturi. This could be useful during construction, but has limited value to NKWD once the project is constructed. Quest to provide cost alternatives before NKWD makes a final decision.
   - Venturi to be located upstream of the chemical injection points in a vault. The vault to be located outside the building with an access hatch. The top slab of the vault to be removable by crane with lifting eyes for access to the Venturi.
   - After the 60" line goes through the building it will separate back into the existing 3 raw water lines. Provide three manual gate valves to control the flow in each line.
   - The site layouts that merit additional consideration are B, C and D.

3. Building Layouts
   - Four building layouts were considered.
   - Delete external access to electric room.
   - NKWD prefers carbon inside the building to be wet, not dry.
   - The storage for KMNO4 will be in 330 lb drums. Provide space for 15 drums.
   - Provide one drum eductor for KMNO4.
   - FTTP uses about 3 drums of KMNO4 every two weeks.
   - All metering pumps to be redundant.
   - The KMNO4 storage tank to have four day capacity or approximately 2500 gallons.
   - The building layout calls for a future space. NKWD will only expect this if the space is available and does make the building larger.
   - The space allocated for future use should be left open without a storage tank. Provide joints in the exterior wall adjacent to the future space so that the wall can be removed to install a chemical tank in the future.

- The janitor and rest room may be combined to save some space.
- The electrical room appears to be larger than necessary and could be cut in half. Consider relocating some of this space to other areas.
- Provide a sample tap in the 60" line for a future turbidity monitor.
- Provide additional taps in the 60" line for future connections such as pilot testing.
- Provide two double doors into the building. Show one on the west side and one in the center of the south wall.
- The basis of design for metering pumps is to be Milton Roy diaphragm pumps.

4. Carbon Requirements
   - Don't provide space in the new building for carbon storage.
   - NKWD has problems with the solution lines clogging. Provide blow-outs and wyes for cleaning out carbon lines. Also, minimize the distance between the carbon feeder and the injection point.
   - 5 mg/l would be the minimum feed rate.
   - The average feed rate is 10 mg/l.
   - Provide a solenoid valve and timer to flush out the lines.
   - If a new silo is provided, do not provide drain lines to daylight. NKWD would prefer the drain lines be routed to the sewer.
   - Quest to discuss one tank versus two with vendors. Also, if we go with a single tank, can it be fitted with two cones.
   - 10 States Requirements for Carbon:
     - The required rate of feed of carbon in a WTP depends on the tastes and/or odor involved, but provisions should be made for adding from 0.1 mg/l to at least 40 mg/l.
     - Storage space should be provided for: (a) At least 30 days storage; (b) Convenient and efficient handling of chemicals; (c) Dry storage conditions and (d) A minimum storage volume of 1.5 times a truckload where purchased by truckload lot.
   - Items for consideration on silo sizing:
     - Theoretical max = 40mg/l x 8.33 x 44 MGD (FTTP max flow) = 14,661 lbs of PAC on max day
     - Maximum theoretical capacity = 14,661 lbs x 30 days/32 lbs per cubic ft density = 13,745 cubic ft = 102,810 gal
     - Current silo = 28.5 tons (from NKWD proposal) = 57,000lbs; 57,000/32 lbs per cubic ft = 1,781 cubic ft = 13,325 gallon silo
     - Truck volume = 6,000 gal; 6,000 gal x 1.5 = 9.000 gal silo
   - The estimated total storage volume for the new facility is 25,000 gallons or approximately twice as much as NKWD currently has available.
   - The options to consider are:
     - Re-use the existing tank and install an additional tank with equal capacity. The existing tank would require some modifications.
     - Demolish the existing tank and install one 25,000 gallon capacity tank.
     - Install two new tanks.

5. FTTP Valve Status – This part of the project is still on hold.

6. TMTP Dry Polymer Status – The dry polymer system design has been moved to the CH2MHILL project.

7. Pretreatment Building SCADA Fiber Route
   - NKWD had previously indicated that there was an existing underground conduit available that ran from the Hypo Building halfway to the Copper Building. After further investigation, a portion of this conduit route lays on top of the ground as it runs around the reservoir. It was determined that re-using the conduit would be unacceptable for the new fiber.
   - A new underground conduit with 12 fiber cables will be installed to connect the new Pretreatment PLC to the FTTP SCADA network.

8. Wonderware Demo Comments
   - At this time, there does not appear to be justification to upgrade to latest version of Wonderware. Since this portion of the project is down the road, it was decided to wait and evaluate the next Wonderware upgrade. Then, NKWD can evaluate whether to upgrade to the latest version or convert to Wonderware Industrial Application Server (IAS).
   - With respect to the MPTP Chemical Feed project currently underway, NKWD/Quest to consider the advantages of going with IAS on that project. Amy will contact ADGO and initiate some discussion.

9. The next meeting will be January 17, 2006, 9:00 a.m., at FTTP Lab.

Action Items:

Quest

1. Determine if the Copper Building has any historical significance.
2. Confirm depth of existing pipes.
3. Provide estimated cost of bypass piping.
4. Discuss one carbon silo tank versus two with vendors.
5. Evaluate the possibility of using IAS for MPTP Chemical Feed.
6. Quest to provide three site alternatives with estimated cost.
7. Quest to revise building floor plan based on comments.
8. Quest to provide a draft preliminary design memo.
9. Quest to submit preliminary review package one week prior to the next meeting.

NKWD

1. Contact ADGO to discuss Wonderware IAS possibilities at MPTP Chemical Feed.
2. Verify status of FTTP valves.

CH2MHILL Quest Northern Kentucky Water District

FTTP Pretreatment SCADA Phase 3 Improvements

TO: Amy Kramer, NKWD

FROM: Larry Anderson, Quest

COPIES: Brent Tippey, Quest
Frank Duran, CH2MHILL

DATE: October 30, 2006

SUBJECT: 10/11/06 Kickoff Meeting Minutes

Attendees: Amy Kramer, NKWD
Jim Dierig, NKWD
Bill Wulfeck, NKWD
Amy Matracia, NKWD
Kevin Owen, NKWD
Mike Casebolt, NKWD
Gary Long, NKWD
Jeff Schuchter, NKWD
Brent Tippey, Quest
Larry Anderson, Quest

Items of Discussion:

1. Introductions
   - Larry Anderson will function as project manager for Quest and be the point of contact. He will also serve as the lead on electrical and I&C design.
   - Brent Tippey will be the lead on process design.
   - A contact list has been created. Quest will forward to Amy Kramer for her input, then issue final document.

2. Communication
   - All communications to go through Amy Kramer. Direct communication between Quest and other NKWD personnel is acceptable as long as Amy is copied on all correspondence.
   - Draft meeting minutes to be sent to Amy Kramer for review and returned to Quest with comments. The final version will be sent back to Amy for her to distribute to the appropriate NKWD staff.

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LEXINGTON, KENTUCKY 40509
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3. Goals and Objectives
   - Upgrade the chemical pre-treatment facility and carbon silo at FTTP.
   - Automate three clearwell effluent valves at FTTP and the transmission main valve on the inlet to the Dudley tanks.
   - As an option, upgrade the TMTP sludge press polymer feed system. NKWD is currently trying to determine if this work will be a part of this project or should be included as part of a CH2M HILL Filter Backwash project.

4. Project Scope
   - Evaluate the existing Copper Building and make a recommendation whether to renovate this facility or demolish it and build a new pre-treatment building. Consideration to renovate will include cost, code issues, structural integrity and space allocation for new equipment. Either alternative would have to be presented to Management for review, so a fair assessment of either alternative must be considered.
   - Demolition of the existing building should include turning over existing chemical metering pumps to NKWD. Existing tanks will need to be demolished. Demolition will be addressed in the specifications.
   - The initial thought for renovating the Copper Building would include a building addition on the west side and replacement of the roof. The veneer of the new structure should match the existing.
   - Based on initial discussion, the preferred location for a new building would be between the fence and the driveway northwest of the existing building. The building will be rectangular in shape with the back facing Military Road. The building location and architectural features will have to be approved by Management prior to proceeding with detailed design. Some key features of a new building design should include:
     - Layout should include consideration of existing property line, setbacks and existing fence. Outside the fence is a parking area that belongs to NKWD and is currently not in active use.
     - There should not be any windows on the Military Road side of the building. Consider installing window outlines.
     - Provide building access on the front (south side) and side (west side only).
     - Provide access control and entrance alarms on doors and windows.
     - Relocate cameras and access control system from existing building to new building.
     - Chemical deliveries will be on the west side of the new building.
     - Provide access to all three raw water lines in the basement of the new building or inside a common vault. This will require relocating a short segment of raw water line.
     - Provide a separate room for the electrical/SCADA control panel.

5. The raw water flow range for FTTP is 12.0 – 60.0 MGD.
6. The proposed chemical feed systems to be located in the building are:
   - PAC – 10mg/l avg; 20 mg/l max
   - Copper – 1.0 mg/l avg; 2.5 mg/l max
   - KMnO4 – 0.5 mg/l avg; 2.0 mg/l max

Feed rates were based on MPTP design. However, it was recently identified that Ten State Standards Part 4.9.4.e (1997 edition) states that the required feed rate is at least 40 mg/l. The corresponding plant flow rate is not clear and should be investigated.

7. Some key features to consider for Carbon are:
   - The existing silo is approximately 12 years old.
   - Design to consider re-using the existing carbon silo (with some improvements) and add a second silo; or installing one larger carbon silo and removing the existing one.
   - The existing equipment is not very reliable and requires more than normal maintenance.
   - The dust collector does not operate properly.
   - The existing controls are complicated and difficult to trouble-shoot. There aren't any record drawings for the control panel.
   - The existing silo holds about 60,000 lbs and is in good shape.
   - Truck deliveries are about 40,000 lbs at a time.
   - When carbon is being fed, the existing system will last about one month.
   - If a new carbon silo is installed, consider using multiple bin shakers.
   - Design needs to consider the impact of GAC on PAC.
   - The silo should be sized to handle 44 MGD. The feeders should be sized for 60 MGD.
   -
8. NKWD prefers to install a ControlLogix PLC with HMI at the Copper Building with fiber optic cable to interface with FTTP SCADA. There are existing spare conduits out of the Hypo Building that run about half way to the Copper Building. These conduits, which run along the ground on the bank of the reservoir above the water level, could be used for the fiber cables. The suitability of re-using the conduits will be discussed.
9. SCADA control panel to be designed similar to panels provided as part of recent MPTP Chemical Feed project.
10. Provide flow meters on all chemical feed lines. Consider various alternatives for carbon feed lines such as ultrasonic meter that will be reliable for this chemical feed system.
11. NKWD is considering replacement of one of the clearwell effluent lines with a 42-inch line. This would impact the control valve requirements.
12. Any of the three clearwell effluent valves can be isolated during replacement which should minimize downtime.
13. The best place for 480 volt power to each valve may be the U.S. 27 pump station.
14. Consider running fiber optic cable to U.S. 27 pump station to eliminate the radio telemetry system and reduce response time between the pump station and FTTP SCADA network. Then, the effluent valves I/O could be routed to U.S. 27 pump PLC station instead of the Filter Building PLC-5 in the break room closet.
15. Consider installing a PLC at the Sludge Building for the clearwell effluent valves I/O.
16. Project will include the installation of new valves and actuators that can be modulated.
17. Avoid putting the valve actuators in the valve vault.

18. Valve actuator I/O is to be hard-wired to SCADA. NKWD does not want to use "smart" actuators with Ethernet connections to SCADA.
19. The FTTP effluent clearwell valves will be programmed to interface with U.S. 27, Latonia and West Covington pump stations; and 3 TMTP high service pumps.
20. The Dudley inlet valve will be programmed to interface with Richardson Road, Hands Pike and 6 TMTP high service pumps.
21. The new valve vault at Dudley should be setup to avoid the driveway. Consider the presence of concrete thrust blocks at the tee adjacent to the valves.
22. During the Dudley valve installation, the inlet lines are to be plugged so that the tanks can remain in service. The 6 TMTP high service pumps, Richardson Road and Hands Pike will have some downtime during valve installation.
23. NKWD does not have any record drawings on the Copper Building or Carbon Silo.
24. NKWD has found some B&N site drawings that may have some information. These have been sent to Quest.
25. Quest to assess the possibility of upgrading the current version of Wonderware to the latest version. Options, cost, advantages and disadvantages will be summarized in a memo.
26. The next meeting will be November 30, 2006, 9:00 a.m., at FTTP Lab.

Action Items:

Quest

1. Develop kickoff meeting minutes.
2. Develop contact list.
3. Verify property line location adjacent to potential area for new building. Check with Thelen to see if they have any survey information that might be useful.
4. Check with Thelen to see if they have any existing geotech information in the Copper Building area.
5. Verify Ten State Standards for PAC feed maximum capacity.
6. Confirm if SCADA telemetry system at the U.S. 27 pump station can be polled more often.
7. Setup demo at ATR facilities for NKWD to view potential Wonderware upgrades. NKWD could have as many as 6 people attend. Potential dates for demo are 10/25, 10/27, 10/30 or 11/1.
8. Provide Wonderware evaluation memo.

NKWD

1. Verify if the polymer system at TMTP will be a part of this project.
2. Verify if 42-inch clearwell effluent line at FTTP will be installed.
3. Verify if additional work will be required at TMTP to replace the existing PLC-5 panels.

Attachment C

Existing Copper Building Investigation Report

freeland harris
consulting engineers
108 esplanade • suite 210
lexington, kentucky 40507 • (859) 252-6413

November 27, 2006

Quest Engineers
2517 Sir Barton Way
Lexington, Kentucky 40509

Attn: Larry Anderson

Re: Northern Kentucky Water District
Existing Pretreatment Building Investigation
Ft. Thomas, Kentucky

Dear Larry;

On November 7, 2006 I visited the Northern Kentucky Water Treatment Plant to observe the structural condition of the existing pre-treatment building. To my knowledge no plans exist for this building, thus the age of this structure is not known. However, I suspect that the structure is approximately 100 years old. A description of the building is as follows:

- This building is a two-story structure, comprised of load bearing brick masonry walls (generally three wythes thick and two wythes around windows). These walls appeared to be non-reinforced.
- The second floor structure is comprised of 2 x 10 floor joist supported on steel or wood beams.
- The roof structure is wood trusses spaced at 24" on center.
- The ground level floor consists of concrete slab-on-grade with many elevation "irregularities".
- The structure appeared to be in generally good condition, especially, considering it's age. The most common structural deficiency observed was random wall cracks.
- The structure showed no indications of significant settlement or movement due to fatigue caused by excessive loading or deterioration.

Although, this structure is generally in good condition, I have the following areas of concern when considering it for expanded use.

- The existing facility does not meet the structural criteria for the current Kentucky Building Code. The code allows existing structures to remain in service for continued use without being brought into compliance with new code requirements, if the occupancy is unchanged or the alterations are not major. However, if a change of use is desired or the alterations are major, the structure must be brought into compliance with the current code. It is likely that the necessary changes would require the structure to be brought into compliance with the current code. This could be virtually impossible to accomplish.

- The possibility of removing the second floor structure to provide additional usable height was questioned. This will not be possible without considerable modification to the structure. The second floor structure currently provides lateral stability to the non-reinforced brick wall. If the second floor structure was removed, a secondary framing system would need to be installed behind the existing brick wall. It is anticipated that this secondary system would not be cost effected and would likely interfere with the desired usable space. This alteration would also be considered major, thus, requiring the existing building to be brought into compliance with the current code.

- If certain conditions are met, the code will allow one to construct an addition to the existing building without bringing the existing building into current seismic requirements. However, unless the addition is very small, or completely detached from the existing building it is unlikely that these conditions could be met. It would be virtually impossible to bring the existing structure into compliance with the current seismic requirements.

In summary, it is unlikely that the existing building could be utilized without significant code required modifications. Thus, I feel that this building is not a good candidate for expanded use. This conclusion is based on my general understanding of the anticipated modifications that will be required. I ask that you consider these comments in your conceptual design. As the design is finalized, the specific considerations can be addressed.

Sincerely,

Eddie Alexander, PE
Principal Engineer

KY PE License No. 16412

Attachment I

Opinion of Probable Cost

CONSTRUCTION COST ESTIMATE

( ) No Design Complete
(X) Preliminary
( ) Final Design

Project: NKWD FTTP SCADA Phase 3 Improvements
Project No.: 06410
Checked By: RLA

Date: 9/26/2007 11/5/2007
Estimated By: RLA
Drawing No.:

Summary Of: Pretreatment Facility Alternate A	Quantity		Material		Labor/Equipment		Total Cost
	No. Units	Unit Measure	Per Unit	Total	Per Unit	Total	
				$ -		$ -	$ -
Site Work/Misc Piping	1	lot		$ -		$ -	$ 860,000
Copper Bldg Demo	1	lot		$ -		$ -	$ 25,000
Building	1	lot		$ -		$ -	$ 300,000
Carbon Silo Modifications	1	lot		$ -		$ -	$ 150,000
Electrical/Inst	1	lot		$ -		$ -	$ 165,000
Fiber Connection to SCADA	1	lot		$ -		$ -	$ 23,000
Carbon Silo Relocation	1	lot		$ -		$ -	$ 20,000
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SUBTOTAL				$ -		$ -	$ 1,543,000
Misc - 8%				$ -		$ -	$ 123,440
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 1,666,440
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 123,440
SUBTOTAL							$ 1,789,880
OH/Profit - 15%				$ -		$ -	$ 268,482
Sheet Totals							$ 2,058,362

Quest

CONSTRUCTION COST ESTIMATE

( ) No Design Complete
(X) Preliminary
( ) Final Design

Project:	**NKWD FTTP SCADA Phase 3 Improvements**	**Date:**	**9/26/2007** **11/1/2007**
Project No.:	**06410**	**Estimated By:**	**RLA**
Checked By:	**RLA**	**Drawing No.:**	

Summary Of: Pretreatment Facility	***Quantity***		***Material***		***Labor/Equipment***		***Total Cost***
Alternate B	***No. Units***	***Unit Measure***	***Per Unit***	***Total***	***Per Unit***	***Total***	
				$ -		$ -	$ -
Site Work/Misc Piping	1	lot		$ -		$ -	$ 882,000
Copper Bldg Demo	1	lot		$ -		$ -	$ 25,000
Building	1	lot		$ -		$ -	$ 300,000
Carbon Silo Modifications	1	lot		$ -		$ -	$ 150,000
Electrical/Inst	1	lot		$ -		$ -	$ 165,000
Fiber Connection to SCADA	1	lot		$ -		$ -	$ 23,000
Carbon Silo Relocation	1	lot		$ -		$ -	$ 20,000
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SUBTOTAL				$ -		$ -	$ 1,565,000
Misc - 8%				$ -		$ -	$ 125,200
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SUBTOTAL				$ -		$ -	$ 1,690,200
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 125,200
SUBTOTAL							$ 1,815,400
OH/Profit - 15%				$ -		$ -	$ 272,310
		Sheet Totals					$ 2,087,710

Quest

CONSTRUCTION COST ESTIMATE

( ) No Design Complete
(X) Preliminary
( ) Final Design

Project: NKWD FTTP SCADA Phase 3 Improvements
Project No.: 06410
Checked By: RLA

Date: 9/26/2007 11/1/2007
Estimated By: RLA
Drawing No.:

Summary Of: Pretreatment Facility	Quantity		Material		Labor/Equipment		Total Cost
Alternate C	No. Units	Unit Measure	Per Unit	Total	Per Unit	Total	
				$ -		$ -	$ -
Site Work/Misc Piping	1	lot		$ -		$ -	$ 950,000
Copper Bldg Demo	1	lot		$ -		$ -	$ 25,000
Building	1	lot		$ -		$ -	$ 300,000
Carbon Silo Modifications	1	lot		$ -		$ -	$ 150,000
Electrical/Inst	1	lot		$ -		$ -	$ 165,000
Fiber Connection to SCADA	1	lot		$ -		$ -	$ 23,000
Carbon Silo Relocation	1	lot		$ -		$ -	$ 20,000
				$ -		$ -	$ -
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				$ -		$ -	$ -
SUBTOTAL				$ -		$ -	$ 1,633,000
Misc - 8%				$ -		$ -	$ 130,640
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 1,763,640
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 130,640
SUBTOTAL							$ 1,894,280
OH/Profit - 15%				$ -		$ -	$ 284,142
		Sheet Totals					$ 2,178,422

Quest	CONSTRUCTION COST ESTIMATE
	( ) No Design Complete (X) Preliminary ( ) Final Design
Project: NKWD FTTP SCADA Phase 3 Improvements **Project No.:** *06410* **Checked By:** RLA	**Date:** 9/26/2007 **Estimated By:** RLA **Drawing No.:**

Summary Of: Pretreatment Facility	Quantity		Material		Labor/Equipment		Total Cost
Alternate D	No. Units	Unit Measure	Per Unit	Total	Per Unit	Total	
				$ -		$ -	$ -
Site Work/Misc Piping	1	lot		$ -		$ -	$ 975,000
Copper Bldg Demo	1	lot		$ -		$ -	$ 25,000
Building	1	lot		$ -		$ -	$ 300,000
Carbon Silo Modifications	1	lot		$ -		$ -	$ 150,000
Electrical/Inst	1	lot		$ -		$ -	$ 165,000
Fiber Connection to SCADA	1	lot		$ -		$ -	$ 25,000
				$ -		$ -	$ -
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SUBTOTAL				$ -		$ -	$ 1,640,000
Misc - 8%				$ -		$ -	$ 131,200
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 1,771,200
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 131,200
SUBTOTAL							$ 1,902,400
OH/Profit - 15%				$ -		$ -	$ 285,360
			Sheet Totals				$ 2,187,760

Quest	CONSTRUCTION COST ESTIMATE
	( ) No Design Complete (X) Preliminary ( ) Final Design
Project: NKWD FTTP SCADA Phase 3 Improvements **Project No.:** 06410 **Checked By:** RLA	**Date:** 9/26/2007 **Estimated By:** RLA **Drawing No.:**

Summary Of: Pretreatment Facility	***Quantity***		***Material***		***Labor/Equipment***		***Total Cost***
Additive Alternate No. 1	***No. Units***	***Unit Measure***	***Per Unit***	***Total***	***Per Unit***	***Total***	
				$ -		$ -	$ -
Carbon Silo	1	lot		$ -		$ -	$ 325,000
Concrete Pad	1	lot		$ -		$ -	$ 3,000
				$ -		$ -	$ -
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				$ -		$ -	$ -
SUBTOTAL				$ -		$ -	$ 328,000
Misc - 8%				$ -		$ -	$ 26,240
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 354,240
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 26,240
SUBTOTAL							$ 380,480
OH/Profit - 15%				$ -		$ -	$ 57,072
		Sheet Totals					$ 437,552

Quest

CONSTRUCTION COST ESTIMATE

( ) No Design Complete
(X) Preliminary
( ) Final Design

Project:	**NKWD FTTP SCADA Phase 3 Improvements**	**Date:**	**9/26/2007** **11/1/2007**
Project No.:	**06410**	**Estimated By:**	**RLA**
Checked By:	**RLA**	**Drawing No.:**	

Summary Of: Pretreatment Facility	***Quantity***		***Material***		***Labor/Equipment***		***Total Cost***
Additive Alternate No. 2 (A, B, C)	***No. Units***	***Unit Measure***	***Per Unit***	***Total***	***Per Unit***	***Total***	
				$ -		$ -	$ -
New Carbon Silo	1	lot		$ -		$ -	$ 350,000
Concrete Pad	1	lot		$ -		$ -	$ 3,000
Delete Ex Silo Rehab	1	lot		$ -		$ -	$ (170,000)
Carbon Silo Demo	1	lot		$ -		$ -	$ 15,000
				$ -		$ -	$ -
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SUBTOTAL				$ -		$ -	$ 198,000
Misc - 8%				$ -		$ -	$ 15,840
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 213,840
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 15,840
SUBTOTAL							$ 229,680
OH/Profit - 15%				$ -		$ -	$ 34,452
		Sheet Totals					$ 264,132

Quest

CONSTRUCTION COST ESTIMATE

( ) No Design Complete
(X) Preliminary
( ) Final Design

Project: NKWD FTTP SCADA Phase 3 Improvements
Project No.: 06410
Checked By: RLA
Date: 9/26/2007 11/1/2007
Estimated By: RLA
Drawing No.:

Summary Of: Pretreatment Facility	*Quantity*		*Material*		*Labor/Equipment*		*Total Cost*
Additive Alternate No. 2 (D)	*No. Units*	*Unit Measure*	*Per Unit*	*Total*	*Per Unit*	*Total*	
				$ -		$ -	$ -
New Carbon Silo	1	lot		$ -		$ -	$ 350,000
Concrete Pad	1	lot		$ -		$ -	$ 3,000
Delete Ex Silo Rehab	1	lot		$ -		$ -	$ (150,000)
Carbon Silo Demo	1	lot		$ -		$ -	$ 15,000
				$ -		$ -	$ -
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SUBTOTAL				$ -		$ -	$ 218,000
Misc - 8%				$ -		$ -	$ 17,440
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 235,440
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 17,440
SUBTOTAL							$ 252,880
OH/Profit - 15%				$ -		$ -	$ 37,932
		Sheet Totals					$ 290,812

Quest	CONSTRUCTION COST ESTIMATE
	( ) No Design Complete (X) Preliminary ( ) Final Design
Project: NKWD FTTP SCADA Phase 3 Improvements **Project No.:** 06410 **Checked By:** RLA	**Date:** 9/26/2007 **Estimated By:** RLA **Drawing No.:**

Summary Of: Pretreatment Facility	*Quantity*		*Material*		*Labor/Equipment*		*Total Cost*
Additive Alternate No. 3 (A & B)	*No. Units*	*Unit Measure*	*Per Unit*	*Total*	*Per Unit*	*Total*	
				$ -		$ -	$ -
Stone Veneer	1	lot		$ -		$ -	$ 79,200
Brick Veneer	1	lot		$ -		$ -	$ (36,960)
				$ -		$ -	$ -
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SUBTOTAL				$ -		$ -	$ 42,240
Misc - 8%				$ -		$ -	$ 3,379
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 45,619
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 3,379
SUBTOTAL							$ 48,998
OH/Profit - 15%				$ -		$ -	$ 7,350
		Sheet Totals					$ 56,348

Quest

CONSTRUCTION COST ESTIMATE

( ) No Design Complete
(X) Preliminary
( ) Final Design

Project: NKWD FTTP SCADA Phase 3 Improvements
Project No.: 06410
Checked By: RLA

Date: 9/26/2007
Estimated By: RLA
Drawing No.:

Summary Of: Pretreatment Facility	*Quantity*		*Material*		*Labor/Equipment*		*Total Cost*
Additive Alternate No. 3 (A & B)	*No. Units*	*Unit Measure*	*Per Unit*	*Total*	*Per Unit*	*Total*	
				$ -		$ -	$ -
Stone Veneer	1	lot		$ -		$ -	$ 64,200
Brick Veneer	1	lot		$ -		$ -	$ (29,960)
				$ -		$ -	$ -
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SUBTOTAL				$ -		$ -	$ 34,240
Misc - 8%				$ -		$ -	$ 2,739
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 36,979
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 2,739
SUBTOTAL							$ 39,718
OH/Profit - 15%				$ -		$ -	$ 5,958
		Sheet Totals					$ 45,676

Attachment J

Existing Carbon Silo Inspection Report

HDR Engineers, Inc.
NKWD FTTP
Carbon Storage Silo

To: HDR Engineers, Inc.
Attn: Larry Anderson, P.E.

Copies: Horizon QC Inc. File

From: C. Mike Topp, Horizon QC

Date: 9 Aug 07

Project No: (CON0021948)

On July 26th 2007, Horizon QC inspected the Carbon Storage Silo located at the NKWD FTTP. The purpose of the inspection was to evaluate the exterior and interior coatings, metal thickness, tank structure, and complete lab analysis of paint samples. The carbon storage silo was inspected while in service.

This report summarizes Horizon QC (Horizon's) observations and recommendations of the carbon storage silo. Photographs from this evaluation are provided in Attachment A. Paint chip samples for lead, chrome, cad lab results are provided in attachment B.

BACKGROUND

Chemco Equipment Company erected the carbon storage silo in 1994.

The carbon silo is located in FT. Thomas, Kentucky. The silo is situated in the rear section of the water treatment plant grounds. The site is accessible by vehicles and has adequate parking.

The carbon silot has been repaired for corrosion issues several times over the last 10 years. A recent overcoat paint application of the exterior was completed during the last two years. The silo has 34-foot sidewalls and is 15-foot in diameter.

OBSERVATIONS

Horizon QC (Horizon) inspected the carbon silo for coating related issues, obvious structural problems, and metal thickness. The inspection covered all portions of the exterior and interior portions visible from the floor section. The following observations were noted:

Exterior

- Overall condition of the exterior should be considered Good/Fair. Corrosive coating spot failures are found mainly on the control box and lower sidewall.

- Control box is in poor condition with significant metal loss to the lower sections. Coating failure found throughout the inside of the box to the substrate. Metal thickness of **Failing Areas** (Inches). 124, 173, .124, .119, .124, .183, **Non-Failing Areas** (Inches). 242, .247. Dry film thickness 7.9 – 12.7 mils.

- Lower sidewall corrosion found along the lower sidewall and base plate. Metal thickness readings of sidewall: **Failing Areas-** (Inches). 173, .183, .223 **Non-Failing Areas-** (Inches). 227, .230, .232 Failing areas cover the lower 12 inches of the sidewall. Dry film thickness 14-18 mils.

- Upper sidewall sheets are in good condition with no corrosion. Dry film thickness in excess of 20 mils.

- Roof section is in good condition with no corrosion found. Miscellaneous equipment, (dust collector) etc. is properly coated with no signs of any corrosion. Dry film thickness was 18-26 mils. Aluminum roof handrails are in good condition.

- Sidewall entry door is in poor condition, have both corrosion and mechanical damage.

- Concrete foundation is in good condition with no exposed aggregate. Staining from the carbon can be found on the foundation as a result an internal leakage. The leak is occurring between the foundation and steel base plate seam.

- Exterior paint chip samples pulled for lab testing.

- Exterior ladder is in good condition (Aluminum)

Interior

- Overall condition can be considered Good/Poor. Areas of corrosion found mostly on the lower sections below the grating.
- 3 to 4 inches of water/carbon slurry below the grating.
- Anchor plates are in poor condition with coating failure and corrosion. Metal thickness readings: (Inches) .472, .482, .492, .555
- Lower sidewall has random spot failure and corrosion. Metal thickness readings: (Inches) .208, .198, .203, .172, .210
- Upper sidewall covered in shroud not accessible for inspection.
- Equipment Structural Steel Supports are in poor condition with heavy corrosion and coating failure. Tubular steel supports metal thickness (Inches) .188, .171, .212
- Mixing equipment is in good condition (stainless steel)
- Carbon hoppers are in good condition without any corrosion or coating failure
- Floor section covered in fiberglass grating.
- Carbon container area not accessible for inspection.
- Sample paint chips pulled analysis.

Coatings Test

Adhesion Test- ASTM D3359 adhesion test was conducted on the accessible interior portions of the silo. Scale 0 = poor adhesion & 5 = good adhesion, the topcoat had a **2** adhesion mark.

Solvent Sensitivity Test- ASTM D5402 found on exterior finish coat with a moderate/good resistance to MEK solvent.

Lab testing 1. Interior – No lead, chromium, cadmium

2. Exterior – No lead, chromium, cadmium

Recommendations

Interior

The overall condition of the interior remains good above the grating, where the water carbon slurry is not present. The stainless steel mixing equipment has been cleaned on a daily basis as does not require any maintenance work at this time.

The condition of the carbon steel below the grating has degraded due to the immersion environment. The daily power washing of the interior equipment allows water to pond on the silo floor in wet carbon slurry. The protective coatings found on the lower sidewalls and structural supports were not designed for immersion service. The premature coating failure has resulted in heavy corrosion. Drain holes cannot be added to the lower sidewalls to alleviate the slurry ponding, because the carbon must be contained. Due to the silo design and the inability to drain the wet carbon slurry, metal loss will continue from corrosion on the carbon steel.

The condition of the interior steel and protective coatings on the lower section of the silo does warrant immediate remediation. Repairs should be made within the next 0-2 years before additional damage to the steel substrate can occur. Horizon suggests the following method for remediation:

1. Complete removal of the interior coating system **(SSPC SP-10)**. This method should be considered the most appropriate method. A new epoxy system, (Immersions Grade) if properly applied, should last for 10-15 years before any remediation will be necessary again.

    1. **SSPC SP-10** surface preparation for all interior surfaces. Performed within **0-2** years.
    2. Caulk all edges and seams. Caulk should be Sika-flex 1a.
    3. Plate any pitted areas where metal loss is more than half of steel thickness.
    4. Apply a three (3)-coat system of epoxy (12-16 mils). Stripe coat all seams.

Exterior

At present the exterior coating system is in good/fair condition with an adequate protection to the underlying substrate. Due to marginal adhesion in areas near the lower sidewall spot failure has occurred. This premature coating failure should be monitored for any further damage to the coating system. Horizon recommends abrasively cleaning the lower 12 inches of the sidewall in conjunction with interior repairs.

The control box's condition warrants replacing due to the metal loss and the leaks allowing the penetration of rainwater. If the control box is going to remain in service, then steel sections need to be replaced to maintain structural integrity. The box should be seal welded or caulked to prevent rainwater from entering the box.

Horizon presents the following methods of remediation for consideration:

1. A complete removal of the coating system **(SSPC SP-6)** on the lower 12 inches of the sidewall.

    1. **SPC-6** all exterior surfaces.
    2. Apply two coats of epoxy and one coat of polyurethane.

2. Replace or repair the Control Box

CORROSION CONTROL CONSULTANTS & LABS INC. a GPI company

ANALYTICAL LABORATORY REPORT

Wednesday, August 08, 2007 Page 1 of 1

CLIENT: Horizon QC
P.O. Box 338
Campbellsburg, KY 40011

DATE RECEIVED: Friday, August 03, 2007
DATE COMPLETED: Wednesday, August 08, 2007
PO/PROJECT #:
SUBMITTAL #: 38443

Preparation Method: EPA 600/R-93/200M-P (Total Metals in Paint Chips, Sonication)
Analysis Method: EPA 6010B (ICP-AES Method for Determination of Metals)

LAB NUMBER: AA 12812
Sampled By: Mike Topp
Job Location: Northern KY Carbon Tank
Sample Identification: 1- Carbon Tank N. KY
Date Sampled: Thursday, July 26, 2007
Sample Description: Paint Chips

ELEMENT	RESULT (by weight)	REPORTING LIMIT
Lead	***ND**	0.0050 %
Chromium	***ND**	0.0013 %
Cadmium	***ND**	0.00075 %

Unless Otherwise Noted: 1.) All Of The Quality Control Meets The Requirements.
2.) The Condition Of Each Sample Was Acceptable Upon Receipt

Test Reviewed By: Megan Cornell, Senior Chemist

*Not Detected At The Reporting Limit

Megan Cornell

Corrosion Control Consultants & Labs, Inc. Is AIHA Accredited In The Environmental Lead Program For Paint, Soil, Dust Wipes And Air; And In The Industrial Hygiene Program For Metals.

CHAIN OF CUSTOD. .ORM

Send To:

Corrosion Control Consultants & Labs, Inc. a GPI company

4403 Donker Ct Kentwood MI 49512-4054

ph: 616-940-3112 fx: 616-940-8139 web-sites: www.ccclabs.com www.gpinet.com

FOR LAB USE ONLY

Properly Contained	(YES)	NO	N/A
Properly Filled	YES	NO	(N/A)
Adequate Cooling	YES	NO	(N/A)
Adequate Ph Adjust	YES	NO	(N/A)

Lab acidified: By/Date:

Company:	Address:	Company Contact: Mike Topp	P.O./Proj #:
Horizon Inspection Inc.	P.O. Box 338 Campbellsburg, KY. 4011	Telephone: 502-727-2828	Job Location: Northern KY Carbon Tank

MATRIX

- [x] PAINT CHIPS
- [ ] SOIL
- [ ] SPENT ABRASIVE
- [ ] WIPE
- [ ] WIPE, COMPOSITE
- [ ] WIPE BRAND_____
- [ ] WASTEWATER
- [ ] WATER, DRINKING
- [ ] PROCESS DISCHARGE WATER
- [ ] 37 mm CASSETTE
- [ ] TSP FILTER
- [ ] PM 10 FILTER
- [ ] OTHER _____

TOTAL CONCENTRATION

- [ ] LEAD
- [x] LEAD, CAD, CHROME
- [ ] RCRA (8) METALS
- [ ] OTHER _____

WASTE CHARACTERIZATION

- [ ] LEAD TCLP
- [ ] RCRA (8) METALS TCLP
- [ ] OTHER_____

MISC. TESTS

- [ ] pH (Corrosivity)
- [ ] Ignitability
- [ ] Chloride / Flouride
- [ ] Reactivity
- [ ] Other _____

Turnaround Time:

- [ ] Rush (1 day)*
- [x] Standard (2-4 days)
- [ ] Other_____ **

Special Instructions:

Email results to: mike@horizonqc.com

*1 day turn around not available for TCLP or PM10

**For Same Day or accererated turn around indicate request

CCC&L accepts Visa, MasterCard, and American Express. Please call for information.

CCC&L Lab No.	Sample Number	Date/Time Sampled	Sample Identification/Location	WIPES Area wiped (sq.ft.)	AIR SAMPLES TIME START	TIME STOP	FLOW RATE START	FLOW RATE STOP	FLOW RATE UNITS
AA12812	1	26-Jul-07	Carbon Tank N.KY						

Sampled By (Please print) : Mike Topp Date Submitted: 31 July 07 Signature: Mike Topp

Received by: _____ Date/Time: _____ Relinquished Date/Time: _____

Received by: M. Cornell Date/Time: 8-3-07 2:10PM ~~Relinquished Date/Time:~~ 38443 | 2007-08-03-013

Form #53

Case No. 2008-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

Project
Fort Thomas Treatment Plant Pretreatment Improvements

Kenton County
184-411.502

Engineer's Opinion of Probable Total Construction Cost

Quest

	CONSTRUCTION COST ESTIMATE
	( ) No Design Complete
	( ) Preliminary
	(X) Final Design

Project:	NKWD FTTP Pretreatment Improvements	Date:	9/26/2007; 11/1/07; 1/16/08; 3/28/08
Project No.:	06410	Estimated By:	RLA
Checked By:	RLA	Drawing No.:	

Summary Of: Pretreatment Facility	*Quantity*		*Material*		*Labor/Equipment*		*Total Cost*
Base Bid w/ New Silo	*No. Units*	*Unit Measure*	*Per Unit*	*Total*	*Per Unit*	*Total*	
				$ -		$ -	$ -
Site Work/Misc Piping	1	lot		$ -		$ -	$ 897,000
Copper Bldg Demo	1	lot		$ -		$ -	$ 35,000
Building	1	lot		$ -		$ -	$ 300,000
Carbon Silo	1	lot		$ -		$ -	$ 350,000
Electrical/Inst	1	lot		$ -		$ -	$ 165,000
Fiber Connection to SCADA	1	lot		$ -		$ -	$ 23,000
Carbon Silo Pad	1	lot		$ -		$ -	$ 8,000
Building/Carbon Silo Caissons	1	lot		$ -		$ -	$ 34,000
Storm Sewer Pipe Rerouting	1	lot		$ -		$ -	$ 5,000
Sanitary Sewer Grinder PS	1	lot		$ -		$ -	$ 8,000
				$ -		$ -	$ -
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				$ -		$ -	$ -
				$ -		$ -	$ -
SUBTOTAL				$ -		$ -	$ 1,825,000
Misc - 8%				$ -		$ -	$ 146,000
				$ -			$ -
SUBTOTAL				$ -		$ -	$ 1,971,000
Mobilization, Bonds, Etc - 8%				$ -		$ -	$ 146,000
SUBTOTAL							$ 2,117,000
OH/Profit - 15%				$ -		$ -	$ 317,550
		Sheet Totals					$ 2,434,550

Case No. 2008-____
Exhibit ____A____

NORTHERN KENTUCKY WATER DISTRICT

Project
Fort Thomas Treatment Plant Pretreatment Improvements

Kenton County
184-411.502

Plans and specifications prepared by HDR Quest titled "Fort Thomas Treatment Plant Pretreatment Building Improvements"

Submitted as separate attachments

Northern Kentucky
Water District

The following items are enclosed separately from this volume.

- Plans prepared by Quest titled "Fort Thomas Treatment Plant Pretreatment Building Improvements" dated March, 2008. (5 sets)

- Specifications prepared by Quest titled "Fort Thomas Treatment Plant Pretreatment Building Improvements" dated March, 2008. (5 sets)

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