

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF NORTHERN KENTUCKY)	
WATER DISTRICT FOR)	Case No. 2017-00147
ISSUANCE OF A CERTIFICATE OF)	
CONVENIENCE AND NECESSITY)	
FOR THE TAYLOR MILL WATER TREATMENT PLANT)	

APPLICATION FOR APPROVAL OF CONSTRUCTION

Northern Kentucky Water District (NKWD), by counsel, petitions for an order approving the repairs and construction of the Taylor Mill Water Treatment Plant as described below pursuant to KRS 278.020. In support of the application, the following information is provided:

1. NKWD's office address is 2835 Crescent Spring 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 and is incorporated by reference.

Its contact officer is:

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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 incorporated by reference.

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. NKWD proposes to construct new facilities as described in Exhibit A. The project consists of replacement of the belt filter and related construction at the Taylor Mill Treatment Plant. The estimated cost of the total project with engineering, construction, and contingencies is \$1,075,000.

6. This project will be paid from the District's Five-Year Capital Budget, PSC No. 186, TMTP Sludge Conveyors and Press, with a budget of \$1,075,000 which includes construction cost, engineering, and contingencies. A summary of the project costs is provided below:

○ Design Engineering	\$ 100,00
○ Construction Engineering	\$ 10,000
○ Contractor's Bid	\$ 886,800
○ Misc. & Contingencies	<u>\$ 78,200</u>
Total Project Cost	\$1,075,000

The project will be funded using \$1,075,000 from a future Bond Anticipation Note.

7. The construction is in the public interest and is required to allow NKWD to continue to provide adequate service to its customers. The project need is described in the District's Asset Management Program Update. A portion of the non-confidential summary is included with Exhibit A. The project, its cost, need and other details are contained in Exhibit A. The District has received all approvals from the DOW for the Plans and Specifications and funding for these improvements. See Exhibit B.

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 construction project identified in Exhibit A is scheduled to begin

construction in upon PSC approval and the expected in service date is July, 2018. Board approval of the final bids for the project is included in Exhibit C. The bids were opened January 25, 2017 and are subject to acceptance for 90 days. Therefore, **the bids will expire April 25, 2017.**

11. The following information is provided in response to 807 KAR 5:001 (14)(2):

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

12. The following information is supplied pursuant to 807 KAR 5:001(15)(2):

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

b. No new franchises are required. A copy of the DOW letter approving the Plans and Specifications for the proposed improvements is attached as Exhibit B.

c. 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.

d. Description of location, maps of the area showing location of the proposed facilities are in Exhibit A. Two paper copies and one PDF are provided. A petition for confidentiality for the plans and specifications is included.

e. The construction costs will be funded by as described above.

f. Estimated operating costs for operation and maintenance, depreciation and debt service after construction are shown in Exhibit D.

13. The start date for construction is June 1, 2017 or upon PSC approval. The proposed in-service date is July, 2018. The total estimated cost of construction at completion is referenced in Exhibits A, B and D.

14. CWIP at end of test year is listed in the Annual Report incorporated by reference.

15. Plant retirements are listed in Exhibit B and the Annual Report. No salvage

values are included as booked.

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

17. No rate adjustment is being proposed.

18. Schedule of mortgages, bonds, notes and other debt is attached as exhibit E.

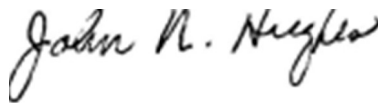
18. Current balance sheet, income statement is attached as Exhibit F.

19. USoA plant accounts are included in Exhibit D.

20. Depreciation cost, cost of operation after installation and debt service are in Exhibit D.

For these reasons, the District requests issuance of an order granting authority to construct the facilities and for any other authorization that may be necessary.

SUBMITTED BY:



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NORTHERN KENTUCKY
WATER DISTRICT

Case No. 2017-00147

Project

**Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky**

184-0488

NORTHERN KENTUCKY WATER DISTRICT
Taylor Mill Treatment Plant Belt Filter Press Replacement
184-488

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<u>EXHIBIT</u>	<u>TITLE</u>
A	ENGINEERING REPORTS AND INFORMATION Asset Management Plan, Project Map, Preliminary Engineering Report; Engineer's opinion of probable total construction cost; plans titled "Taylor Mill Treatment Plant Belt Filter Press Replacement" dated January 2017, sealed by a P.E.; specifications titled "Taylor Mill Treatment Plant Belt Filter Press Replacement Project" dated January 2017 and sealed by a P.E.
B	Certified statement from an authorized utility Official confirming: (1) Affidavit (2) Franchises (3) Plan review and permit status (4) Easements and Right-Of-Way status (5) Construction dates and proposed date in service (6) Plant retirements
C	BID INFORMATION AND BOARD RESOLUTION Bid tabulation, Engineer's recommendation of award, Board resolution.
D	PROJECT FINANCE INFORMATION Customers added and revenue effect, Debt issuance and source of debt, Additional costs and operating and maintenance, USoA plant account, Depreciation cost and debt service after construction.
E	SCHEDULE OF MORTGAGES, BONDS, NOTES, AND OTHER INDEBTEDNESS
F	CURRENT BALANCE SHEET AND INCOME STATEMENT

NORTHERN KENTUCKY
WATER DISTRICT

Project

**Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky**

184-0488

ENGINEERING REPORTS AND INFORMATION

2008 Asset Management Program Update (A.1)

Project Map (A.2)

Preliminary Engineering Report(A.3)

Engineer's Opinion of Probable Total Construction Cost (A.4)

Plans prepared by GRW, Inc., titled "Taylor Mill Treatment Plant Belt Filter Press Replacement" dated January 2017, sealed by a P.E. (A.5)

Specifications prepared by GRW, Inc., titled "Taylor Mill Treatment Plant Belt Filter Press Replacement Project" dated January 2017, sealed by a P.E. (A.6)

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

2008 Asset Management Program Update



Northern Kentucky Water District

2835 Crescent Springs Rd. • PO Box 18640 • Erlanger, KY 41018-0640

2008 Asset Management Program Update

November 2011

FINAL DRAFT



Report Prepared By:

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4775-011



The Water Division of ARCADIS

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IV. Identified Needs and Improvements



4. Identified Needs and Improvements

4.1. Large Capital Projects in 5-Yr CIP

The results of the asset renewal and replacement planning were combined with evaluations of alternatives to meet the District's needs in areas of increased capacity and regulatory compliance. Areas of focus for this AMP Update included:

- Raw Water Supply
- Water Treatment Plants
- Pumping Stations and Storage Tanks
- Other (including laboratory equipment)

4.1.1. Raw Water Supply Evaluation

4.1.1.1. Ohio River Pump Station No. 2

In the 2004 Asset Management Plan, NKWD identified the Ohio River Pump Station No. 2 (ORPS2) as one of the Districts' assets that was most critically in need of improvements. The 100 plus year old pump station delivers raw water to the Memorial Parkway Water Treatment Plant (MPTP). Currently, ORPS2 contains three 10 MGD pumps with one of the three being inoperable. The remaining two pumps are able to provide the necessary 10 MGD firm capacity of raw water necessary at the MPTP. To accommodate their expanding service population over the foreseeable future, NKWD has decided to upgrade the capacity at the MPTP to 15-20 MGD at some point during the duration of this planning period. The timing of this improvement depends on available treatment plant capacity pending detailed hydraulic analyses. In order to meet that increased raw water demand and address the identified physical condition of the pump station, NKWD has several alternatives to satisfy these necessary improvements. This analysis will evaluate the raw water pumping alternatives and provide preliminary capital cost estimates associated with each alternative to assist NKWD in the critical task of improving their raw water intake asset in ORPS2.

The first alternative available to the District (Alternative A) would be a complete rehabilitation and upgrade of the existing ORPS2. The renovated pump station would house two 12 MGD pumps to meet off-peak pumping capacity needs and a third 12 MGD pump would be added giving ORPS2 a future firm pumping capacity of 24 MGD. The pump station's concrete and brick have significantly deteriorated over the years and rehabilitation would be challenging and unpredictable. Numerous amounts of structural

and destructive testing would have to be performed to accurately assess the condition of the existing superstructure. It is also not conceivable to assume the continued operation of this facility during the rehabilitation process. It is very possible that ORPS2 could be out of service for almost two years during construction. Because of the building's being listed as a historical site by the AWWA, any rehabilitation and upgrade efforts must retain the historical integrity of the structure. This alternative would result in larger design fees and disclaimers associated with the unpredictability and dangers present with the task of renovating a 100 plus year old facility. Further, by providing this summary of probable costs, Malcolm Pirnie and GRW are in no way conclusively stating that a rehabilitation of this facility can actually be accomplished.

**Table 4-1.
Probable Costs for Alternative A - Rehabilitate and Upgrade Existing
ORPS2**

Item	Cost
Structural renovation (floors, walls, roof, etc.)	\$10,800,000
Protective Cofferdams in River	\$1,600,000
Equipment (HVAC, electrical, etc.)	\$1,800,000
Misc. Improvements (bar screens, stairs, etc.)	\$2,900,000
Three 12 MGD Pumps	\$2,450,000
Back-up Generator	\$1,700,000
24" DIP from PS to Top of Hill	\$1,700,000
24" DIP from Top of Hill to MPTP	\$2,300,000
Design and Fees (40%)	\$10,100,000
Subtotal	\$35,350,000
Contingency (40%)	\$14,150,000
Total	\$49,500,000

The second alternative available to the District (Alternative B) would be to retire the existing ORPS2 and replace it with a new 24 MGD intake structure and pumping facility. The new pump station would also house three 12 MGD pumps giving the ORPS2 a firm pumping capacity of 24 MGD. A large percentage of the cost for this alternative would be in the rock excavation for the superstructure, the building of coffer dams, and the pumping equipment itself. This alternative would provide NKWD a new, reliable source of raw water in comparison to what is currently available. Since there is no retrofitting to an existing facility, this alternative provides minimal effect on current operations during construction. This alternative also provides more flexibility in design and offers a greater accuracy in estimating construction costs.

Table 4-2.
Probable Costs for Alternative B - Replace ORPS2 with a New Intake & Pumping Facility

Item	Cost
Raw Water Intake Structure and Equipment	\$22,400,000
Electrical Services Updates	\$500,000
Back-up Generator	\$1,700,000
24" DIP from PS to Top of Hill	\$1,700,000
24" DIP from Top of Hill to MPTP	\$2,300,000
Design and Fees (25%)	\$7,150,000
Subtotal	\$35,750,000
Contingency (25%)	\$8,900,000
Total	\$44,650,000

The third alternative available to the District (Alternative C) would be to retire the existing ORPS2 and supply MPTP from the existing Ohio River Pump Station No. 1 (ORPS1). Currently, ORPS1 is nominally sized for six 12 MGD pumps and supplies the District's Fort Thomas Water Treatment Plant (FTTP). The FTTP has a rated capacity of 44 MGD and the firm capacity of ORPS1 is 60 MGD. Due to site constraints, a future expansion of the FTTP has not been considered. If ORPS1 is also to supply MPTP with the future treatment capacity of 15-20 MGD, then an upgrade and possible expansion of ORPS1 would be necessary to circumvent any redundancy and reliability issues. The first option considered was to upgrade the size of the existing pumps at ORPS1 therefore raising the firm capacity at the pump station to supply raw water to both treatment plants. As it currently stands, the weight of each existing pump meets or narrowly exceeds the floor loading design capacity of the pump foundation at ORPS1. Therefore, due to floor loading issues, it is not feasible to just upgrade the size of the pumps currently in ORPS1 without considering methods to increase the floor loading capacity and pipe gallery modifications. This option was not further considered due to the assumption that it is not feasible to remove ORPS1 from service to accomplish the structural and piping modifications. The second option would be to build an addition onto the current ORPS1 structure that could house three 10 MGD pumps giving ORPS1 an additional 20 MGD of firm capacity. This would provide NKWD with the capacity and reliability to now provide MPTP with raw water from ORPS1. In addition to the upgrades at ORPS1, a transmission main would need to be constructed to supply MPTP with raw water from ORPS1. This option is the basis for the costs presented below in Table 4-3. This alternative will no longer provide the District with the redundancy of having two separate raw water intake pumping sources and would require significant hydraulic modeling to ensure proper pumping operations.

Table 4-3.
Probable Costs for Alternative C - Retire ORPS2 and Supply MPWTP from Existing ORPS1

Item	Cost
Pumping Station Structure Upgrades	\$17,250,000
Three 10 MGD Pumps	\$1,950,000
Changes to ORPS1 Gallery Piping	\$1,150,000
24" DIP from ORPS1 to ORPS2	\$2,700,000
24" DIP from ORPS2 to Top of Hill	\$1,700,000
24" DIP from Top of Hill to MPTP	\$2,300,000
Additional Back-up Generator	\$1,700,000
Electrical Services Updates	\$500,000
Design and Fees (25%)	\$7,300,000
Subtotal	\$36,550,000
Contingency (30%)	\$11,000,000
Total	\$47,550,000

All estimates do not include any costs associated with easement or land acquisition. The costs for Alternatives B and C are similar, but Alternative B is being recommended because it provides more redundancy and less disruption to operations at ORPS1. However, additional detailed evaluation would be needed to verify costs for these options.

4.1.1.2. Licking River Pump Station

The following level of service improvements were identified during a site visit to the Licking River Pump Station and are included in the 5-year CIP as 09-05.

- **Improvements to the Building Superstructure** - A large number of structural deficiencies that were identified in the 2004 AMP have been addressed. A number of small cracks were still visible in the concrete and brick on both the interior and exterior of the building. The current condition of the roof is unsatisfactory and operations staff indicated there is no efficient method to remove and service the station's pumps. Current openings in the roof to pull pumps are not sized properly creating difficulties when removed via crane on the Licking River. It is recommended that a new roof be installed with properly sized hatches to facilitate removal of the pumps along with a new 2-ton hoist. Hatches should double as sky lights to improve lighting inside the pump room. Ventilation inside the building is provided by one roof mounted fan and one wall fan with fresh air louvers located on the river side wall. Temperatures inside the building were slightly higher than normal with both ventilation fans running. The operations staff indicated some deterioration in some of the ladders used to maneuver alongside the exterior of the building. The District expressed interest in implementing a programmatic approach to building maintenance allowing a budgeted amount of money to be set aside each year to aide

in the rehabilitation efforts of the building. The estimated annual cost for building rehabilitation is \$40,000/year. The estimated cost for roof replacement is \$205,000.

- **Replacement of Sluice Gates** - Currently there are three sluice gates located at various points of the intake structure that have not been operated in several years, according to the operations staff, and need to be replaced. The majority of this work would need to be completed in wet conditions by divers. A capital cost was generated to replace the current gates as well as their corresponding electric operators. The estimated cost to replace the sluice gates is \$185,000.
- **Raw Water Main Relocation** - The aerial portion of the 16" raw water main that runs across the Licking River was previously identified as a security risk in a vulnerability assessment due to the lack of redundancy. However, discussion on feasibility of building this line suggests this is not a realistic budget and it may not be possible to build a buried main at this site (affordably). This project is being removed from the budget.
- **Variable Frequency Drive Pump Upgrade and Relocation** - NKWD and its operations staff indicated strong interest in moving the existing drives and MCC out of the pump station into a newly constructed, climate controlled electrical building located on the river bank side of the walk bridge (approximately 400 feet from the pumps). This change would also correspond with installation of variable frequency drives on the remaining two pumps. These improvements would improve reliability, provide operational flexibility and result in a facility that is more easily maintained. Also, by moving the existing drives and MCC outside of the pump room, this will improve any current deficiencies in ventilation. The estimated cost for upgrading and relocating the VFD are \$940,000. To perform this work the follow tasks are required:

1. New VFD's to control current 150 Hp, 250 Hp and 350 Hp pump motors.
2. New building to house the MCC and VFD drives.
3. New MCC with service rated feed along with TVSS.
4. New service feeds to the pumps out from the new building.
5. Commissioning, tuning and debugging of the new drives.
6. Spare parts needed for the VFD's.
7. The demolition work needed for removal of the drives, conduit and wire, clean up, removal of the old electrical feed to the motors and MCC.
8. Installation of the new motor (need to be at least a class F to handle the VFD requirements).
9. New service feed to the new MCC panel.

4.1.2. Water Treatment Plant Evaluation

4.1.2.1. Memorial Parkway WTP

Regulatory

Regulatory needs at the Memorial Parkway WTP include the addition of granular activated carbon (GAC) for advanced treatment to meet the Stage 2 Disinfectant/Disinfection By-product (D/DBP) Rule and potentially a UV disinfection facility to meet the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), or to provide an additional disinfection barrier.

Several site alternatives were analyzed and the selected alternative was to locate the GAC facility in the footprint of Sedimentation Basins No. 5 and No. 6. The following assumptions for capacity and redundancy were made in developing the basis of design for the GAC facilities:

- The GAC facility will include 6 GAC contactors, GAC feed pump station, GAC backwash system, contactor-to-waste function, combination backwash waste/contactor-to-waste equalization basin, and carbon loading/unloading facilities.
- Normal operation will provide at least a 20-minute EBCT with all contactors in-service at a maximum production rate of 20 MGD.
- Duty and standby pumps are provided for each of the pumping systems required for these facilities.
- Provisions to enable incorporation of UV disinfection at the future treatment capacity of 20 MGD.

All six GAC contactors will have the same type of equipment and operational mode as shown in Table 4-4.

**Table 4-4.
Design Criteria for GAC Contractors MPTP**

Parameter	Value
No. of Contactors	6
Contactor Length (feet)	34
Contactor Width (feet)	15
Surface Area per Contactor (sf)	510
GAC Media Depth (inches to top of underdrain)	144
Design Flow per Contactor at Current Design Capacity (MGD)	3.3
Surface Loading Rate at Current Design Capacity (gpm/sf)	4.5

As the preliminary design progressed, a final opinion of probable costs was developed. The cost opinion is considered a Class 3 estimate in accordance AACE and has a predicted accuracy of -20% to +30%. The detailed cost opinion is shown in Table 4-5, and includes the UV disinfection facility.

**Table 4-5.
Opinion of Probable Project Costs-MPTP**

Item	Capital Cost (\$ Million)
GAC Facilities (Contactor building, site work, GAC PS, EQ Basin)	\$18.5
UV Facility	\$2.3
Contingency	\$4.1
Engineering (Legal, administration)	\$3.1
Total	\$28.0

Capacity

Capacity needs at the MPTP will include an upgrade of the plant capacity from a 10 MGD to 15 MGD or 20 MGD facility sometime between 2020 and 2030. Additional coagulation, sedimentation, filter, clearwell and pumpage capacity is anticipated.

Level of Service

During a recent site visit to the MPTP facility, a number of items were identified in need of repair. The findings of this visit are described in the following paragraphs.

- **Replacement of Raw Water Reservoir suction/discharge piping** - The District indicated, during our site visit, that the original suction/discharge piping located at

both existing raw water lagoons is undersized therefore creating a hydraulic bottleneck that possibly limits the capacity of the treatment plant. This piping supplies the raw water pump station by conventional gravity methods. It is recommended that the existing suction/discharge piping be upsized and replaced to accommodate additional capacity at MPTP. Estimated cost is \$285,000.

- **Dredging of Residuals in North and South Raw Water Reservoirs (2012-2013) -** The South Reservoir is currently being used as the raw water presedimentation basin and feeds the plants raw water pump station while the North Reservoir is currently being used only as a sludge and backwash holding basin. Based on comments by the operating staff, it is believed that the North Reservoir is over 80% filled with solids and when the water level reaches a certain height water spills over the dam separating the two reservoirs. Due to possible improvements to the Sludge Handling Facility and implementation of Advanced Treatment facilities at MPTP, the District expressed interest in postponing any possible improvements to the condition of both Raw Water Reservoirs past the year 2012.
- **Addition of Backup Generator -** The District expressed interest in providing MPTP with an additional back-up generator to provide the plant with a source of additional power reliability for the Actiflo® process and plant's general operations. Currently, the existing generator at MPTP only serves the lighting panels for the Filter Building, Chemical Building, Backwash Pump Station, and the Raw Water Pump Station. The generator is part of the Advanced Treatment Project AMP 09-03. The estimated cost for the addition of a backup generator is \$900,000.
- **Demolition or Conversion of Current Chemical Building -** The current condition of the Chemical Building's superstructure is unsatisfactory. Visible structural defects are numerous and a large portion of the buildings upper levels have been taken out of service. Over the past several years, the District has had numerous studies completed on the possible demolition of the existing building or possible conversion of the existing building to a single story maintenance shop. Either alternative would be an acceptable recommendation since the District seeks to take some type of action towards the condition of the existing building. A specific project has not been included for this work.
- **Replacement of valve actuators on Filters 4, 5, and 6 -** Currently, the District uses pneumatic actuators for all valves involved in the filter process at MPTP. NKWD has stated they would like to replace the current pneumatic valve actuators on Filters 4, 5, and 6 with electrically controlled actuators. This is part of Advanced Treatment Project AMP 09-03.
- **Sludge Process Equipment Rehabilitation (annual programmatic budget and AMP 17-02 & 29-01) -** The residuals handling system at MPTP is currently not in operation due to numerous problems associated with the process equipment in the Sludge Handling Building. Instead of a single project to rehabilitate the residuals handling system and place it back in service, the District expressed strong interest in

supplementing projects with an annual programmatic budget approach to rehab/upgrade the existing inoperable facilities. An upgrade to the following process equipment is recommended - Sludge Press Rehab, Conveyer System Rehab, Sludge Pump Replacement, Electrical Upgrade, and Dumpster Area Rehab. Once the recommended improvements are addressed and the facility is put back in service, the current practice of using the North Raw Water Reservoir for residuals storage may be eliminated. The estimated annual cost associated with rehabilitation of the sludge process equipment is \$120,000/year.

4.1.2.2. Fort Thomas WTP

Regulatory

Regulatory needs at the FTTP include the addition of granular activated carbon (GAC) for advanced treatment to meet the Stage 2 Disinfectant/Disinfection By-product (D/DBP) Rule and potentially a UV disinfection facility to meet the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) or to provide an additional disinfection barrier.

Several site alternatives were analyzed and the selected alternative was to locate the GAC facility adjacent to the existing laboratory building. The following assumptions for capacity and redundancy were made in developing the basis of design for the GAC facilities:

- The GAC facility will include 8 GAC contactors, a GAC feed pump station, GAC backwash system, contactor-to-waste function, combination backwash waste/contactor-to-waste/filter-to-waste equalization basin, and carbon loading/unloading facilities.
- Normal operation will provide at least a 20-minute EBCT with all contactors in-service at a maximum production rate of 44 MGD.
- Duty and standby pumps are provided for each of the pumping systems required for these facilities.
- Provisions to enable incorporation of UV disinfection at the current treatment capacity of 44 MGD.
- A GAC supplier will provide virgin carbon to the site and truck the spent GAC off-site.

All eight GAC contactors will have the same type of equipment and operational mode as shown in Table 4-6.

**Table 4-6.
Design Criteria for GAC Contactors-FTTP**

Parameter	Value
No. of Contactors	8
Contactors Length (feet)	44
Contactors Width (feet)	20
Surface Area per Contactor (sf)	880
GAC Media Depth (inches to top of underdrain)	144
Design Flow per Contactor at Design Capacity (MGD)	5.5
Surface Loading Rate at Design Capacity (gpm/sf)	4.3

As the preliminary design progressed, a final opinion of probable cost was developed. The cost opinion is considered a Class 3 estimate in accordance AACE and has a predicted accuracy of -20% to +30%. The detailed cost opinion in 2007 dollars is shown in Table 4-7, and includes the UV disinfection facility.

**Table 4-7.
Opinion of Probable Project Costs-FTTP**

Item	Capital Cost (\$ Million)
GAC Facilities (Contactor building, site work, GAC PS, EQ Basin)	\$33.5
UV Facility	\$2.8
Contingency	\$7.3
Engineering (Legal, administration)	\$5.4
Total	\$49.0

Capacity

There were no assets identified at the FTTP that required improvements to provide capacity for meeting future growth through the year 2030.

Level of Service

During a recent site visit to the FTTP facility, a number of items were identified in need of repair. The findings of this visit are described in the following paragraphs.

- **Repair of Concrete Flocculation/Sedimentation Basins #2 & #3** - Visual inspection of sedimentation basins #2 & #3 showed numerous areas of deterioration in the concrete and similar deteriorations were apparent in the corresponding flocculation basins. It is recommended that the District take the necessary measures to

repair the concrete as part of capital improvement planning at FTTP before the condition worsens. The estimated cost for these repairs is \$900,000.

- **Improvements to Flocculation Process Equipment** - NKWD expressed interest in revising the current flocculation arrangement for three of the four existing basins. It is recommended that NKWD revise current flocculator drive arrangements in basins #1, #2 & #3 similar to the direct drive assembly in basin #4. The current two stage horizontal flocculator arrangement should be converted to a three stage vertical flocculator arrangement to alleviate current alignment issues, age, and system wear. The estimated cost associated with revising the drive arrangement on flocculation basins #1, #2 & #3 is \$71,500. The estimated cost associated with revising the flocculation paddle arrangement is \$42,500.
- **Addition of Protective Covers to all Four Sedimentation Basins** - NKWD expressed interest in the addition of protective covers over all four existing sedimentation basins at FTTP. This capital improvement will aide in blocking sunlight which is a proven and effective method for algae control. By covering the basins, it may no longer be necessary to feed copper sulfate to all four sedimentation basins. Upon further investigation, the cost to span the dimension with support members to cover the basin was higher than anticipated. This project will not be carried forward.
- **Replacement of Filter Backwash Tank** - During our site visit, NKWD indicated that the current condition of the underground Filter Backwash Tank is unsatisfactory and may still leak even after recent attempts to recondition the aging tank. The District expressed strong interest in replacing the existing underground tank with a slightly larger tank. A lower cost alternative, with less functionality, would be to make remedial repairs to the existing tank. The District may elect to cancel this project if the new backwash pumps installed with the Advanced Treatment Project are found to be reliable. The estimated cost for upgrading and replacing the Filter Backwash Tank is \$460,000.
- **Perform Comprehensive Hydraulic Analysis of FTTP** - NKWD expressed strong interest in completing a comprehensive hydraulic analysis of the operations at FTTP. There may be hydraulic bottlenecks that are preventing the Plant from operating at its optimal capacity. One area of concern that was specifically mentioned by the District was the Filter Influent Flume.
- **Replacement of Sludge Building Interior Process Equipment** - NKWD indicated that, even though there are no current operational issues with any of the existing sludge handling process equipment, the aging equipment is quickly approaching the end of its useful life and should be considered for scheduled replacement. Two new sludge belt filter presses, conveyor system, decant valves, and repairs to the dumpster room were all specifically mentioned by the District and are recommended to be addressed as part of the capital improvements at FTTP. NKWD recommended delaying the above mentioned capital improvements until the year 2012-2013 in order

to concentrate solely on Advanced Treatment improvements in the near future. The estimated cost associated with replacing the sludge belt filter press is \$1,600,000 and the estimated cost associated with replacement of the sludge press process equipment is \$270,000.

4.1.2.3. Taylor Mill WTP

Regulatory

Regulatory needs at the TMTP include the addition of granular activated carbon (GAC) for advanced treatment to meet the Stage 2 Disinfectant/Disinfection By-product (D/DBP) Rule.

Both basin-style and vessel-style contactors were investigated for the GAC facility to be located west of the current treatment processes at the TMTP. Vessel-style contactors were selected and the following assumptions for capacity and redundancy were made in developing the basis of design for the GAC facilities:

- The GAC facility will include 28 GAC pressurized vessels, GAC feed pump station, GAC backwash system, contactor-to-waste function, combination backwash waste/contactor-to-waste equalization basin, and carbon loading/unloading facilities.
- Normal operation will provide at least a 20-minute EBCT with all contactors in-service at a maximum production rate of 10 MGD.
- Duty and standby pumps are provided for each of the pumping systems required for these facilities.

Twenty-eight pressurized contactors will be provided. It is anticipated that the contactors will have the following characteristics as shown in Table 4-8.

**Table 4-8.
Design Criteria for GAC Contactors-TMTP**

Parameter	Value
No. of Contactors	28
Contactor diameter (feet)	10
Approximate Contactor height (feet)	22
Design Flow per Contactor at Design Capacity (MGD)	0.42

As the preliminary design progressed, a final opinion of probable costs in 2007 dollars was developed. The cost opinion is considered a Class 3 estimate in accordance AACE

and has a predicted accuracy of -20% to +30%. The detailed cost opinion, which includes the UV disinfection facility, is shown in Table 4-9.

**Table 4-9.
Opinion of Probable Project Costs-TMTP**

Item	Capital Cost (\$ Million)
GAC Facilities (Contactor building, site work, GAC PS, EQ Basin)	\$15.3
Contingency	\$3.1
Engineering (Legal, administration)	\$2.3
Total	\$20.7

Capacity

There were no assets identified at the TMTP that required improvements to provide capacity for meeting future growth through the year 2030.

Level of Service

During a recent site visit to the TMTP facility, a number of items were identified in need of repair. The findings of this visit are described in the following paragraphs.

- **Replacement of Concrete Sedimentation, Flocculation, and Rapid Mix Basins -** Recent tests by a concrete testing company have validated the operations staff's concerns that both the north and south sedimentation basins are rapidly deteriorating. Visual inspection showed similar, but less severe, deterioration in the concrete of the adjoining flocculation and rapid mix basins. It is recommended that the District replace the concrete sedimentation, flocculation, and rapid mix basins as part of capital improvement planning at TMTP. The existing rapid mixer was last replaced in 1989 and should also be replaced with a new mixer as part of the basin replacement. The District has expressed interest in replacing the existing tube settlers in both basins but has elected to wait until replacement of the existing basins is completed. This project is combined with the Advanced Treatment Project. The estimated cost for replacing the concrete basins is \$3,405,000. The estimated cost for replacing the rapid mixer is \$4,500. The estimated cost for replacing the tube settler is \$235,000.
- **Replacement of Sludge Building Interior Process Equipment -** NKWD indicated that, even though there are no current operation issues with any of the existing sludge

handling process equipment, the aging equipment is quickly approaching the end of its useful life and should be considered for scheduled replacement. A new belt filter press, conveyor system, decant valves, and repairs to the dumpster room were all specifically mentioned by the District and are recommended to be addressed as part of the capital improvements at TMTP. NKWD recommended delaying the above mentioned capital improvements until the year 2014 in order to concentrate solely on Advanced Treatment improvements in the near future. The estimated cost for the sludge belt filter press replacement is \$800,000. The estimated cost for replacing the sludge press process equipment is \$175,000.

4.1.3. Pumping Station Evaluation

Regulatory

There were no regulatory improvements identified for any of the pump stations through the year 2030.

Capacity

A pump station capacity analysis was conducted as part of the Hydraulic Model Update, see Section 1 of this report.

Level of Service

Bromley Pump Station

During a recent site visit to the Bromley Pump Station, a number of items were identified in need of repair. These items are included in the R&R portion of the CIP. The findings of this visit are described in the following paragraphs.

- **Improvements to Interior of Pump Room Building** - Unlike at the Carothers Pump Station, the renovations to the Bromley Pump Station had not been completed at the time of our site visit. It could be assumed that similar renovations would have a similar impact on the capital improvement recommendations at this pump station. According to the operations staff, the Bromley Pump Station is at the top of the District's renovations list. The current condition of the interior of the building was fair and the staff indicated no problems with daily operations of the pump station. All pumps have been recently refurbished by NKWD staff. All three concrete pump support blocks were in poor condition, with significant concrete deterioration visible at the Pump #1 support block. All non-buried piping showed extensive corrosion and, according to the operations staff, is to be painted as part of the renovations program. Piping supports underneath control valves were either non-existent or crude

**Table 4-11.
5-Year CIP Project Description**

Designation	Description
14-02	<p><u>TMTP Sludge Pumps, Conveyors & Press</u></p> <p>This project will replace the existing sludge processing equipment at the Taylor Mill Treatment Plant that has reached the end of its useful service life. A new belt filter press, conveyor, decant valves and repairs to the dumpster room are recommended.</p>
14-03	<p><u>ORPS2 Replacement Design and Construction</u></p> <p>This project will replace the existing Ohio River Pump Station No. 2 that supplies water to the Memorial Parkway Treatment Plant because the existing station was built in the late 1800s and has reached the end of its useful service life. The facility has numerous structural issues that need addressed to remain in operation and would take significant work to bring into current building code compliance if altered. The first year budget includes design engineering services for all improvements and installation of two phases of raw water main. The second and third year budgets include engineering services during construction and the contractor's construction cost for the station.</p>
14-05	<p><u>36-inch Licking River Crossing</u></p> <p>This project involves constructing a new 36-inch redundancy water main across the Licking River between Kenton & Campbell Counties. This project is designed to strengthen the District's water transmission system and provide additional redundancy for the District's existing 36-inch concrete water main. The District's Master Plan Addendum for Reliability and Redundancy Analyses identified this as a needed improvement.</p>
14-09	<p><u>Vineyard (Gunkel Rd.) Between Eight Mile & Fender Rd.</u></p> <p>The proposed project involves constructing a new 8-inch water main along Gunkel Road from Eight Mile Road to Fender Road in southern Campbell County, Kentucky. The length of this project is approx. 9,000 LF. No new right-of-ways or easements will be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to extend water service to additional customers, support existing water systems, improve water quality, and improve fire protection in the area. The District's Master Plan identified this as a needed hydraulic improvement.</p>
14-10	<p><u>IT Improvements - Year 4</u></p> <p>This project includes implementation of improvements to the WAN, IT Tracking system, and integration with software systems.</p>

**Table 4-12
Master List of 5-Year CIP Projects 2009 – 2030**

Designation	Location	Project Description	Cost
14-01	FFTP	Laboratory Generator	\$237,000
14-02	TMTP	TMTP Sludge Pumps, Conveyors & Press	\$1,537,000
14-03	ORPS2	ORPS2 Replacement Design and Construction	\$42,250,000
14-04	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	\$983,000
14-05	Distribution	36" Licking River Crossing	\$4,503,000
14-06	Distribution	2014 Distribution R&R	\$4,000,000
14-07	Distribution	2014 Coordinated Roadway Imp./Water Main Replacement	\$2,500,000
14-08	Distribution	2014 Mains into Unserved Areas	\$250,000
14-09	Distribution	Vineyard (Gunkel Rd.) Between Eight Mile & Fender Rd.	\$608,000
14-10	Technology	IT Improvements - Year 4	\$86,000
15-01	Distribution	2015 Mains into Unserved Areas	\$250,000
15-02	Distribution	2015 Water Main Replacement Program	\$5,000,000
15-03	Distribution	2015 Coordinated Roadway Imp./Water Main Replacement	\$2,500,000
15-04	Bromley	Bromley Pump Replacement and Misc. Improvements	\$1,716,000
15-05	Plants/PS	Upgrade SCADA/Instrumentation/Security Equipment at Plants and PS	\$10,172,000
15-06	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	\$1,007,000
15-07	Technology	IT Improvements - Year 5	\$300,000
16-01	Distribution	2016 Mains into Unserved Areas	\$250,000
16-02	Distribution	2016 Water Main Replacement Program	\$5,250,000
16-03	Distribution	2106 Coordinated Roadway Imp./Water Main Replacement	\$2,500,000
16-04	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	\$1,018,000
16-05	Hands Pike	Hands Pike Pumps and Misc Improvements	\$700,000
16-06	Distribution	Horsebranch Road 24" from 36" to Thomas More Parkway	\$800,000
17-01	FFTP	Raw water line to FFTP south reservoir	\$700,000
17-02	MPTP	MPTP Residuals Handling Improvements	\$4,600,000
17-03	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	\$1,038,000
17-04	Distribution	SR17 From Hands Pike to Apple Drive	\$12,740,000
17-05	Distribution	2017 Mains into Unserved Areas	\$250,000
17-06	Distribution	2017 Water Main Replacement Program	\$5,500,000
17-07	Distribution	2017 Coordinated Roadway Imp./Water Main Replacement	\$2,500,000
17-08	Bellevue	Replacement Bellevue Tank	\$1,300,000
18-01	New PS	New KY17 PS To Replace Richardson Rd. PS	\$1,900,000
18-02	New Tank	1.0 MG Elevated Storage Tank East of Independence	\$4,375,000
18-03	Dayton Tank	Replace Dayton Tank	\$3,700,000
18-04	US 27 PS	US 27 Pump Station VFDs	\$449,000

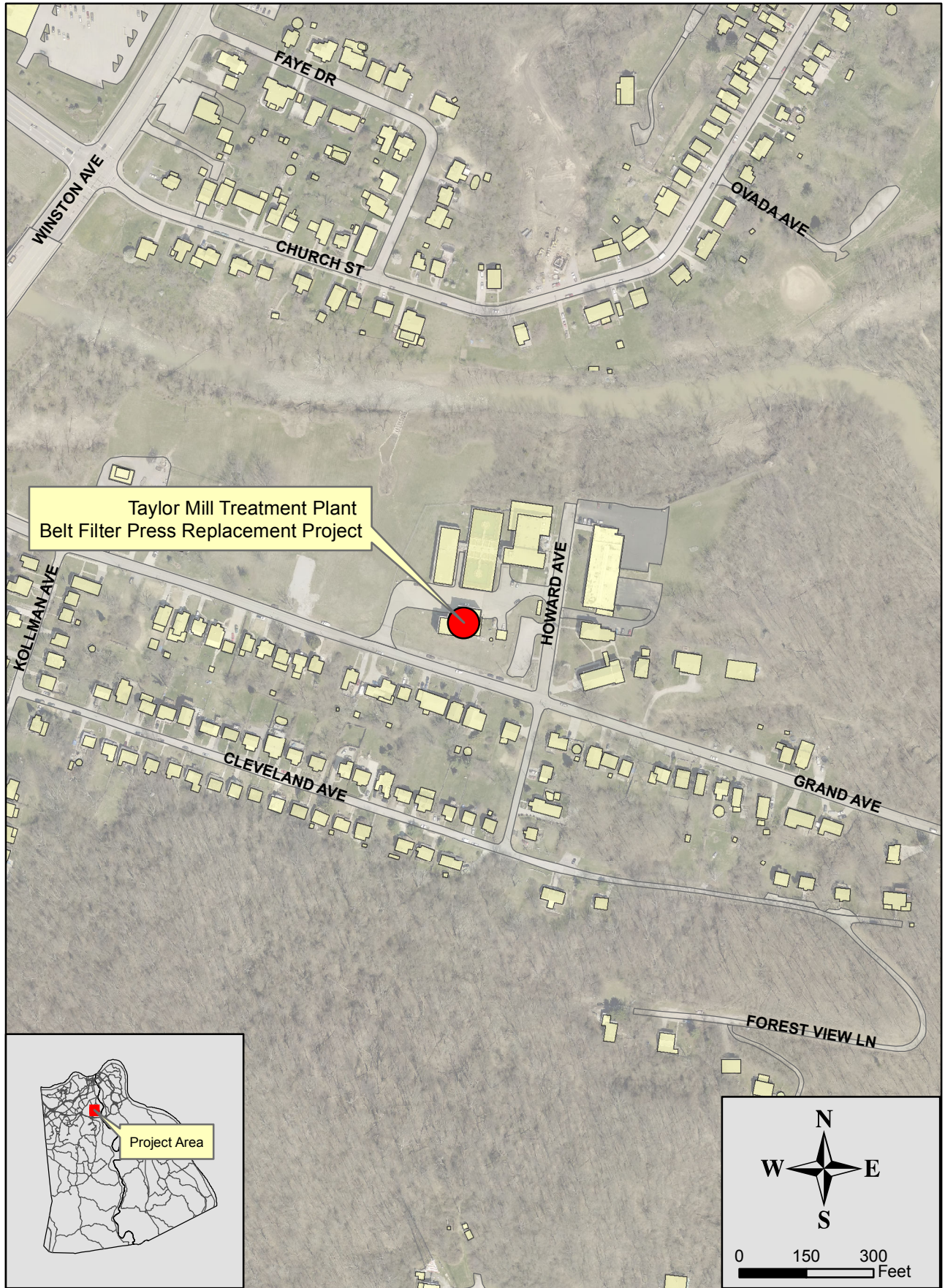
NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

Project Map



Taylor Mill Treatment Plant Belt Filter Press Replacement Project

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

Preliminary Engineering Report



Preliminary Engineering Report

**Taylor Mill Treatment Plant
Sludge Press Replacement**

Northern Kentucky Water District
GRW Project No. – 4384

July 2015



engineering | architecture | geospatial

NORTHERN KENTUCKY WATER DISTRICT

TAYLOR MILL TREATMENT PLANT SLUDGE PRESS REPLACEMENT

PRELIMINARY ENGINEERING REPORT (PER)

JULY 2015



**NORTHERN KENTUCKY WATER DISTRICT
TAYLOR MILL TREATMENT PLANT SLUDGE PRESS REPLACEMENT
PRELIMINARY ENGINEERING REPORT (PER)**

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CHAPTER 1

EXECUTIVE SUMMARY

1.1 Introduction

In March of 2015, the Northern Kentucky Water District (NKWD) retained the services of GRW Engineers, Inc. to develop a plan to replace or refurbish the existing belt filter press (BFP) at the Taylor Mill Water Treatment Plant (TMTP). The goal of this study was to explore and identify the costs associated with all sludge dewatering replacement options. Each replacement alternative was to be evaluated on both an engineering and economic level.

1.2 Objectives

GRW Engineers prepared the NKWD TMTP BFP replacement evaluation to meet the following objectives:

- Develop and evaluate, on an engineering and economic level, the project costs associated with each replacement alternative.
- Present a recommended course of action to provide NKWD with an efficient and cost effective method to replace the existing BFP.

1.3 Existing Facilities

The NKWD presently owns and operates three water treatment plants: the Fort Thomas Treatment Plant (FTTP), the Taylor Mill Treatment Plant (TMTP) and the Memorial Parkway Treatment Plant (MPTP). The existing sludge press at TMTP is located on the second floor of the two-story Residuals Handling Building. Walls are painted CMU construction interior and brick masonry exterior with a knock-out panel centered on the press on the north wall of the second story. The existing sludge press is a pneumatically operated Andritz “CPF 2.0 SMK (S8P)” BFP. The BFP is the original equipment installed when the building was constructed in 1989.

According to the Request for Proposals, the existing belt filter press has the following characteristics:

Number of Units	1
Manufacturer	Andritz “CPF 2.0 SMK (S8P)”
Capacity	2,000 lbs/hr (at 3% feed of TSS)
Inlet Consistency	2.0 – 8.0 % TSS
Min. Cake Solids	35%
Min. Solids Capture	95%

1.4 Development of Replacement Alternatives

Several potential alternatives were evaluated to address the replacement of the existing BFP. These alternatives included:

- Alternative 1 - Rehabilitation of Existing Andritz BFP
- Alternative 2 - New Pneumatic BFP
- Alternative 3 - Rehabilitation & Relocation of Existing MPTP BFP
- Alternative 4 - New Screw Press

In addition to the evaluation of replacement alternatives, GRW was tasked with evaluating the best way to gain access to the existing sludge press in the Residuals Handling Building at TMTP. The three options evaluated were:

- Access Option 1 – Removal & utilization of the knock-out panel
- Access Option 2 – Installation of double leaf doors with monorail and hoist system
- Access Option 3 – Removal & replacement of sections of the roof

GRW evaluated each access option on the flexibility it provides NKWD as well as the cost to implement. It was determined and recommended that NKWD utilize Access Option 2 for each sludge dewatering replacement alternative. Access Option 2 provides NKWD increased flexibility to access the second story for future projects, required tasks & maintenance. Therefore, Access Option 2 and its associated costs were included in the evaluation of each replacement alternative included in this report. Additionally, NKWD elected to incorporate the costs required to demolish and remove the existing polymer tanks and pumps and install a new polymer feed system into each replacement alternative.

1.5 Final Recommendations

A construction cost estimate was completed for each of the four (4) replacement alternatives. GRW determined that operation & maintenance (O&M) costs and life cycle costs were not necessary for this evaluation as a result of the operational and performance similarity between the alternatives. Therefore, total construction cost estimates were determined to be the best method of monetary evaluation.

On the basis of having the lowest construction cost estimate, Alternative 3, replacing the TMTP BFP with a rehabilitated MPTP BFP, would be the recommended alternative. However, the discrepancy in total construction cost estimates between Alternative 1, 2 & 3 is relatively small. As a result of the relatively small increase in total construction cost & NKWD's preference of pneumatic operation, GRW recommends Alternative 2, a new pneumatic BFP, for the replacement of the existing TMTP BFP. By selecting Alternative 2, NKWD would be provided with a new BFP while maintaining the preferred pneumatic operation. NKWD has had problems with hydraulic operated presses in the past resulting in spills of hydraulic fluid into the sludge holding basins. Additionally, the maintenance costs associated with pneumatic systems are less than that required of a hydraulic system. As stated hereinbefore, Alternative 2 also includes the retrofit of the Residuals Handling Building with Access Option 2 and the monorail with hoist system, a new electrical control panel, a new belt conveyor, piping & foundation reconfigurations and the removal of the existing BFP.

CHAPTER 2

PROJECT OVERVIEW AND EXISTING FACILITIES

2.1 Project Overview

The Northern Kentucky Water District (NKWD) is responsible for supplying water to 81,000 residential, commercial, industrial and wholesale customers in the Northern Kentucky area. Presently, the NKWD owns and operates three water treatment plants: the 44 MGD Fort Thomas Treatment Plant (FTTP), the 10 MGD Taylor Mill Treatment Plant (TMTP) and the 10 MGD Memorial Parkway Treatment Plant (MPTP). The TMTP is a peaking plant that supplements finished water supply from FTTP and pumps water to Kenton County excluding Covington, Bromley and Ludlow.

2.2 Existing Facilities & Their Condition

The existing sludge press at TMTP is in need of upgrading and/or replacement. The existing sludge press is a pneumatically operated Andritz “CFP 2.0 SMK (S8P)” 2-meter belt filter press (BFP). The existing BFP is located on the second story of the two-story Residuals Handling Building. The walls of the Residuals Handling Building are painted CMU construction interior and brick masonry exterior. A knock-out panel is centered on the BFP on the north wall of the second floor. The second floor of the Residuals Handling Building also features an office, restroom and electrical equipment. The sludge and backwash pumps are located on the ground floor of the Residuals Handling Building along with the polymer feed system and dumpster bay. The two (2) progressing cavity pumps transfer sludge from the holding basins to the BFP. The existing BFP, which rests upon a raised concrete slab, then leads to a two-way conveyor. The BFP is the original equipment installed when the building was constructed in 1989. Areas on the north and south side of the existing BFP are confined and restrict accessibility and movement of operation personnel.

According to the Request for Proposals, the existing BFP has the following characteristics:

Number of Units	1
Manufacturer	Andritz “CPF 2.0 SMK (S8P)”
Capacity	2,000 lbs/hr (at 3% feed of TSS)
Inlet Consistency	2.0 – 8.0 % TSS
Min. Cake Solids	35%
Min. Solids Capture	95%

The existing BFP exhibits rusting on various parts of the frame. According to Andritz specialists who evaluated the BFP on Thursday, April 16th, 2015, the frame of the press remains structurally sound. Additionally, operation personnel have expressed concern over the difficulty of cleaning certain areas of the BFP due to limited accessibility.

CHAPTER 3

EVALUATION OF REPLACEMENT ALTERNATIVES

3.1 Residuals Handling Building Access

This evaluation started with the examination of the existing belt filter press (BFP) and its current location within the Residuals Handling Building. It is evident that the existing BFP is in need of replacement or rehabilitation to dewater sludge effectively and efficiently. A design hurdle was the current configuration of the Residuals Handling Building and the location of the BFP within it. In all replacement or rehabilitation options, existing press parts and equipment are needed to be removed from the Residuals Handling Building with new/refurbished parts being moved in after the fact. As stated in Chapter 2, a knock-out panel is centered on the press on the north wall of the second story. Furthermore, the existing press rests upon a raised concrete slab.

Three options were analyzed to access the second story of the Residuals Handling Building: the removal & utilization of the knock-out panel, the installation of two-double leaf doors on the west wall of the building and removal and replacement of sections of the roof.

Building Crafts, Inc. is a well-respected general contractor that is currently under contract with NKWD to perform repairs at the Taylor Mill Treatment Plant (TMTP). Project Superintendent, Mr. Donnie Ellison, met with NKWD & GRW personnel on April 16th, 2015 in regards to the access options listed above. Mr. Ellison added the following information on the three access options discussed:

- Access Option 1: The removal & utilization of the knock-out panel would be the simplest and least expensive option in accessing the press. As stated, the existing press rests upon a raised concrete slab. The removal of the press would require jacking the press to a higher elevation so that the concrete slab could be cut and lowered. The press could then be removed through the knock-out panel once it is lowered. Additionally, the removal & replacement of the knock-out panel limits NKWD's ability to access the sludge press in the future. In the event that the replaced or refurbished press requires maintenance or removal, the knock-out panel would need to be removed once again, thus, adding additional costs to future projects. Mr. Ellison estimates the cost of removing the knock-out panel and removal of concrete slab to be approximately \$60,000.
- Access Option 2: The installation of double leaf doors on the west wall of the Residuals Handling Building would be more difficult than Access Option 1 but would provide NKWD with additional benefits for future accessibility. The double leaf doors would need to be 5-feet wide, each, to accommodate the size of the press. At the request of NKWD, a monorail & hoist system would be installed along with the double leaf doors to make the delivery and movement of parts & equipment easier for operation personnel. Mr. Ellison estimates the cost of removing the west wall, installation of double leaf doors and monorail with hoist system to be approximately \$75,000. This option also provides NKWD the flexibility to move their polymer feed system to the second story and allow chemicals to be easily delivered to the second floor. Additionally, this

option allows NKWD to have access to the replaced or refurbished sludge press if maintenance or removal is needed with minimal additional cost to future projects.

- Access Option 3: The removal of sections of the roof was initially considered as a way to access the existing BFP. After consulting with Mr. Ellison, this was determined to not be a viable access option due to the necessary costs associated with it as compared to Access Options 1 & 2.

It is recommended that NKWD elect to utilize Access Option 2. The installation of the double leaf doors with the monorail and hoist system gives NKWD the ability to access the second story and the sludge press with ease. Additionally, the double leaf door can be combined with the existing knock-out panel to increase the accessibility to the second story if required by future projects. Therefore, this option provides NKWD enhanced flexibility to access the second story for future projects, required tasks and on-going maintenance. Therefore, Access Option 2 and its costs are included in the evaluation of all replacement alternatives listed below.

3.2 Polymer Feed System

Discussions with NKWD personnel have informed GRW that there are operational issues with the existing polymer feed system. In order for a new or rehabilitated press to operate efficiently and effectively, the existing polymer feed system is required to operate properly. Therefore, NKWD has decided to include the installation of a new polymer feed system on the second floor of the Residuals Handling Building. The existing polymer system located on the first floor of the Residuals Handling Building will act as a backup to the new system. At the direction of NKWD, the costs of demolishing the existing and out-of-use polymer tanks and pumps, located on the second floor of the Residuals Handling Building, are included in this evaluation. The costs for the new polymer feed system and the demolition of all existing equipment are included in each replacement alternative.

As stated hereinbefore, Access Option 2 provides NKWD the flexibility of installing a polymer system on the second floor of the existing Residuals Handling Building with the use of the double leaf doors and the monorail system. The monorail with hoist system allows for chemicals to be easily delivered to the second story of the building. Reconfigurations of the existing utility room and bathroom have been proposed to provide sufficient space for a new polymer feed system and chemicals along the west wall. A new layout was coordinated with Kevin Owen of NKWD to determine the ideal location of the reconfigured utility room and bathroom. Exhibit 3.5 showcases this proposed layout.

3.3 Replacement Alternatives

GRW explored many alternatives in the planning phase of this sludge dewatering replacement evaluation. The alternatives discussed were rehabilitation of the existing Andritz BFP, a new pneumatic BFP, the rehabilitation & relocation of the existing Ashbrook Simon-Hartley “Klampress Type 85/890” BFP located at the Memorial Parkway Treatment Plant (MPTP) and a new screw press. Additionally, each replacement alternative requires a new electrical control panel. The costs associated with a new electrical control panel have been included in the each replacement alternative exhibit. Similarly, each alternative includes the costs associated with a new polymer system, as stated above.

3.3.1 Alternative 1 - Rehabilitation of Existing Andritz BFP

Alternative 1 includes the refurbishment and rehabilitation of the existing Andritz BFP for the TMTP. As stated in Chapter 2, the existing press is a pneumatically operated Andritz “CFP 2.0 SMK (S8P)” 2-meter BFP. Andritz rehabilitation specialists were consulted to provide budgetary costs associated with the refurbishment of the press. The existing press will be disassembled and then re-assembled on site. The existing rolls and bearing housings will be removed from the press and shipped to a repair facility for rehabilitation. All refurbished and replaced parts will meet original equipment manufacturer (O.E.M.) design standards. Andritz specialists inspected the frame of the press and determined that the frame requires no rehabilitation. However, Andritz does advise NKWD to clean the frame while the press is disassembled to remove rust and to touch up the painting of the frame. Additionally, Andritz included quotes on upgrading the plow assembly and rehabilitation of the gravity and wedge zone wear strip assemblies. These items are considered optional by Andritz but recommended during the rehabilitation to increase performance and prevent future wear and replacement. The quoted cost by Andritz includes the rehabilitation of the existing BFP press and additional items. Appendix A includes the quoted cost and description of the rehabilitation work required by Andritz for the existing BFP. Furthermore, a new electrical control panel, belt conveyor and air compressor are included in the total construction cost. The total construction cost of Alternative 1 is estimated at \$689,000. Exhibit 3.1 outlines all of the costs associated with the rehabilitation of the existing Andritz BFP.

3.3.2 Alternative 2 - New Pneumatic BFP

Alternative 2 includes purchasing a new BFP for the TMTP. GRW held lengthy discussions with NKWD staff and personnel on the operation preference of a BFP. NKWD’s preference is a pneumatically operated press as opposed to a hydraulically operated press. NKWD has had problems with hydraulic operated presses in the past resulting in spills of hydraulic fluid into the sludge holding basins. Pneumatic presses are extremely versatile and allows an operator to stop the press at any time by simply opening valves to release the air. Also, pneumatic presses have very few moving parts and require no fluid, thus eliminating the fear of leakage. Hydraulic presses, however, requires fluid and many monitoring devices designed to regulate the pressure to ensure the press works efficiently. Therefore, the maintenance costs associated with pneumatic systems are less than that required of a hydraulic system. GRW obtained quotes from the well-respected pneumatic press manufacturers of Andritz Separation, Komline-Sanderson & Phoenix for a new 2-meter pneumatic BFP, an electrical control panel and assembly. The quoted costs are located in Appendix B. Moreover, new sludge piping, foundation reconfiguration and other miscellaneous costs required to set up the new BFP are not included in the quoted costs but are included in the total construction cost. Furthermore, a new belt conveyor and new air compressor are included in the total construction cost. The total construction cost of Alternative 2 is estimated at \$753,000. Exhibit 3.2 outlines all of the costs associated with a new pneumatic BFP.

3.3.3 Alternative 3 - Rehabilitation & Relocation of Existing MPTP Ashbrook Simon-Hartley BFP

Alternative 3 includes the rehabilitation and relocation of the existing BFP at the MPTP. The existing press is a 2-meter Ashbrook Simon-Hartley “Klampress Type 85/890”. The press was installed in 1997 but was only operated for approximately 100 hours before being shut down. Ashbrook Simon-Hartley (Ashbrook) was consulted to provide budgetary costs associated with the rehabilitation of the press. Furthermore, all parts supplied by Ashbrook shall meet Ashbrook’s latest original equipment manufacturer (O.E.M.) design standards. The rehabilitation of the press includes a new set of filter belts, a new set of O.E.M. rollers, a new set of O.E.M bearing housing assemblies, a new fiberglass steering/tensioning cylinders and the reconditioning of the existing hydraulic unit with new return filters and hydraulic fluid. All parts will be made to Ashbrook’s standard level of quality under ISO9001 certified procedures and all labor shall be performed by qualified Ashbrook trained service technicians who are experienced in the disassembly and reassembly of the Klampress model. However, the Ashbrook quoted cost does not include relocation of the existing MPTP BFP to TMTP nor the removal of the existing BFP at TMTP. Additionally, new sludge piping, foundation reconfiguration and other miscellaneous costs required to set up the new BFP are not included in the quoted cost from Ashbrook but are included in the total construction cost. Moreover, the MPTP BFP is a hydraulically operated press as compared to the pneumatically operated TMTP BFP. Therefore, the costs associated with removing the existing pneumatic lines and installing new hydraulic lines for the MPTP BFP have been included in the total construction cost. Furthermore, a new belt conveyor, a new hydraulic pump and new scrapers & gears are included in the total construction cost. The total construction cost of Alternative 3 is estimated at \$659,000. Exhibit 3.3 outlines all of the costs associated with the rehabilitation and relocation of the existing BFP from the MPTP. The quoted costs of the rehabilitation from Ashbrook are located in Appendix C.

3.3.4 Alternative 4 - New Screw Press

Alternative 4 includes purchasing a new screw press for the TMTP. Similar to a belt press, a screw press is used to dewater, thicken and convey sludge. A screw press utilizes auger-style screws with a unique dewatering drum to accomplish the dewatering and conveying of sludge. The screw press requires an integrated electrical control panel to allow for 24-hour unattended operation. Typical screw presses can handle sludge feeds ranging from less than 0.2% to greater than 4%. The quoted cost including the press, electrical controls and installation costs are included in Appendix D. Additionally, new sludge piping, foundation reconfiguration and other miscellaneous costs required to set up the new screw press are not included in the quoted cost but are included in the total construction cost. The total construction cost of Alternative 4 is estimated at \$934,000. Exhibit 3.4 outlines all the costs associated with a new screw press.


3.4 Evaluation of Alternatives & Recommended Plan


As discussed hereinbefore, four (4) alternatives were explored for the replacement of the existing TMTP BFP. A construction cost estimate was completed for each alternative. GRW determined that operation & maintenance (O&M) costs and life cycle costs were not necessary for this evaluation as a result of the


operational and performance similarity between the alternatives. Therefore, total construction cost estimates were determined to be the best method of monetary evaluation. Table 3-1, located below, highlights the total construction cost estimate for each alternative. Detailed construction cost estimates can be found as exhibits at the end of this chapter.


Table 3-1 Construction Cost Estimates	
Alternative	Total Construction Cost Estimate
Alternative 1 – Rehabilitate Existing BFP	\$689,000
Alternative 2 – New Pneumatic BFP	\$753,000
Alternative 3 – Replace with Rehabilitated & Relocated MPTP BFP	\$659,000
Alternative 4 – New Screw Press	\$934,000

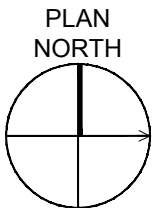
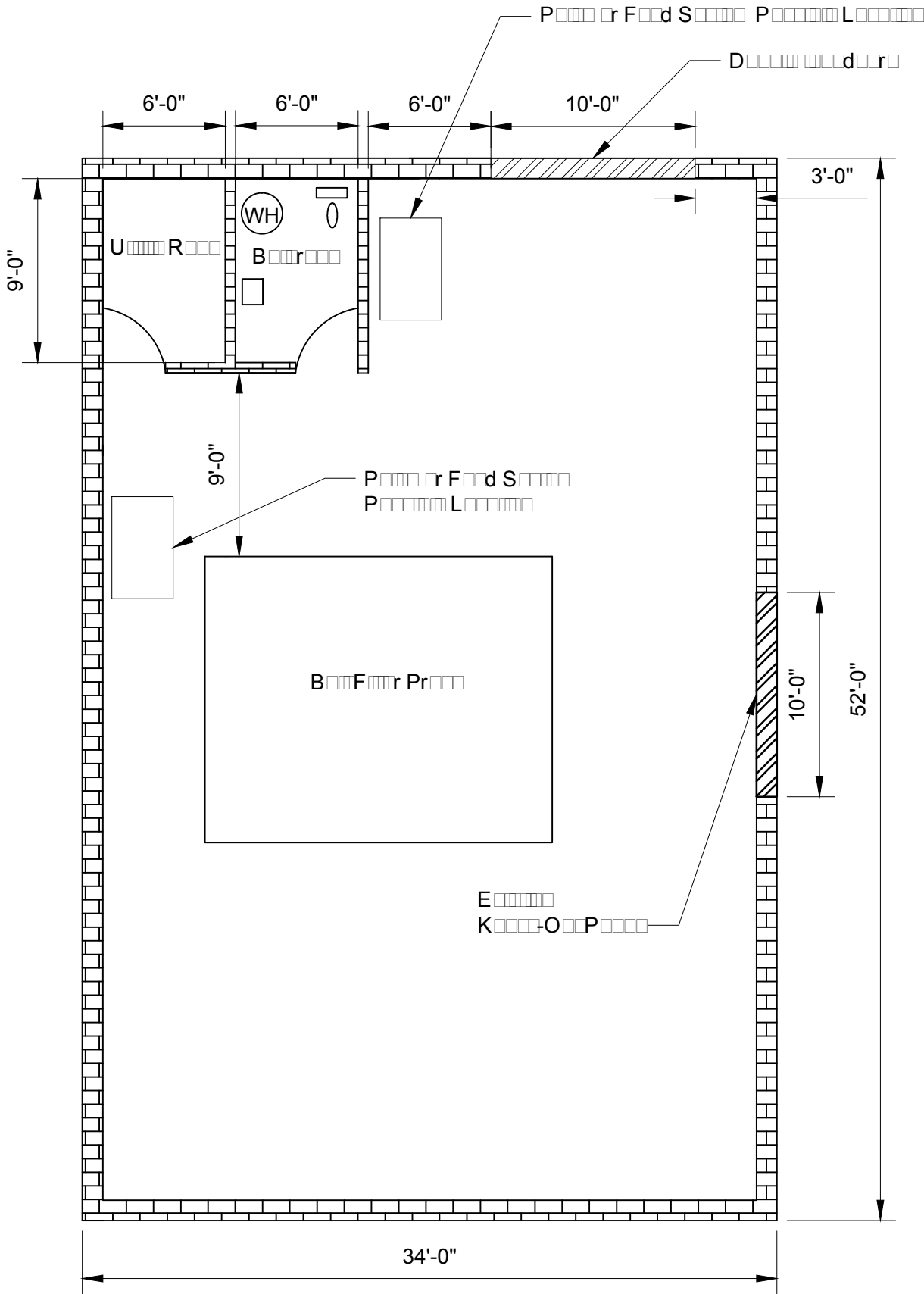
On the basis of having the lowest construction cost estimate, Alternative 3, replacing the TMTP BFP with a rehabilitated MPTP BFP, would be the recommended alternative. Nevertheless, the discrepancy between the total construction cost estimates of Alternative 1, 2 and 3 is relatively small. The total construction costs of Alternative 1 and Alternative 2 are approximately 5% and 15% higher than Alternative 3, respectively. However, as stated hereinbefore, the existing BFP in Alternative 3 is hydraulically operated. NKWD prefers pneumatically controlled presses due to lower maintenance costs and past operational issues with hydraulic presses. As a result of the relatively small increase in total construction cost & NKWD’s preference of pneumatic operation, GRW recommends Alternative 2, a new BFP, for the replacement of the existing TMTP BFP. By selecting Alternative 2, NKWD would be provided with a new BFP while maintaining the preferred pneumatic operation. As stated hereinbefore, Alternative 2 also includes the retrofit of the Residuals Handling Building with Access Option 2 and the monorail with hoist system, a new electrical control panel, a new belt conveyor, piping & foundation reconfigurations, the removal of the existing BFP and a new polymer feed system.

 GRW Engineers, Inc.	Project: TMTTP Sludge Press			
	Owner: Northern Kentucky Water District			
	Project No.: 4384			
Exhibit 3.1 - Alternative 1 Opinion of Project Cost	Date: 07/03/15	Dwg. No.: All		
	Estimator: DCO/RC	Type: Preliminary		
Item Description	No. of Units	Units of Measure	Unit Cost	Total Cost
Alternative 1 - Rehabilitate Existing Andritz TMTTP BFP				
Refurbishment of Existing Andritz BFP	1	LS	\$192,875	\$192,875
New Electrical Control Panel	1	LS	\$50,000	\$50,000
New Belt Conveyor	1	LS	\$35,000	\$35,000
Plow Assembly Upgrade	1	LS	\$16,625	\$16,625
Gravity & Wedge Zone Wear Strip Assemblies	1	LS	\$33,500	\$33,500
New Air Compressor	1	LS	\$5,000	\$5,000
New Pneumatic Lines	1	LS	\$10,000	\$10,000
Existing BFP Parts & Electrical Control Panel Removal	1	LS	\$5,000	\$5,000
Access Option 2 - Double-leaf Doors & Monorail	1	LS	\$75,000	\$75,000
Cleaning & Painting of BFP Frame	1	LS	\$10,000	\$10,000
Dry Polymer Feed System with Mix Tank, Storage Tank, Control Panel, Metering Pumps, Piping, etc.	1	LS	\$75,000	\$75,000
Renovation & Reconfiguration of Existing Utility Room & Bathroom	1	LS	\$20,000	\$20,000
Demolition of Existing Polymer Equipment & Mixing Tanks	1	LS	\$10,000	\$10,000
Equipment Installation (10%)	1	LS	\$40,800	\$40,800
Electrical Installation	1	LS	\$20,000	\$20,000
			Sub-Total	\$599,000
<i>Contractor OH&P (15%)</i>	1	LS	\$89,850	\$89,850
TOTAL CONSTRUCTION COSTS FOR ALTERNATIVE 1				\$689,000

 GRW Engineers, Inc.	Project: TMTTP Sludge Press			
	Owner: Northern Kentucky Water District			
	Project No.: 4384			
Exhibit 3.2 - Alternative 2 Opinion of Project Cost	Date: 07/03/15	Dwg. No.: All		
	Estimator: DCO/RC	Type: Preliminary		
Item Description	No. of Units	Units of Measure	Unit Cost	Total Cost
Alternative 2 - Replace BFP with New Pneumatic BFP				
New Pneumatic Belt Filter Press (Includes Electrical Control Package & Assembly)	1	LS	\$260,000	\$260,000
New Belt Conveyor	1	LS	\$35,000	\$35,000
New Air Compressor	1	LS	\$5,000	\$5,000
New Sludge Piping, Foundation Reconfiguration & Misc. costs	1	LS	\$50,000	\$50,000
New Pneumatic Lines	1	LS	\$10,000	\$10,000
Removal of Existing BFP & Control Panel at TMTTP	1	LS	\$20,000	\$20,000
Access Option 2 - Double Leaf Doors & Monorail	1	LS	\$75,000	\$75,000
Dry Polymer Feed System with Mix tank, Storage tank, Control Panel, Metering Pumps, Piping, etc.	1	LS	\$75,000	\$75,000
Renovation & Reconfiguration of Existing Utility Room & Bathroom	1	LS	\$20,000	\$20,000
Demolition of Existing Polymer Equipment & Mixing Tanks	1	LS	\$10,000	\$10,000
Equipment Installation (20%)	1	LS	\$75,000	\$75,000
Electrical Installation	1	LS	\$20,000	\$20,000
			Sub-Total	\$655,000
Contractor OH&P (15%)	1	LS	\$98,250	\$98,250
TOTAL CONSTRUCTION COSTS FOR ALTERNATIVE 2				\$753,000

 GRW Engineers, Inc.	Project: TMTP Sludge Press			
	Owner: Northern Kentucky Water District			
	Project No.: 4384			
Exhibit 3.3 - Alternative 3 Opinion of Project Cost	Date: 07/03/15	Dwg. No.: All		
	Estimator: DCO/RC	Type: Preliminary		
Item Description	No. of Units	Units of Measure	Unit Cost	Total Cost
Alternative 3 - Replace BFP with Rehabilitated & Relocated Ashbrook Simon-Hartley BFP from MPTP				
Rehabilitation of Existing "Klampsess Type 85/890"	1	LS	\$120,000	\$120,000
New Electrical Control Panel	1	LS	\$50,000	\$50,000
New Hydraulic Pump, Scrapers & Gears	1	LS	\$10,000	\$10,000
New Belt Conveyor	1	LS	\$35,000	\$35,000
New Sludge Piping, Foundation Reconfiguration & Misc. costs	1	LS	\$50,000	\$50,000
New Hydraulic Lines	1	LS	\$10,000	\$10,000
Relocation of Press from MPTP to TMTP	1	LS	\$20,000	\$20,000
Removal of Existing BFP & Control Panel at TMTP	1	LS	\$20,000	\$20,000
Access Option 2 - Double-leaf Doors & Monorail	1	LS	\$75,000	\$75,000
Dry Polymer Feed System with Mix Tank, Storage Tank, Control Panel, Metering Pumps, Piping, etc.	1	LS	\$75,000	\$75,000
Renovation & Reconfiguration of Existing Utility Room & Bathroom	1	LS	\$20,000	\$20,000
Demolition of Existing Polymer Equipment & Mixing Tanks	1	LS	\$10,000	\$10,000
Equipment Installation (20%)	1	LS	\$58,000	\$58,000
Electrical Installation	1	LS	\$20,000	\$20,000
			Sub-Total	\$573,000
<i>Contractor OH&P (15%)</i>	1	LS	\$85,950	\$85,950
TOTAL CONSTRUCTION COSTS FOR ALTERNATIVE 3				\$659,000

 GRW Engineers, Inc.	Project: TMTD Sludge Press			
	Owner: Northern Kentucky Water District			
	Project No.: 4384			
Exhibit 3.4 - Alternative 4 Opinion of Project Cost	Date: 07/03/15	Dwg. No.: All		
	Estimator: DCO/RC	Type: Preliminary		
Item Description	No. of Units	Units of Measure	Unit Cost	Total Cost
Alternative 4 - New Screw Press				
New Screw Press, Polymer System, Electrical Controls, etc.	1	LS	\$475,000	\$475,000
New Belt Conveyor	1	LS	\$35,000	\$35,000
New Sludge Piping, Foundation Reconfiguration & Misc. costs	1	LS	\$40,000	\$40,000
Removal of Existing BFP & Control Panel at TMTD	1	LS	\$20,000	\$20,000
Access Option 2 - Double-leaf Doors & Monorail	1	LS	\$75,000	\$75,000
New Polymer Feed System Piping	1	LS	\$15,000	\$15,000
Renovation & Reconfiguration of Existing Utility Room & Bathroom	1	LS	\$20,000	\$20,000
Demolition of Existing Polymer Equipment & Mixing Tanks	1	LS	\$10,000	\$10,000
Equipment Installation (20%)	1	LS	\$102,000	\$102,000
Electrical Installation	1	LS	\$20,000	\$20,000
			Sub-Total	\$812,000
Contractor OH&P (15%)	1	LS	\$121,800	\$121,800
TOTAL CONSTRUCTION COSTS FOR ALTERNATIVE 4				\$934,000



GRW PROJECT NO. 4384		CLIENT PROJECT NO. XXXX		DESIGNED: DCO
REVISIONS				DRAWN: DCO
NO.	DESCRIPTION	DATE	BY	REVIEWED: RCC
				APPROVED: DCO
SCALE CHECK: _____ THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED				

**RESIDUALS HANDLING BUILDING
PROPOSED LAYOUT**

TMTTP SLUDGE PRESS REPLACEMENT

**NORTHERN KENTUCKY
WATER DISTRICT**



engineering | architecture | geospatial
www.grwinc.com

ALL RIGHTS RESERVED.
 THIS DOCUMENT IS THE PROPERTY OF GRW ENGINEERS, INC. AND SHALL
 NOT BE REPRODUCED IN WHOLE OR IN PART OR USED FOR CONSTRUCTION
 OF OTHER THAN THIS SPECIFIC PROJECT WITHOUT WRITTEN PERMISSION

DATE: JUNE 2015
SCALE:
SHEET NO. EXHIBIT 3-5

Appendix A

Andritz Belt Filter Press Rehabilitation Budgetary Quote

5/21/2015

David Osborne
GRW
801 Corporate Drive
Lexington, KY 40503

Subject: ANDRITZ 2M Belt Press Refurbishment Project, Taylor Mill Facility

Attachments: (1) Belt Press Inspection Report,
(2) Andritz Terms and Conditions
(3) Andritz Field Service Policy and Rate Sheet

Dear Mr. Osborne,

Thank you for the opportunity to provide a proposal to refurbish the ANDRITZ 2M Belt Press at the Northern Kentucky Water District, Taylor Mill Facility. Over the past 30 years, ANDRITZ SEPARATION has performed hundreds of rebuilds across the world on various models and designs of belt filter presses. Our experienced team of engineers, field technicians, and project managers are unmatched in delivering OEM quality refurbishments. Our goal is to refurbish the press, as close as we can, to the same quality as on the day it was initially installed.

Please note the mechanical and electrical scopes of work (SOW) in the proposal. These are based upon the findings contained in that report and our on-site discussions with GRW and Taylor Mill Facility personnel. We will provide a project schedule and timeline based upon these SOW's after the receipt of a purchase order. Our proposal is based upon this understanding, in particular the Andritz scope of work and design, and is offered in accordance with our standard terms and conditions.

If there are any questions or concerns, please give me a call to discuss at 304-716-6332.

Thanks again for the opportunity to be of service to GRW Engineering, and I look forward to hearing from you soon!

Sincerely,

Jason Hill
Mid-Atlantic Sales/Service Manager
Andritz Separation Inc.

PROPOSAL

1.0 Mechanical Scope of Work

1.1 Shop Work

The existing rolls and bearing housings will be removed from the machine and shipped to our Pittsburg, TX repair facility. Upon receipt the old bearings and covers will be removed and the parts cleaned inspected to determine their suitability for re-coating. Should something be found, you will be notified and provided photographs and a price adder for the additional work.

Parts will be re-coated, new bearings applied to the rolls and mounted into the housings. Parts will be prepared for return shipping along with other new components.

Optional wear strip assemblies (gravity and wedge zones) and plow assembly will be manufactured here if selected for purchase.

1.2 On-Site Work

- Press will be disassembled and then re-assembled on site.
- The majority of the press will remain on site (frame, drain pans, shower boxes and so on).
- ANDRITZ will supply transportation of rolls from the customer site to our service center and then back to the customer site (with other new components).
- ANDRITZ to provide 2 service technicians to be on site for 5 days to dis-assemble press and conveyor and stage required components for shipping.
- ANDRITZ to provide 2 service technicians to be on site for 12 days to assemble components and confirm machine installation and startup.
- Additional time required due to delays outside of ANDRITZ control or request for additional work will be charged per the attached service rate sheet.

1.3 Work Not in Scope and Provided by Others

- Civil and structural engineering work.
- Cranes, lifting devices, and other material handling equipment.
- Customer will be responsible for the power washing and cleaning of the equipment prior to work.
- Customer will be responsible for removing the components from the building and lowering them to the ground level for loading. Then they would need to raise them back into the building upon reassembly of the press.
- No work to the frame is being quoted (such as removal of rust, touch up of paint or galvanize).
- Customer will be responsible for disconnecting (and reconnection) of all utilities from the machine. Such as sludge, water, compressed air and electrical service.
- ANDRITZ will not supply or connect wiring or pneumatic connections from the belt press to the electrical or pneumatic control panels.
- Vulcanization of conveyor belt.

1.4 Parts Supplied

- 1 ea Upper and lower press belts
- 1 set Side wall seals.
- 1 ea Splash guard seals.
- 4ea Belt tension bellows.
- 8ea Tension rack shaft and cross shaft bushings.
- 4ea Belt tracking bellows.
- 2ea Tracking air control valve.
- 2ea Tracking sensing paddle and arm. 8ea Shower box seals.
- 42ea Shower bar nozzles.
- 2ea Shower bar internal brush.
- 2ea Shower bar seal kit.
- 2ea Doctor Blades (1 upper roll and 1 lower roll).
- 2ea Upper Doctor Blade brackets.
- 1ea Tension roll doctor blade.
- 1ea Tension roll doctor blade support.
- 2ea New electrical switches, E stop and limit switches
- 1ea New drive motor and gear box, KA96D34BEFDT100L4, 5hp, DFT100L4W, 208/360 v
- 2ea New drive bull gears.
- 1ea New pneumatic control panel.
- 1 lot New pneumatic tubing on press frame.
- ~~• Conveyor, 2-PLY, 220 PIW, 3/16" x 1/16" Belt~~
- ~~• Conveyor, (4) 2.438" 2-Bolt Pillow Block Bearings~~
- ~~• Conveyor, Rubber Lagged Head and Tail Pulley with Shafts~~
- ~~• Conveyor, (5) C5 30 degree idlers~~
- ~~• Conveyor, 3HP at approx. 35 RPM Shaft Mount Drive with Motor, Sheaves and Belts~~

New Conveyor.

1.5 Parts Reused

- Frame
- Drainage Pans
- Shower Boxes
- Rolls and Bearing Housings
- Tracking Assemblies
- Side Walls, Distribution Box, and Plows (unless plow upgrade is selected)
- Conveyor Frame and Other Components (except what's listed above)

New Electrical Control Panel & Equipment.

2.0 Controls Scope of Work

ANDRITZ will provide the control panel components, engineering design, documentation, programming and on-site coordination with the customer's electrical contractor for the demolition of obsolete components and installation and wiring of new components. Also included is Service Engineers on-site time for functional testing the control system and start-up.

The customer will provide the services of an electrical contractor to make all control panel modifications and wiring changes based on ANDRITZ provided engineering documentation and instructions.

2.1 Design Criteria

The existing BFP Control Panel operator controls and indicators are in need of replacement and updating. The existing BFP control panel PLC system has been updated with a newer PLC model and has the capability to communicate with an Operator Interface Terminal that can be installed in the existing panel in place of the operator controls and indicators.

The existing Main Belt Drive has been converted from the original design that utilized a servo for increasing and decreasing speed from the control panel to a mechanical variable speed unit using a hand wheel for adjusting the speed, there is no speed indication available. With the proposed mechanical upgrade to a new gear motor arrangement a VFD will be included for the control panel upgrade in place of the existing motor starter.

The control panel modifications will require the removal and disconnection of all door mounted indicators, pushbutton controls and panel meters with the exception of System Control Power. The left door will require cutout for the installation of a cover plate with new OIT installed which will cover and seal other open holes. Hole plugs will be used for the remaining pushbuttons and indicators removed. The PLC will be modified with an Ethernet communication card and analog input card. The main Belt drive motor starter will be removed and replaced with a VFD. OIT application code will be developed and the PLC program written to provide the functional control of the BFP and ancillary components as originally designed.

2.2 Major Components Supplied

- AB Panelview Plus 10", Color touchscreen Operator Interface Terminal
- AB ControlLogix Ethernet communication module
- AB ControlLogix's Analog input / output card
- AB Stratix Ethernet switch
- AB Powerflex 70 VFD, 5HP, 208VAC, 3PH
- Control panel door cover plate
- Miscellaneous components, hole plugs, etc...

New Electrical Control Panel & Equipment.

2.3 Engineering Services Provided

- Electrical drawings – control panel layout, schematics, point to point wiring detail.
- Electrical drawings – demolition redline drawings of existing system
- Bill of Material of new components.
- Annotated PLC code.
- OIT application code
- PLC data exchange table tag list.
- Operating and maintenance manuals for new components.
- All documentation and programs to be provided in hard copy and electronic format.

2.4 On-Site Work

ANDRITZ will provide Service Engineer for coordinating with customer Instrumentation and Control Engineers and start-up of unit.

- One (1) trip, one (1) day on site for control system and communication coordination.
- One (1) trip, four (4) days on site for functional testing and start-up of system

Additional time required due to delays outside of ANDRITZ control or request for additional programming will be charged per the attached Service Rate Sheet.

2.5 Scope Not Included

- Demolition and installation and wiring of control panels
- Disposal of obsolete equipment.
- Field wiring and plumbing modifications outside of centrifuge control panels
- Civil and structural engineering work including preparation of foundations, platforms, and channels
- Building modifications
- All utilities required for operation
- Cranes or other lifting devices
- Unloading at site and on site storage if required
- Components and other instruments not specified in our scope of supply

2.6 Additional Information

- Customer to provide the services of Plant Wide system programmer for Data exchange tag list if PLC communication is required during ANDRITZ engineering program development and during on-site functional testing phase for system check out.

3.0 OFFER

3.1 PRICING SUMMARY

Item	Qty.	Description	Unit Price (Taxes Not included) USD	Total Price (Taxes not included) USD
1	1	Refurbish Belt Filter Press	\$192,875.00	\$192,875.00
2	1	Touch Screen, Cover Plate, and VFD	\$40,377.00	\$40,377.00
3	1	Conveyor Refurbishment Parts	\$18,387.00	\$18,387.00
4	1 lot	Freight to Jobsite: Prepay and Add	\$ Excluded	\$ Excluded
TOTAL PRICE FOR Refurbishment and Controls				\$ 251,639.00

3.2 Special Notes to Pricing Summary

See Options Pricing below for pricing on the Plow Upgrade, Gravity Zone and Wedge Zone Wear Strip Assemblies, and conveyor parts.

**New Electrical Control Panel & Equipment
and New Conveyor.**

3.3 Options Pricing

Item	Qty.	Description	Unit Price (Taxes Not included) USD	Total Price (Taxes not included) USD
9	1	Plow Assembly Upgrade	\$ 16,625.00	\$ 16,625.00
10	1	Gravity and Wedge Zone Wear Strips Assemblies	\$ 33,500.00	\$ 33,500.00

3.4 Special Notes to Options/Adders

No special notes or comments.

4.0 Commercial Terms

4.1 Terms and Conditions and Field Service Policy

This proposal is offered in accordance with the attached Andritz Standard Terms and Conditions of Sale and our Field Service Policy and Rate Sheet. See paragraph 3 of our terms and conditions for our warranty.

4.2 Validity

Offer is good for 60 days from the date on this proposal.

4.3 Special Provisions

- All prices are quoted in US Dollars
- Pricing does not include any local, state or federal taxes, permits, duties or other fees. Any taxes or fees that may apply must be added to the quoted price and paid by the buyer.
- Bonding is not included.

4.4 Payment Terms

ANDRITZ Separation agrees to the following payment terms (on a Net 30 Day basis):

- 20% with purchase order.
- 60% with return of rolls, bearing housings, and controls.
- 20% after press start-up.

4.5 Delivery and Freight Payment

Delivery will be confirmed after PO is received and approved.

Standard Parts: FCA Origin, Prepay and Add. 4 to 6 weeks.

Re-coat Rolls and Housings and Assemblies: Ex Works Pittsburg, TX, Prepay and Add, 6 to 8 weeks after received at repair shop.

Controls: Ex Works Arlington, TX, Prepay and Add, 8 to 10 week

Machine Inspection Report

Belt Press

Report No.: M-100123
Original Project No.: 691-267. 2.0M SMX-S8
Machine Serial Number(s): 8943

Date Report Issued: 4/24/2015
Author: Glen Ozella
Copy: David Osborne (GRW) Kevin Owen
(Northern KY Water District) Bill Lane

Customer: Northern Kentucky Water District
Plant Name: Taylor Mill WTP
Attention: Ryan Carr (GRW)

Address: 602 Grand Ave.
Taylor Mill, KY 41015

ANDRITZ Separation Inc.
Regional Sales Manager: Jason Hill

Address: 1010 Commercial Blvd. S.
Arlington, TX 76001

www.andritz.com

1. Purpose of Visit

- To inspect the belt press and evaluate its present condition.
- To work with the owner/operator and answer any question about the operation or maintenance required.
- If applicable, generate a quote on required replacement parts or refurbishment.
- To investigate the site for best possible method for the removal and installation of components.
- The inspection is limited to the mechanical components of the belt press. This did not include inspection of performance and process of sludge, plumbing and piping or the control system.



Figure 1 - Overall View of installed belt press

2. General Observations

- The equipment is used in processing the waste stream of municipal sludge.
- There is one belt press in use at this location.
- The machine was shut down during the inspection.
- The press is in need of maintenance and is showing signs of significant wear.
- Preventative maintenance was evident.
- The bearing housings and other items showed signs of recent greasing and items were in adjustment.
- This press is going to need an eventual overhaul. The majority of the things noted during the inspection will be items which will be suggested for replacement or refurbishment.
- The press is on the second floor of an enclosed building. There are no bay doors or overhead cranes.

3. Inspection Details

3.1 Belts

The belt filter press is designed to remove water from sludge by mechanical means. It uses the force due to gravity and the forces generated from filter fabrics (or belts) converging and being wrapped around rollers to squeeze the water from the sludge. The suspended solids remain on the belts; the water is drained away.

Because of this, the belt needs to remain in good shape free from buildup of sludge, polymer and physical damage. Proper dosing of polymer will prevent the belt from being “blinded” and not allowing adequate drainage. The wash boxes need to provide an adequate spray to remove any buildup on the fabric. Wrinkling of the belt may indicate a stretching of the belt material usually caused by uneven sludge distribution, or uneven wear in the wear strips causing a pooling of the sludge. Attention needs to be paid to the belt seam as well, making sure excessive belt tension does not cause a compromise of the seam. All of these problems could lead to a high spot, which could catch on the plows or the doctor blade and lead to a tearing of the belt fabric.

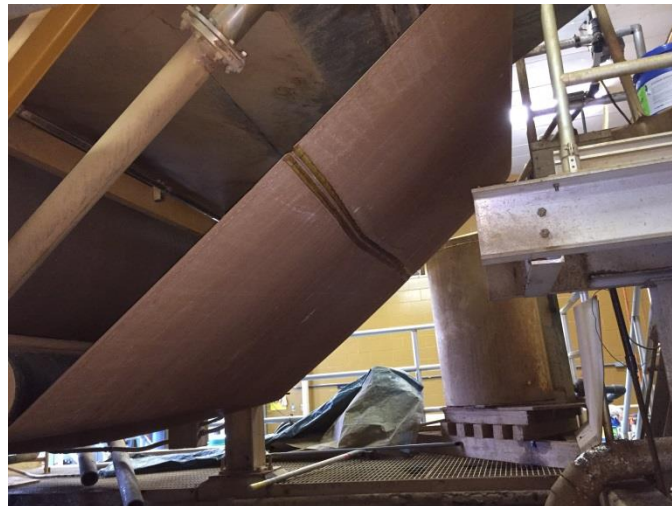


Figure 2 - Press Belt

Observations:

- The belts had signs of polymer blinding but were reasonably clean of sludge build up.
- The belts need to be replaced.
- There are signs of streaking indicating the spray nozzles are beginning to clog.
- The belt seams were reasonably straight, indicating that tracking is being achieved.
- There was evidence of wrinkling in the upper belt. I suspect it is due to uneven drainage.
- I spoke with the operator concerning power washing the belts on a regular basis in order to remove the polymer residue and how this will lead to better dewatering and long belt life.

3.2 Frame and Cross Members

The machine frame on the belt press serves as the main carriage for the roll assemblies. It is designed for minimal deflection and maximum factor of safety.

Observations:

Frame assembly drawing: 60402955

- The frame is a welded and bolted design.
- The frame is of carbon steel construction, galvanized and then painted.
- The painting is in good condition, with minor paint chips and rust streaks.
- The only area of heavy rust was in the press nip arms which could be reconditioned.
- Cross beams are in similar condition to the frame.
- Vertical members are in similar condition to the frame.
- The paint issue could be resolved with simple touch ups during a major overhaul.

3.3 Drain Pans

The stainless steel filtrate collection pans are in each dewatering zone. They are designed to completely contain all the water being drained away.

Observations:

- The gravity zone drain pan was clean and washed out.
- The wedge zone drain pan was starting to have an accumulation of dry sludge.
- The high pressure (squeeze zone) drain pan had an accumulation of dry sludge and in need of cleaning.
- The drain lines are in place and clear.
- There needs to be more cleaning/washing of the drainage pans during wash-down at the end of shifts.

3.4 Distribution Chute

The distribution chute is where the sludge is deposited on the belt. The chute creates and evenly spreads the flocculated slurry over the full working width of the belt and provides for gentle handling of the slurry to avoid any breakdown of the floc.

Observations:

Distribution chute assembly drawing: DMM3481D

- Simple chute design with metal flaps in place.
- The machine was shut down and I was unable to observe the sludge distribution.

3.5 Plow/Chicane Assembly

The first phase of dewatering is the Gravity Zone. In this phase, the sludge is carried along by the movement of the belt, being turned gently by the unique ANDRITZ chicanes. The chicanes rest lightly on the belt to wipe it clean, and actually roll the sludge over to expose the free water to clean the belt, allowing it to drain through. Mounting hardware allows the chicanes to lift from the belt to clear an obstruction or during the changing of the belts.



Figure 3 – Plow Chicane Assembly and Gravity Zone

Observations:

Plow / Chicane assembly drawing: DMM3570D

- All rows were missing and I was not able to locate the cross beams.
- Addition of the chicanes will assist in dewatering and reduce wear on the machine.
- The plastic chicane should be replaced with the new design during a major overhaul.

3.6 Gravity Zone and Wedge Zone Assembly

The gravity zone is the area where the drainage of “free” water occurs. The walls on either side define the containment zone of sludge. Seals are integrated into the sidewalls to assist in confining the sludge to within the gravity zone. The gravity zone should remain viewable at all times during operations. This is where the operator can determine whether proper sludge conditioning and other press parameters are being maintained. Adjustments are made based on the appearance and feel of the sludge.

The wedge zone is the area on the press where the belts converge, gradually, to begin applying pressure to the sludge. This is critical to maintain the floc that has been achieved in the previous dewatering phases.

Support of the belt is important in these zones. It must be supported uniformly across the width of the belt. In the event that it is not, sludge will tend to “pool” in the middle and this allows it to pass through the high pressure zone unevenly which eventually can lead to stretching of the belt. This stretching can lead to wrinkles which eventually can catch on the chicanes or doctor blades.

Observations:

Head box assembly drawing: 60302768

- The stainless steel side walls and side wall supports are in good shape.
- The side wall seals are worn and cracking and should be replaced.
- The support grid in the gravity zone is beginning to show signs of wear and may be leading the sludge to pooling in the middle.
- The grid type support (gravity zone and wedge zone) could be upgraded to a new design with removable wear strips during a major overhaul.

3.7 High Pressure (S-Roll) Zone Assembly

The high pressure zone is the area where the sludge is subjected to the maximum allowable pressure. (From the point where the belts are fully converged to the point where they separate to discharge the cake.) The sludge must be stable enough by this point not to extrude from the sides of the belts.

The roll diameters sequentially decrease in diameter. This configuration increases surface tension, and allows for a gradual increasing pressure on the sludge cake, thus increasing cake dryness. Adjustment to belt tension will determine the amount of pressing force generated on each roller.

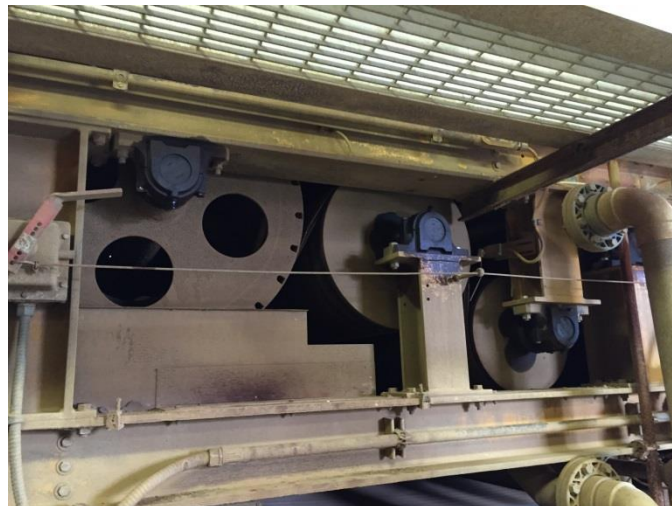


Figure 4 – High Pressure Roll Zone

The bearing housings are of the split-case, pillow block design so they need not be removed from the frame when replacing the bearing cartridges during normal maintenance. The bearings must be lubricated with specific lubricant and to a schedule which may be found in the operation manual. They should be greased with the equipment running at its slowest speed to allow for proper circulation of grease throughout the inside of the housing and bearing. It must be greased to the point where there is a small amount of grease that purges through the v-ring seal on the side of the housing that faces the roller.

Observations:

- Qty. 1 850 Perforated Roll 60302742
Perforated roll is in good condition. Should be sandblasted clean in a refurbishment.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 1 570 S-Roll 60302744
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 2 430 S-Roll 60302745
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 1 336 S-Roll 60302746
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 1 285 S-Roll 60303908
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 1 255 Driven Roll 60303910
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 1 255 Drive Roll 60303918
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 2 284 Tension Roll 60302751
The Upper Tension Roll is being damaged by the tension roll doctor assembly which is causing grooves to be worn on the diameter. It will need to be recoated. The Lower Tension Roll is in a worn condition, and it is rubbing the bent doctor blade bracket. It will also need to be recoated during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 1 255 Deflection Roll 60302752
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.

- Qty. 1 285 Deflection Roll DMM9716D
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 2 210 Tracking Roll 60302754
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
- Qty. 1 202 Press Nip Roll 60114420
Roll is in a worn condition, but coating is intact. Would recoat during a major overhaul.
Bearing housing is in good condition and coating is intact. Would rebuild during a major overhaul.
I am uncertain if the press nip assembly is currently being used.

3.8 Belt Tensioning Assembly

The belt tensioning assembly consists of a system using pneumatic pressure to inflate air bellows to maintain tension in the belt. Air bellows, located on both sides of the machine, control the movement of the tensioning roller via thrust rods. A chart located on the control panel correlates the air pressure gauge reading and bellow measurement to a belt tension value.

To insure that both ends of the tensioning roller extend the same distance (and remains parallel with the rest of the machine) the belt press utilizes a rack and pinion alignment system. The thrust rods on each side are connected via racks to a cross shaft which fixes the position on one roller end relative to the opposite end.



Figure 5 – Belt Tensioning Assembly

Observations:

Belt tension assembly drawing: 60402955

- The air bellows are in good working condition. The bellow supports are also good.
- The tension arm assemblies appear to be greased and in good working condition.
- The (30mm) cross shaft connecting the two rack shafts is in good condition.
- The tension shaft bushings are starting to show signs of wear.
- The tension bushings and bearings should be replaced during a major overhaul.

3.9 Belt Tracking Assembly

The belt tracking assembly also uses pneumatics. The system works by continuous monitoring of the belt position by means of a sensing paddle. When the belt moves off-center in either direction, a pressure regulator is cued to make an adjustment to the movable end of the tracking roller. This end of the roller has air bellows on both sides of a slide mounted bearing assembly to move the roller in either direction. The other end is capable of pivoting from a fixed point to accommodate this movement. The belt press has a separate tracking system for each belt.



Figure 6 – Belt Tracking Assembly

Observations:

Belt tension assembly drawing: 60402342

- A few of the air bellows are showing signs of cracking and/or rusting. It would be advisable to have replacement bellows on hand.
- The tracking unit (roll slide mount) was responsive and in good condition. Continue to grease accordingly.
- The tracking control valve was responsive to changes. But due to its age, it is starting to stick.
- The sensing paddle had cuts on the face caused by rubbing of the belts.
- The tracking unit is starting to show signs of minor wear. The air bellows and valve/paddles should be replaced during a major overhaul.

3.10 Belt Cleaning (Shower) Assembly

The belts are cleaned by a high-pressure water showers, one per belt. The shower box assembly is located so that the belts are washed just prior to accepting a new charge of sludge. A seal keeps the wash water contained within the housing.

The nozzles create a high pressure spray. To dislodge any particles that may clog these nozzles or to remove scale or build-up, the spray pipe is equipped with a wire brush running the length of the pipe internally. By turning a handwheel located at the end of the spray pipe, the wire brush rotates and the wash water back-flushes the particulate and debris out of the pipe.

Particular attention should be paid to the shower pipes when streaking along the length of the belt or bands indicating that the belt is not being cleaned. This could lead to uneven sludge dewatering or even distribution problems across the width of the belt leading to stretching or damage.



Figure 7 – Belt Cleaning Assembly / Shower Box

Observations:

Belt shower assembly drawing: 60402954

- The shower box is in good condition.
- Some of the seals have large pieces missing and should be replaced.
- Shower pipe manufacturer: Spraying Systems
- The handwheel operated as designed. The brushes were not very tight.
- The drain lines were installed.
- The belts are showing minor signs of streaking and buildup of polymer causing blinding of the drainage. I would check the corresponding nozzles as well as the water pressure.
- The shower pipes should have new nozzles installed and new internal brushes.

3.11 Doctor Blade Assembly

The doctor blade assembly is provided to separate, or doctor, the dewatered cake from each belt. They consist of flat pieces of UHMW polyurethane and mounting hardware at the discharge end of the press.

Proper adjustment of the assembly will permit the blades to rest lightly on the belt, at obtuse angles to the rollers. The nature of the application will determine the pressure necessary to effectively remove the sludge from the belts. The assembly allows for adjustable pressure settings; the pressure settings on both ends of the doctor blade should be maintained the same.



Figure 8 – Doctor Blade Assembly

Observations:

Doctor blade assembly drawing: 60303899

- The doctor assembly is in complete and the hardware was present.
- The doctor blades showed signs of breaking and wear and should be replaced.
- The upper doctor blade brackets have been bent. They are rubbing on the tension roll and are causing coating damage. The brackets should be replaced in order to reset the assembly in its proper place.
- The handles and hardware were in place.
- The tension roll doctor blade (opposite end of the machine) showed signs of significant wear and needs to be replaced. The assembly is rubbing the tension roll and causing damage.

3.12 Belt Drive Assembly

The belt drive transfers the torque from a drive motor, through a gear box and to the drive roll. The press is designed to convey the sludge at a particular speed to allow time for proper dewatering. It also must provide adequate torque to pull the compressing assembly through the high pressure zone.



Figure 9 – Drive Assembly

Observations:

Drive assembly drawing: DMM3928E

- This press uses a drive motor coupled to a gearbox which uses mechanical speed adjustment.
- Gearbox manufacturer: SEW/Eurodrive
- Gearbox Ratio: 115.78 : 1 Gearbox Model: KA96D34BEFDT100L4
- Electric Drive Motor: 5 HP. DFT100L4W (208/360 V)
- The drive rolls are coupled to bull gears. (not inspected)
- I was told the drive seemed to be working well (not running during inspection).
- It is unknown when the gearbox oil was changed last.
- I would suggest replacement of the gearbox and drive motor with a more energy efficient model.

3.13 Electrical Switch Assembly

The belt limit switches are provided as a safety device in the event that the belts should track drastically off-center. When the limit switch senses the belt is in danger of running outside the roller surface, it signals the control panel to stop the press.

Emergency stops are provided on both sides of the belt press. Trip cords that run the full length of the press will shut down the press when pulled in the event of a hazardous situation.

Observations:

- Limit switches on both sides were installed and in contact with the belts.
- The e-stop housings showed signs of corrosion but were functioning well. The pull cords were in place.
- This press was not equipped with roll speed sensors.
- This press was not equipped with belt break sensors.
- The conduit and junction boxes appeared to be water tight.

3.14 Pneumatic Panel Assembly

The pneumatic panel provides air pressure for the operation of the belt press. Particularly it provides the pressure for belt tensioning and belt pressure. It is important that the source air be clean, dry and then lubricated to maintain the valves and regulators. The air pressures should be monitored to assure proper operation and performance.



Figure 10 – Pneumatic Control Panel Assembly

Observations:

- The control panel was in place and gauges functioning.
- The respective graphs were in place and readable.
- The FLR unit (Filter/Lubrication/Regulator) was in place and working.
- Incoming air pressure: (air pressure was turned off).
- The air lines on the belt press have been repaired with splices. I would suggest the flexible tubing be replaced during a rebuild.
- There were concerns from the operator about the internal valves in the control panel. We will quote replacement of the pneumatic components.

4. Conclusions

These machines are in very good structural shape and can be easily repaired at this point in time. I did not feel that they needed to be immediately refurbished, but rather in a time frame which would be convenient with them.

With the care and upkeep already given to this equipment, recoating of the rolls and bearing housings along with replacement of the wear items, these machines should easily give many more years of reliable service.

5. Recommendations

I would suggest an on-site refurbishment of the belt press. Due to the constraints of working in the existing building, we would only remove the components that need off site refurbishment. This would allow for the frame, large pans and other components to stay on site. During this time, the frame could have the paint "touched up" by a local company.

We would go to site and remove the rolls and bearing housings. As per our conversation on site, the customer would take responsibility to lower the rolls to the ground level in a manner they see fit. We would strip the existing coating, inspect for damage and then recoat them to OEM specifications. We would install new bearings and bearing seals to the recoated bearing housings. We would then return them to site and again, they would lift them to the second floor and we would install them.

The press nip arm assembly would be removed, sandblasted and inspected for damage. Then it would be repainted and new bearings installed.

The refurbishment would include recoating of the rolls and our installation of the following parts.

- Upper and lower press belts. Part# 84" x 438", quantity 1.
Part# 84" x 790", quantity 1.
- Side wall seals. Part# 60112325, quantity 2.
Part# 60112553, quantity 1.
- Splash guard seals. Part# 60112554, quantity 1.
- Belt tension bellows. Part# 12600058, quantity 4.
- Tension rack shaft and cross shaft bushings. Part# MB 60 60 DU, (qty. 8 total).
Part# SY30TF, qty. 4.
- Belt tracking bellows. Part# AY131, quantity 4.
- Tracking air control valve. Part# E260, quantity 2.
- Tracking sensing paddle and arm. Part# E261, quantity 2.
- Shower box seals. Part# 60112583, quantity 8.
- Shower bar nozzles. Quantity 42.
- Shower bar internal brush. Quantity 2.
- Shower bar seal kit. Quantity 2.

- Doctor blades (1 upper roll and 1 lower roll). Part# 60114389, quantity 2.
- Upper Doctor Blade brackets. Part# 60206703, quantity 2.
- Tension roll doctor blade. Part# 60114381, quantity 1.
- Tension roll doctor blade support. Part# 60204706, quantity 1.

I would suggest the following also be considered during a refurbishment:

- New electrical switches (2 limit switches, 2 e-stops).
- New drive motor and gear box. KA96D34BEFDT100L4 5 HP. DFT100L4W (208/360 V)
- New drive bull gears. Part# 60112534, quantity 2.
- New pneumatic control panel. Quantity 1.
- New pneumatic tubing on press frame. Quantity 1 lot.

6. Future Activities

The following quote will be generated:

1. Refurbishment of machine including service technicians to remove and install components.
2. Upgrade to a new plow/chicane system featuring independent plows.
3. Upgrade of belt support grid to a new grid support featuring individual replaceable wear strips.

TERMS AND CONDITIONS OF SALE AND/OR SERVICE**1. TERMS APPLICABLE**

The Terms and Conditions of Sale listed below are the exclusive terms and conditions applicable to quotations made and orders acknowledged by Andritz Separation Inc. or the applicable Andritz entity supplying the same ("Seller") for the sales of products, equipment, parts and services relating thereto ("Products" and "Services"). If this quotation or acknowledgment contains terms additional to or different from those offered by Buyer, then any acceptance by Seller is expressly made conditional upon Buyer's assent to such additional or different terms. Any of Buyer's terms and conditions that are in addition to or different from those contained herein, which are not separately agreed to by Seller in writing, are hereby objected to and shall be of no effect. The term "this Agreement" as used herein means this quotation or acknowledgment or purchase order, together with any attachment hereto, any documents expressly incorporated by reference, and these Terms and Conditions of Sale and/or Service.

2. DELIVERY

Delivery or performance dates are good faith estimates and do not mean that "time is of the essence." Buyer's failure to promptly make advance or interim payments, supply technical information, drawings and approvals will result in a commensurate delay in delivery. Installation of any Product shall not be Seller's responsibility unless specifically provided for in this Agreement. Upon and after delivery, risk of loss or damage to the Products shall be Buyer's. Delivery of the Products hereunder will be made on the terms agreed to by the parties as set forth in this Agreement, according to INCOTERMS 2010.

3. WARRANTY

(a) In the case of the purchase of NEW EQUIPMENT the Seller warrants to Buyer that the NEW EQUIPMENT manufactured by it will be delivered free from defects in material and workmanship. This warranty shall commence upon delivery of the NEW EQUIPMENT to Buyer and shall expire on the earlier to occur of 12 months from initial operation of the NEW EQUIPMENT and 18 months from delivery thereof (the "Warranty Period").

(b) In the case of PARTS or used or reconditioned machinery or equipment, and unless otherwise indicated, Seller warrants to Buyer that the PARTS or the used or reconditioned machinery or equipment manufactured by it will be delivered free from defects in material and workmanship. This warranty shall commence upon delivery of the PARTS or the used or reconditioned machinery or equipment to the buyer and shall expire 6 months from delivery thereof (the "Warranty Period").

(c) If during the Warranty Period Buyer discovers a defect in material or workmanship and gives Seller written notice thereof within 10 days of such discovery, Seller will, at its option, either deliver to Buyer, on the same terms as the original delivery was made, according to INCOTERMS 2010, a replacement part or repair the defect in place. Any repair or replacement part furnished pursuant to this warranty are warranted against defects in material and workmanship for one period of 12 months from completion of such repair or replacement, with no further extension. Seller will have no warranty obligations under paragraph 3(a) or (b), as applicable, (i) if the Products have not been operated and maintained in accordance with generally approved industry practice and with Seller's specific written instructions; (ii) if the Products are used in connection with any mixture or substance or operating condition other than that for which they were designed; (iii) if Buyer fails to give Seller such written 10 day notice; (iv) if the Products are repaired by someone other than Seller or have been intentionally or accidentally damaged; (v) for corrosion, erosion, ordinary wear and tear or in respect of any parts which by their nature are exposed to severe wear and tear or are considered expendable; or (vi) for expenses incurred for work in connection with the removal of the defective articles and reinstallation following repair or replacement.

(d) In the case of SERVICES, Seller warrants to Buyer that the SERVICES performed will be free from defects in workmanship and will conform to any mutually agreed upon specifications. If any failure to meet this warranty appears within 12 months from the date of completion of the SERVICES, on the condition that Seller be promptly notified in writing thereof, Seller as its sole obligation for breach of this warranty will correct the failure by re-performing any defective portion of the Services furnished. Seller does not warrant the accuracy of, or performance results of, any conclusions or

recommendations provided, nor that any desired objective will result from the Service provided and Seller shall not be liable for any loss of use or any production losses whatsoever.

(e) Seller further warrants to Buyer that at delivery, the Products manufactured by it will be free of any liens or encumbrances. If there are any such liens or encumbrances, Seller will cause them to be discharged promptly after notification from Buyer of their existence.

(f) THE EXPRESS WARRANTIES SELLER MAKES IN THIS PARAGRAPH 3 ARE THE ONLY WARRANTIES IT WILL MAKE. THERE ARE NO OTHER WARRANTIES, WHETHER STATUTORY, ORAL, EXPRESS OR IMPLIED. IN PARTICULAR, THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(g) The remedies provided in paragraphs 3(a), 3(b), 3(c), 3(d), and 3(e) are Buyer's exclusive remedy for breach of warranty.

(h) With respect to any Product or part thereof not manufactured by Seller, Seller shall pass on to Buyer only those warranties made to Seller by the manufacturer of such Product or part which are capable of being so passed on.

4. LIMITATION OF LIABILITY

Notwithstanding any other provision in this Agreement, the following limitations of liability shall apply:

(a) In no event, whether based on contract, tort (including negligence), strict liability or otherwise, shall Seller, its officers, directors, employees, subcontractors, suppliers or affiliated companies be liable to Buyer or any third party for loss of profits, revenue or business opportunity, loss by reason of shutdown of facilities or inability to operate any facility at full capacity, or cost of obtaining other means for performing the functions performed by the Products, loss of future contracts, claims of customers, cost of money or loss of use of capital, in each case whether or not foreseeable, or for any indirect, special, incidental or consequential damages of any nature.

(b) The aggregate liability of Seller, its officers, directors, employees, subcontractors, suppliers or affiliated companies, for all claims of any kind for any loss, damage, or expense resulting from, arising out of or connected with the Products, Services or this Agreement or from the performance or breach thereof, together with the cost of performing make good obligations to pass performance tests, if applicable, shall in no event exceed the contract price.

(c) The limitations and exclusions of liability set forth in this paragraph 4 shall take precedence over any other provision of this Agreement and shall apply whether the claim of liability is based on contract, warranty, tort (including negligence), strict liability, indemnity, or otherwise. The remedies provided in this Agreement are Buyer's exclusive remedies.

(d) All liability of Seller, its officers, directors, employees, subcontractors, suppliers or affiliated companies, resulting from, arising out of or connected with the Products, Services or this Agreement or from the performance or breach thereof shall terminate on the third anniversary of the date of this Agreement.

(e) In no event shall Seller be liable for any loss or damage whatsoever arising from its failure to discover or repair latent defects or defects inherent in the design of goods serviced (unless such discovery or repair is normally discoverable by tests expressly specified in the scope of work under this Agreement) or caused by the use of goods by the Buyer against the advice of Seller. If Seller furnishes Buyer with advice or assistance concerning any products or systems which is not required pursuant to the contract, the furnishing of such advice or assistance will not subject Seller to any liability whether in contract, indemnity, warranty, tort (including negligence), strict liability or otherwise.

5. CHANGES, DELETIONS AND EXTRA WORK.

Seller will not make changes in the Products unless Buyer and Seller have executed a written Change Order for such change. Buyer, without invalidating the contract, may make changes by altering, adding to or deducting from the general scope of the Services by written Change Order. Any such Change Order will include an appropriate adjustment to the contract price and delivery terms. If the change impairs Seller's ability to satisfy any of its obligations to Buyer, the Change Order will include appropriate modifications to this Agreement. If, after the date of this quotation or

acknowledgment, new or revised governmental requirements should require a change in the Products, the change will be subject to this Paragraph 5.

6. TAXES

Seller's prices do not include any sales, use, excise or other taxes. In addition to the price specified herein, the amount of any present or future sales, use, excise or other tax applicable to the sale or use of the Products or Services shall be billed to and paid by Buyer unless Buyer provides to Seller a tax-exemption certificate acceptable to the relevant taxing authorities.

7. SECURITY INTEREST

Seller shall retain a purchase money security interest and Buyer hereby grants Seller a lien upon and security interest in the Products until all payments hereunder have been made in full. Buyer acknowledges that Seller may file a financing statement or comparable document as required by applicable law and may take all other action it deems reasonably necessary to perfect and maintain such security interest in Seller and to protect Seller's interest in the Products.

8. SET OFF

Neither Buyer nor any of its affiliates shall have any right to set off claims against Seller or any of its affiliates for amounts owed under this Agreement or otherwise.

9. PATENTS

Unless the Products or any part thereof are designed to Buyer's specifications and provided the Product or any part thereof is not used in any manner other than as specified or approved by Seller in writing, (i) Seller shall defend against any claims made in a suit or proceeding brought against Buyer by an unaffiliated third party that any Product infringes a device claim of a United States or Canadian patent issued as of the effective date of this Agreement and limited to the field of the specific Products provided under this Agreement; provided Seller is notified promptly in writing and given the necessary authority, information and assistance for the defense of such claims; (ii) Seller shall satisfy a final judgment (after all appeals) for damages entered against Buyer on such claims so long as such damages are not attributable to willful conduct or sanctioned litigation conduct; and (iii) if such judgment enjoins Buyer from using any Product, then Seller will, at its option: (a) obtain for Buyer the right to continue using such Product or part; (b) eliminate the infringement by replacing or modifying all or part of the Products; or (c) take back such Product or part and refund to Buyer all payments on the purchase price that Seller has received. The foregoing states Seller's entire liability for patent infringement by any Product or part thereof.

10. SITE RISKS

(a) Concealed Conditions. The parties acknowledge and agree that increased costs or schedule extensions due to any concealed conditions at the job site shall be to Buyer's account. Buyer shall hold Seller harmless for increased costs and grant any necessary schedule extensions if any concealed or hazardous conditions are found.

(b) Environmental Remediation. Buyer acknowledges that Seller is not an expert in environmental remediation and shall not be directed by change order or otherwise to perform any environmental remediation as part of the Services, including but not limited to asbestos and lead paint removal. If any environmental remediation becomes necessary, Buyer will contract directly with a qualified third party to perform such work.

11. TERMINATION

Buyer may only terminate its order upon written notice to Seller and upon payment to Seller of Seller's termination charges, which shall be specified to Buyer and shall take into account among other things expenses (direct and indirect) incurred and commitments already made by Seller and an appropriate profit; provided, that in no event shall Seller's termination charges be less than 25% of the contract price. Seller shall have the right to suspend and/or terminate its obligations under this Agreement if payment is not received within 30 days of due date. In the event of the bankruptcy or insolvency of Buyer or in the event of any bankruptcy or insolvency proceeding brought by or against Buyer, Seller shall be entitled to terminate any order outstanding at any time during the period allowed for filing claims against the estate and shall receive reimbursement for its cancellation charges.

12. CONFIDENTIALITY

Buyer acknowledges that the information which Seller submits to Buyer in connection with this quotation, acknowledgment or performance of this Agreement includes Seller's confidential and proprietary information, both of a technical and commercial nature. Buyer agrees not to disclose such information to third parties without Seller's prior written consent. Seller grants to Buyer a non-exclusive, royalty-free, perpetual license to use Seller's

confidential and proprietary information for purposes of this specific order and the Products that are the subject hereof only. Buyer further agrees not to permit any third party to fabricate the Products or any parts thereof from Seller's drawings or to use the drawings other than in connection with this specific order. Buyer will defend and indemnify Seller from any claim, suit or liability based on personal injury (including death) or property damage related to any Product or part thereof which is fabricated by a third party without Seller's prior written consent and from and against related costs, charges and expenses (including attorneys fees). All copies of Seller's drawings shall remain Seller's property and may be reclaimed by Seller at any time.

13. END USER

If Buyer is not the end user of the Products sold hereunder (the "End User"), then Buyer will use its best efforts to obtain the End User's written consent to be bound to Seller by the provisions hereof. If Buyer does not obtain such End User's consent, Buyer shall defend and indemnify Seller and Seller's agents, employees, subcontractors and suppliers from any action, liability, cost, loss, or expense for which Seller would not have been liable or from which Seller would have been indemnified if Buyer had obtained such End User's consent.

14. FORCE MAJEURE

(a) Force Majeure Defined. For the purpose of this Agreement "Force Majeure" will mean all unforeseeable events, beyond the reasonable control of either party which affect the performance of this Agreement, including, without limitation, acts of God, acts or advisories of governmental or quasi-governmental authorities, laws or regulations, strikes, lockouts or other industrial disturbances, acts of public enemy, wars, insurrections, riots, epidemics, pandemics, outbreaks of infectious disease or other threats to public health, lightning, earthquakes, fires, storms, severe weather, floods, sabotage, delays in transportation, rejection of main forgings and castings, lack of available shipping by land, sea or air, lack of dock lighterage or loading or unloading facilities, inability to obtain labor or materials from usual sources, serious accidents involving the work of suppliers or sub-suppliers, thefts and explosions.

(b) Suspension of Obligations. If either Buyer or Seller is unable to carry out its obligations under this Agreement due to Force Majeure, other than the obligation to make payments due hereunder, and the party affected promptly notifies the other of such delay, then all obligations that are affected by Force Majeure will be suspended or reduced for the period of Force Majeure and for such additional time as is required to resume the performance of its obligations, and the delivery schedule will be adjusted to account for the delay.

(c) Option to Terminate. If the period of suspension or reduction of operations will extend for more than four (4) consecutive months or periods of suspension or reduction total more than six (6) months in any twelve (12) month period, then either Buyer or Seller may terminate this Agreement.

15. INDEMNIFICATION AND INSURANCE

(a) Indemnification. Seller agrees to defend and indemnify Buyer from and against any third-party claim for bodily injury or physical property damage ("Loss") arising in connection with the goods provided by Seller hereunder or the Services performed by Seller hereunder, but only to the extent such Loss has been caused by the negligence, willful misconduct or other legal fault ("Fault") of Seller. Buyer shall promptly tender the defense of any such third-party claim to Seller. Seller shall be entitled to control the defense and resolution of such claim, provided that Buyer shall be entitled to be represented in the matter by counsel of its choosing at Buyer's sole expense. Where such Loss results from the Fault of both Seller and Buyer or a third party, then Seller's defense and indemnity obligation shall be limited to the proportion of the Loss that Seller's Fault bears to the total Fault.

(b) Insurance. Seller shall maintain commercial general liability insurance with limits of not less than \$2,000,000 per occurrence and in the aggregate covering claims for bodily injury (including death) and physical property damage arising out of the Products or Services. Seller shall also provide workers' compensation insurance or the like as required by the laws of the jurisdiction where the Services will be performed, and owned and non-owned auto liability insurance with limits of not less than \$1,000,000 combined single limit. Seller will provide a Certificate of Insurance certifying the existence of such coverages upon request.

16. GENERAL

(a) Seller represents that any Products or parts thereof manufactured by Seller will be produced in compliance with all applicable federal, state and local laws applicable to their manufacture and in accordance with Seller's engineering standards. Seller shall not be liable for failure of the Products to comply with any other specifications, standards, laws or regulations.

(b) This Agreement shall inure only to the benefit of Buyer and Seller and their respective successors and assigns. Any assignment of this Agreement or any of the rights or obligations hereunder, by either party without the written consent of the other party shall be void.

(c) This Agreement contains the entire and only agreement between the parties with respect to the subject matter hereof and supersedes all prior oral and written understandings between Buyer and Seller concerning the Products, Services and any prior course of dealings or usage of the trade not expressly incorporated herein.

(d) This Agreement (including these standard terms and conditions of sale) may be modified, supplemented or amended only by a writing signed by an authorized representative of Seller. Seller's waiver of any breach by Buyer of any terms of this Agreement must also be in writing and any waiver by Seller or failure by Seller to enforce any of the terms and conditions of this Agreement at any time, shall not affect, limit or waive Seller's right thereafter to enforce and compel strict compliance with every term and condition thereof.

(e) (i) If the Products or Services are delivered or performed in the United States, this Agreement and the performance thereof will be governed by and construed according to the laws of the State of Georgia.

(ii) In the circumstances of (i) above, any controversy or claim arising out of or relating to this Agreement, or the breach thereof, or to the Products or the Services provided pursuant hereto, shall be definitively settled by arbitration, to the exclusion of courts of law, administered by the American Arbitration Association ("AAA") in accordance with its Construction Industry Arbitration Rules in force at the time this Agreement is signed and to which the parties declare they will adhere (the "AAA Rules"), and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction over the party against whom enforcement is sought or having jurisdiction over any of such party's assets. The arbitration shall be conducted in Atlanta, Georgia by a panel of three members, one of whom will be appointed by each of Buyer and Seller and the third of whom will be the chairman of the panel and will be appointed by mutual agreement of the two party-appointed arbitrators. All arbitrators must be persons who are not employees, agents, or former employees or agents of either party. In the event of failure of the two party-appointed arbitrators to agree within 45 days after submission of the dispute to arbitration upon the appointment of the third arbitrator, the third arbitrator will be appointed by the AAA in accordance with the AAA Rules. In the event that either of Buyer or Seller fails to appoint an arbitrator within 30 days after submission of the dispute to arbitration, such arbitrator, as well as the third arbitrator, will be appointed by the AAA in accordance with the AAA Rules.

(f) (i) If the Products or Services are delivered or performed in Canada, this Agreement and the performance thereof will be governed by and construed according to the laws of the Province of New Brunswick.

(ii) In the circumstances of (i) above, any controversy or claim arising out of or relating to this Agreement, or the breach thereof, or to the Products or the Services provided pursuant hereto, shall be definitively settled under the auspices of the Canadian Commercial Arbitration Centre ("CCAC"), by means of arbitration and to the exclusion of courts of law, in accordance with its General Commercial Arbitration Rules in force at the time the Agreement is signed and to which the parties declare they will adhere (the "CCAC Rules"), and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction over the party against whom enforcement is sought or having jurisdiction over any of such party's assets. The arbitration shall be conducted in Saint John, New Brunswick by a panel of three arbitrators, one of whom will be appointed by each of Buyer and Seller and the third of whom will be the chairman of the arbitral tribunal and will be appointed by mutual agreement of the two party-appointed arbitrators. All arbitrators must be persons who are not employees, agents, or former employees or agents of either party. In the event of failure of the two party-appointed arbitrators to agree within 45 days after submission of the dispute to arbitration upon the appointment of the third arbitrator, the third arbitrator will be appointed by the CCAC in accordance with the CCAC Rules. In the event that either of Buyer or Seller fails to appoint an arbitrator within 30 days after submission of the dispute to arbitration, such arbitrator, as well as the third arbitrator, will be appointed by the CCAC in accordance with the CCAC Rules.

(g) The parties hereto have required that this Agreement be drawn up in English. Les parties aux présentes ont exigé que la présente convention soit rédigée en anglais.

2015 FIELD SERVICE POLICY AND RATE SHEET

Installation and Start-up Assistance

All the equipment furnished by ANDRITZ Separation Inc. shall be installed and started up by, and at the expense of the purchaser. There is available, however, upon the request of the purchaser, the service of ANDRITZ Separation Inc. field service personnel for consultation and advice in the installation and start-up of ANDRITZ Separation Inc. equipment. This service is provided with the understanding that ANDRITZ Separation Inc. will function only as technical consultants and coordinators in an advisory capacity, and shall have no responsibility for the supervision or the quality of workmanship of such an installation and/or start-up. Such responsibility will be that of the purchaser.

Certain types of ANDRITZ Separation Inc. equipment, such as that with mechanical seals, require the check out of the equipment by experienced field personnel before the equipment is put into operation. In these instances, the equipment is so tagged upon time of shipment. The failure to have proper mechanical check out by ANDRITZ Separation Inc. field personnel will void our mechanical warranty. For the check out, power and all necessary utilities for the operation of equipment must be available.

Service Rates (Rates/Pricing are in US currency)

Service Rates are applicable for all the time the field service employee spends on the job. This includes traveling to or from either our designated plant or point of residence of the employee. Any holdover time, i.e. time where the employee is required to stay on the job site because time does not permit travel home, or for the convenience of the customer, shall be at regular rates, listed below:

Description	Standard Rates	Overtime Rates
Monday - Friday		
Service Technician	\$1,200.00/ 8 hr. day	\$225.00/ hr. up to 4 hrs
Saturday	\$1,800.00/ 8hr. day	\$225.00/ hr. up to 4 hrs
Sunday	\$2,400.00/ 8hr. day	\$300.00/ hr. up to 4 hrs
Holidays	\$2,400.00/ 8hr. day	\$300.00/ hr. up to 4 hrs
Travel Days:		
Monday - Friday	\$850.00/ day up to 8 hrs	\$225.00/ hr. after 8 hrs
Saturday Travel Day	\$1,250.00/ day up to 8 hrs	\$225.00/ hr. after 8 hrs
Sunday & Holiday	\$1,500/ day up to 8 hrs	\$300.00/ hr. after 8 hrs
Phone Support	\$150.00/ 1 st hr.	\$120.00/ per additional hr.

ANDRITZ SEPARATION INC.

1010 Commercial Blvd. S.
Arlington, Texas 76001
Tel. (817) 465-5611
Fax (817) 468-3961
enviro.us@andritz.com

Travel & Holiday Service

If travel and work requirements carry through weekends and holidays, the premium rates above will be charged. (For example, if a customer requires field service personnel to be on site early Monday, necessitating the need to travel Sunday or a Holiday, the Sunday/Holiday rate will be charged. If work continues through a weekend and/or holiday, the Sunday/Holiday rate will be charged.)

Cancellation Notice

In an effort to keep costs down for our customers, service personnel will book advanced, non-refundable tickets as quickly as possible after the request for service is received. This is a conscientious effort to keep costs to the customer, for air travel, as low as possible. If such expenses have been incurred in good faith, and the customer must cancel, we must invoice for those expenses to be fairly reimbursed.

Other Considerations

Because our Field Service employees are away from home for extended periods for most of the year, we feel they should be with their families over the Christmas and New Year holidays. Except for breakdowns or comparable and equally critical service requirements, our personnel are not available at these times.

When our field service personnel travel international and required on site for periods in excess of four weeks, they are allowed to return home to be with their families. The allowable time period is determined on a case-to-case basis. The cost only of transportation to the employee's home and return will be included with the service charges.

It is required that our service personnel have single rooms in first class hotel or motel accommodations where these are available. The charges for all living and travel expense will be for the account of the customer. Travel, if by public conveyance or rented automobile, will be at cost. Travel, if by employee-owned or company owned automobile will be at the rate of US \$ 0.56.5 per mile plus all toll and parking charges. A 15% administrative fee will apply only to travel and living expenses incurred.

It is the responsibility of the purchaser to provide for all necessary permits, clearances, visas, and other pertinent information required for our personnel to travel to the job site. In the event that public facilities are not available near the job site, it is the purchaser's responsibility to provide the equivalent of first class facilities in single rooms for our personnel at the site. For overseas jobs intended to be of an extended duration in excess of thirty (30) days, special arrangements will

be negotiated immediately (and prior to the requirement for personnel to be at the job site) with regard to visits home with their families.

Service Requirement Notification

Our objective is to provide the best service possible. Experience has proven that one of the best ways to accomplish this is for our employees to arrive on the job site when they are needed - but not before. Our personnel are in short supply from time to time and personnel with the special skills you may require may not be available on short notice. We request, therefore, that for projects requiring extended service (in excess of thirty (30) days) and/or special skills, ANDRITZ Separation Inc. be given at least sixty (60) days notice as to when field service personnel are required on site. We also ask that this be confirmed within fourteen (14) days of the start of their services. In other instances, for a shorter duration of service, we request that at least a minimum of ten (10) days notice be given prior to requirement of our service personnel. After receipt of such advance notice, while we endeavor to comply with all requested time schedules, purchaser should be aware that on rare occasions we may not be able to meet all demands immediately. Negotiations will continue until the best schedule is attained. In the event that emergencies arise, we will work to meet the customers' needs as quickly and as completely as possible.

Please Note: If time is scheduled and the customer must cancel on short notice, there is no guarantee of the immediate availability of field service personnel for rescheduling.

Insurance & Warranty

ANDRITZ Separation Inc. service personnel are fully covered by Worker's Compensation Insurance. ANDRITZ Separation Inc. makes no warranty either express or implied or by trade usage in connection with the services of its field personnel and shall have no liability direct, indirect or for any loss, damage, injury or expense resulting from or arising out of their services other than by reason of their negligence, and in no event for consequential injury or damage or for any amount in excess of the cost of repair or replacement of specific part damaged by their negligence

Rev -01_10_2015

Appendix B

New Pneumatic Belt Filter Press Budgetary Quotes

Andritz Separation Quote

Osborne, David

From: Kelly Ronald <Ronald.Kelly@andritz.com>
Sent: Friday, April 24, 2015 2:07 PM
To: Osborne, David
Cc: Hill Jason
Subject: RE: Taylor Mill Treatment Plant Belt Filter Press
Attachments: 2.0m 3 Belt - Walden.xlsx

Categories: Filed by Newforma

David,

Please use \$260,000.00 for the budgetary price for a 2.0 meter Quantum S8 belt filter press. The cost for O&M is reflected in the attachment.

Thank you.

Sincerely,

Ronald Kelly
SEPARATION
Region North America
Regional Sales Manager - Midwest

ANDRITZ Separation Inc.

1010 Commercial Blvd S
Arlington, TX 76001 USA
Ph: +1 (847) 345-8735
Fax: +1 (817) 468-3961
ronald.kelly@andritz.com
www.andritz.com

From: Osborne, David [mailto:DOsborne@grwinc.com]
Sent: Friday, April 24, 2015 8:53 AM
To: Kelly Ronald
Cc: Hill Jason
Subject: Taylor Mill Treatment Plant Belt Filter Press

Mr. Kelly,

Good morning. Jason Hill has provided me with your contact information with the intent that you may be able to provide me a budgetary quote on a new pneumatically operated belt filter press.

GRW has been retained by Northern Kentucky Water District to evaluate replacement & refurbishment options on their existing Andritz "CPF 2.0 SMK (S8P)". The existing press is a 2-meter belt filter press that was installed in 1989. Jason Hill and other Andritz personnel visited the press on 4/16/2015 to assess its rehabilitation potential and they are currently working on that quote.

Nevertheless, we are looking at all options for replacement for NKWD, including a new press.

The existing BFP has the following characteristics:

Komline-Sanderson Quote

Osborne, David

From: Erik Torgersen <erik@delaneyandassociatesinc.com>
Sent: Tuesday, April 21, 2015 9:57 PM
To: Osborne, David
Subject: RE: TMTP BFP
Attachments: GRS-2 Kompres, Pneumatic.pdf

Categories: Filed by Newforma

David,

For detailed design Komline would really like to do the sampling but for now the budget price for the pneumatic based belt filter press is \$290k. This is a little higher than originally estimated in case this project goes out to 2016 or beyond. I think they based the pricing on a simple controls package as well. We can refine this later. The hydraulic adjustable BFP is an additional \$5k. Please see the attached drawing for the dimensions.

I'll have to follow up with Komline in regards to on site assembly. I don't think the \$290k would cover a significant crew for some field assembly.

Komline often does a shaftless auger style conveyor estimated at \$2,000/ft. NKWD has a belt conveyor and if that is their preference I will probably have to go to one of our other manufacturers to estimate.

Thanks,
Erik

From: Osborne, David [mailto:DOsborne@grwinc.com]
Sent: Tuesday, April 21, 2015 1:41 PM
To: Erik Torgersen
Subject: RE: TMTP BFP

Erik,

Good afternoon. Below is the information listed in the FRP on the existing belt filter press and it's conditions:

Capacity – 2,000 lbs/hr (at 3% feed of TSS)
Inlet Consistency – 2.0-8.0% TSS
Min. Cake Solids – 35%
Min. Solids Capture – 95%

Additionally, the pump curve of the progressive cavity pumps is attached.

For this project, we are only analyzing these options on a preliminary scale, thus, only requiring budgetary estimates for this project. Therefore, is it necessary that sampling occur before the design process? For our purposes, Ryan & I think budgetary quotes on a press that can operate similar to the listed characteristics would be appropriate.

If you have any questions, please let me know.

Thank you for your time,

David Osborne, EIT

GRW | engineering | architecture | geospatial

801 Corporate Drive | Lexington, KY 40503

P 859.223.3999 | C 859.630.6131

Email: DOsborne@grwinc.com | Website: www.grwinc.com

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From: Erik Torgersen [<mailto:erik@delaneyandassociatesinc.com>]

Sent: Friday, April 17, 2015 8:59 AM

To: Osborne, David

Cc: Carr, Ryan

Subject: TMTP BFP

David,

I spoke with Komline. I'll work on answering some of the questions you brought up. First though, they'd like to get a 5 gallon sample to run some tests. They can send the bucket up to you (NKWD) and Komline will pay for the shipping costs. Let me know if this is OK.

It was nice meeting you guys yesterday.

Thanks,

Erik Torgersen, P.E.

Delaney & Associates, Inc.

31 Erlanger Road, Erlanger, KY 41018-1717

erik@delaneyandassociatesinc.com

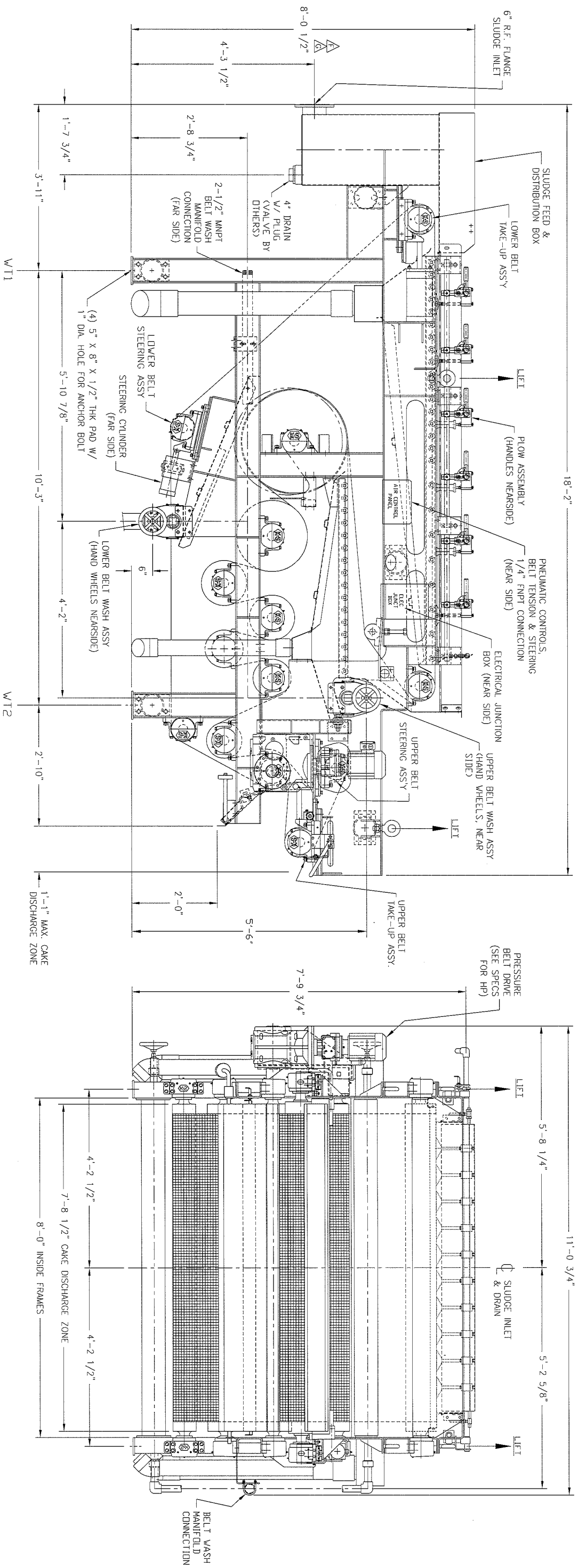
cell: 513-607-8397 | office: 859-342-4944

www.delaneyandassociatesinc.com

No virus found in this message.

Checked by AVG - www.avg.com

Version: 2015.0.5863 / Virus Database: 4334/9591 - Release Date: 04/21/15



ELEVATION
(R.H. UNIT AS SHOWN)

DISCHARGE END VIEW

- NOTES:
1. CUSTOMER TO FIELD SUPPORT PIPING. DO NOT HANG PIPING FROM PRESS.
 2. SEE CERTIFIED SPECIFICATIONS FOR BELT WASH WATER REQUIREMENTS.
 3. CUSTOMER TO SUPPLY SHUT-OFF VALVE FOR WASH WATER SYSTEM TO ISOLATE PRESS.
 4. ANCHOR BOLTS NOT SUPPLIED UNLESS LISTED IN CERTIFIED SPECIFICATIONS.
 5. FLANGED CONNECTION: 150 LB. RAISED FACE, STD ASA DRILLING.
 6. ALL WEIGHTS ARE APPROXIMATE. LOADED WEIGHT SHOWN (WT1 ETC.) IS TOTAL WEIGHT ON LEG AT POINT INDICATED.
 7. FOR SUGGESTED FOUNDATION & ANCHOR BOLT PLAN REFER TO DWG. #CK065-100060.
 8. SEE SHEET 2 FOR PLAN VIEW.

NET WT.	LOADED GROSS WT.	LOADED WT1 NEAR SIDE	LOADED WT1 FAR SIDE	LOADED WT2 NEAR SIDE	LOADED WT2 FAR SIDE
20,400 LBS.	21,500 LBS	3,900 LBS	3,900 LBS	6,850 LBS	6,850 LBS

CD	14-10-08	GENERAL UPDATES: SINGLE-ROLL DRIVE, BELT WASH PIPING, NEW DOC. TYPE, DIM WAS 8".
ED	14-03-03	UPDATED PLOW ASSEMBLY: 8'-0" WAS 8'-5 1/4"
RD	14-03-03	REDRAWN
CD	14-03-03	REVISIONS TO THIS DRAWING: 1. DIM WAS 8" TO 8'-0" (SEE NOTE 8). 2. DIM WAS 8'-5 1/4" TO 8'-0" (SEE NOTE 8). 3. DIM WAS 8'-0" TO 8'-5 1/4" (SEE NOTE 8).

MODEL GRS-2 SERIES III
PNEUMATIC T/U & STEER.

KOMPRESS
KOMLINE-SANDERSON
ENGINEERING CORPORATION
PCAPACK, NJ 07977 USA

CK065

DATE	01-Jul-96	DESIGNED BY	JC	CHECKED BY	JC	APPROVED BY	
SCALE	1=14	DRAWN BY	JC				
REFERENCE		DRAWING NO.	CK065-10010D	REV	1	SHT	1
				OF	2		

Phoenix Quote

Osborne, David

From: Mike Steinel <mikest@dewater.com>
Sent: Thursday, June 11, 2015 10:54 AM
To: Osborne, David
Cc: Gary Lubin; Laura Fletcher
Subject: RE: Phoenix BFP Budgetary Quote Request
Attachments: pro606-mas.pdf; WX1.2-2.2G8W-SALES.pdf

David,

Attached is the budgetary proposal for one (1) 2-meter press for the above referenced project. The proposed press has a 2-meter belt width, standard length gravity / wedge zones and eight rollers in the high pressure section. Per your request, I have left the polymer system out of our scope of supply. The master control panel, air compressor, sludge feed pump and wash water boost pump are included in my scope (but can be deleted or broken out if you wish).

As far as the cake solids are concerned, if it is an alum sludge then the 35% value is at the upper end of what we have seen. The turbidity of the feed source has a lot to do with the cake solids (normally the higher the turbidity the higher the cake solids). I would like to test a sample of the material if possible. I could drive up to pick a sample up at your convenience.

Thank you for the opportunity to provide you with this proposal and let me know if you need anything else.

Best regards,

Mike Steinel
National Sales Manager



PHOENIX Process Equipment Co.
2402 Watterson Trail
Louisville, KY 40299
Phone: (502) 499-6198 ext: 159
Cell: 502-727-1830
Fax: (502) 499-1079
www.dewater.com

From: Osborne, David [mailto:DOsborne@grwinc.com]
Sent: Wednesday, June 10, 2015 3:50 PM
To: Mike Steinel
Subject: RE: Phoenix BFP Budgetary Quote Request

Mike,

Good afternoon. I believe the other budgetary quotes were for standard length gravity/wedge zones. But for apples to apples, it would be best to compare 2-meter presses with one another.

Thank you for your time,

David Osborne, EIT

GRW | engineering | architecture | geospatial

801 Corporate Drive | Lexington, KY 40503

P 859.223.3999 | C 859.630.6131

Email: DOsborne@grwinc.com | Website: www.grwinc.com

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From: Mike Steinel [<mailto:mikest@dewater.com>]

Sent: Wednesday, June 10, 2015 2:35 PM

To: Osborne, David

Cc: Gary Lubin

Subject: RE: Phoenix BFP Budgetary Quote Request

David,

Gary contacted me regarding the below alum sludge application. We can definitely provide what you need but I do have one question. The feed solids below vary from 2 to 8 wt% which is a sizable difference. At 2,0000 lb/hr feed solids, based on the variation in feed solids, the hydraulic loading could go from 50 – 200 gpm. At 50 gpm, we could do it on a 1-meter press with standard length gravity / wedge zones but at 200 gpm I would probably go with a 2-meter press with extended length gravity / wedge zones (could be possible with a standard length but would be pushing it).

I realize that you have asked for a 2-meter press but have the other budgetary quotes that you have received proposed standard length or extended length gravity / wedge zones? I can provide either but want to give you an apples to apples comparison.

Thank you in advance,

Mike Steinel

National Sales Manager



PHOENIX Process Equipment Co.

2402 Watterson Trail

Louisville, KY 40299

Phone: (502) 499-6198 ext: 159

Cell: 502-727-1830

Fax: (502) 499-1079

www.dewater.com

From: Osborne, David [<mailto:DOsborne@grwinc.com>]

Sent: Tuesday, June 09, 2015 9:53 AM

To: Gary Lubin
Subject: Phoenix BFP Budgetary Quote Request

Gary,

Good morning. As discussed, GRW has been retained by client to evaluate the replacement of their existing **2-meter belt filter press**. We are currently in the preliminary planning and engineering phase of our study and are determining budgetary costs for the project. The client wishes to maintain **pneumatic** operation on the new press. If possible, please provide budgetary quotes for a new **pneumatic** belt filter press at your earliest convenience.

The existing BFP has the following characteristics (provided by the owner):

Number of Units	1
Capacity	2,000 lbs/hr (at 3% feed of TSS)
Inlet Consistency	2.0 – 8.0 % TSS
Min. Cake Solids	35%
Min. Solids Capture	95%

If you need additional information, please let me know.

Thank you for your time,

David Osborne, EIT

GRW | [engineering](#) | [architecture](#) | [geospatial](#)

801 Corporate Drive | Lexington, KY 40503

P 859.223.3999 | C 859.630.6131

Email: DOsborne@grwinc.com | Website: www.grwinc.com

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Proposal # 0615606

GRW Engineering Water Treatment Sludge Project

Reference:
Belt Filter Press Proposal
Attn:
David Osborne, EIT

PHOENIX Process Equipment Co.
2402 Watterson Trail
Louisville, KY 40299
p: (502) 499-6198
f: (502) 499-1079
phoenix@dewater.com
www.dewater.com

Proposal # 0615606
Issue Date: June 11, 2015

Prepared by:
MAS





Budgetary Proposal

PHOENIX Proposal No. 0615606
June 11, 2015
Page 2 of 5

Prepared for: GRW
Attention: David Osborne, EIT
Reference: Water Treatment Sludge Dewatering Project

1. Item Covered: One (1) PHOENIX Model WX-2.2G8W Belt Filter Press

- A. Standard Auxiliary Equipment:
- One (1) In-Line Vortex Mixer (304 SS)
 - Rollers are covered to bearing for maximum corrosion protection
 - Press is standard materials of construction. Fully welded carbon steel frame with galvanize / epoxy coating and 304 SS wetted parts
 - One (1) Wash water boost pump
 - One (1) Sludge feed pump
 - One (1) Air compressor
 - One (1) PLC based master control panel
- B. Utility Requirements Per Machine:
- Electric: 460v, 3 Phase, 60 Hz
 - Air: "Clean and dry", 3 scfm at 100 psig
 - Wash Water: 100 gpm at 100 psig
 - Shipping Weight: 21,000 lbs.

All interconnecting external piping and wiring by others.

2. Application Description:

The equipment quoted herein is designed to dewater alum water treatment sludge based on the following criteria:

Estimated Performance*:

- Solids Capacity: 2,000 lb/hr (given)
- Feed Solids Concentration: 2 - 8 wt % (TSS)
- Cake Solids: 20 - 35 wt% (estimated)
- Solids Capture: 95%
- Polymer Dosage: TBD


*Polymer will be required for optimum belt filter press performance. As no two dewatering applications are exactly alike, performance may vary. PHOENIX offers this application description as a customer guideline only. It is not meant to represent or imply a performance warranty or guarantee. If actual performance is critical, PHOENIX recommends field pilot plant tests to determine anticipated commercial scale application performance.



3. Pricing: F.O.B. Point of Manufacture..... US \$235,000.00

4. Pricing Notes:

- Shipping / Handling is included. Taxes are not included.
- Price is firm for thirty (30)-day acceptance and 100-day shipment.
- Price is subject to escalation for orders not shipped within 6 months of PO date.
- Shipment shall be 12-14 weeks from receipt of order, acceptance and approved drawings. Delivery schedule is subject to change based on shop availability at time of order place.
- Start-up Service: One (1) trip, three (3) days. Additional service is available from PHOENIX. Per diem rates shall be those prevailing at time of service.
- Terms and Conditions of Sale: PHOENIX's Standard Terms and Conditions of Sale as included in this Proposal.
- Four (4) Operations and Maintenance Manuals will be furnished. Additional copies may be purchased.
- Payment Terms:
 - 90% upon shipment
 - 10% upon startup (not to exceed 120 days from shipment)

Accepted by:	PHOENIX Process Equipment Co. 2402 Watterson Trail Louisville, Kentucky 40299
Name	
Print Name	
Title	National Sales Manager
Date	June 11, 2015



TERMS AND CONDITIONS OF SALE

1. ACCEPTANCE & PAYMENT

Quotations are held open for 30 days from date of quotation. All payments shall be made in U.S. dollars and pro-rata payments shall become due as shipments are made. Prices do not include any applicable city, county, state, or federal excise, sales, use or any other taxes now in force or to be enacted. All such taxes are to be paid and borne by the Purchaser. Price is subject to escalation for increased costs if Purchaser delays delivery beyond 6 months from the date of Purchase Order. All orders are subject to written acceptance by PHOENIX from corporate headquarters. All orders are subject to credit approval.

2. DELIVERY

Delivery is F.O.B. shipping point. Delivery dates are approximate and are not guaranteed. PHOENIX will not be liable for delays attributable to circumstances beyond its reasonable control, including but not limited to, delays in delivery by its suppliers, natural disasters, acts of third parties or labor disorders. If delivery as originally scheduled is delayed by Purchaser, PHOENIX may invoice Purchaser and store the products at Purchaser's expense and risk. PHOENIX policy is to ship products "Bill Collect" with motor freight company mailing their invoice(s) directly to Purchaser's billing address. PHOENIX assumes no responsibility for loss of, or damage to products after delivery to carrier who shall be deemed acting for the Purchaser.

3. TITLE & INSURANCE

Title to the product(s) and risk of loss or damage shall pass to the Purchaser upon shipment except that a security interest in the product(s) or any replacement shall remain in PHOENIX's name regardless of the mode of attachment to realty or other property, until the full price has been paid. Purchaser agrees to do all acts necessary to perfect and maintain said security interest, and to protect PHOENIX's interest by adequately insuring product(s) against loss or damage from any external cause with PHOENIX's name as insured or co-insured.

4. CANCELLATION OR SUSPENSION

Orders entered cannot be canceled or suspended beyond original ship dates specified without written consent by PHOENIX which would include terms which shall indemnify PHOENIX against any and all losses.

It is noted that in the event of cancellation or suspension, charges will be assessed based on percentage of completion as determined by PHOENIX. The minimum cancellation or suspension charge will in no event be less than 30% of the selling price.

5. MATERIAL OF CONSTRUCTION

The Purchaser is responsible for determining the suitability and providing approval of any and all materials of construction to be used by PHOENIX.

6. WARRANTY & GUARANTEE

PHOENIX warrants that its products covered by this quotation are free from defects in material and workmanship. Except for the express warranties set forth in this Agreement, Purchaser acknowledges and agrees that PHOENIX is making no warranties, express or implied, concerning the products, including, without limitation, any warranty of merchantability or fitness for a particular purpose.

With the exception of normal wear parts, PHOENIX guarantees the products covered by this quotation to be free from defects in material or workmanship under normal and proper usage for a period of twelve (12) months from the date of equipment startup or eighteen (18) months from the date of shipment, whichever first occurs. As stated, this guarantee does not cover failure of normal wear parts unless the failure of such a part has resulted from defective material and workmanship.

In the event of any failure developing within the stated period, under normal and proper use, PHOENIX must be notified immediately in writing. Upon receipt of written consent by PHOENIX the parts are to be returned F.O.B. point of manufacture. If PHOENIX's inspection indicates defective material or workmanship, the product or part thereof, will, at PHOENIX's option, either be repaired or replaced without charge to Purchaser. F.O.B. point of manufacture.

In the case of any failure of components purchased by PHOENIX and incorporated into any of the products or systems provided by PHOENIX under this agreement, PHOENIX's guarantee is limited to the component manufacturer's guarantee. It is agreed PHOENIX shall not be held liable for any further cost, expense, or labor to replace equipment or parts or for any of Purchaser's consequential, incidental, or indirect damages including but not limited to injury to person or property, loss of profits, loss of business reputation, down time, or any expenses that may result as a breach of this agreement.

It is further agreed that PHOENIX will not be held liable for any cost, expense, or labor to replace or modify equipment or parts not supplied by PHOENIX but arising out of, or in connection with, engineering documents, plans and specifications supplied as part of this agreement, and that PHOENIX's liability will be expressly limited to the correction of incorrect engineering documents.

It is important to note that PHOENIX does not accept liability for any corrective work or other expenditures of any kind that have not been authorized by PHOENIX in writing prior to commencement for such work or expenditure.

7. PRODUCT SAFETY

Products and systems designed and manufactured by PHOENIX are capable of being used in a safe manner. PHOENIX cannot warrant safety of these products or systems under all circumstances. Therefore it is agreed that it is the responsibility of the Purchaser to insure that the installation and use of these products or systems is in a safe and lawful manner and in compliance with applicable health and safety regulations and laws and general standards of reasonable care.



8. CONFIDENTIAL INFORMATION, IMPROVEMENTS & DRAWINGS

All information, literature, and drawings included with this quotation are for the sole limited purpose of review in contemplation of entering into a purchase agreement with PHOENIX Process Equipment Company. Purchaser will keep confidential and will not use or reproduce or in any way disclose any said information, part or whole, without prior written permission from an officer of PHOENIX. Purchase will return all such material to PHOENIX if the quotation is not accepted. Purchaser agrees to not copy the product(s) or make design drawings of the product(s) and not to permit others to copy or make design drawings of the product(s). PHOENIX shall have royalty-free license to make, use, and sell any changes, improvements or modifications in the products or systems covered by this quotation regarding inventions, suggestions or operation by Purchaser and/or its employees.

PHOENIX will provide submittal drawings, on request, for purchaser's approval. If upon receipt of drawings Purchaser requests construction and/or design changes, PHOENIX will submit a revised price and shipping date. Upon Purchaser's approval PHOENIX will proceed with production in accordance with the drawings as revised and approved.

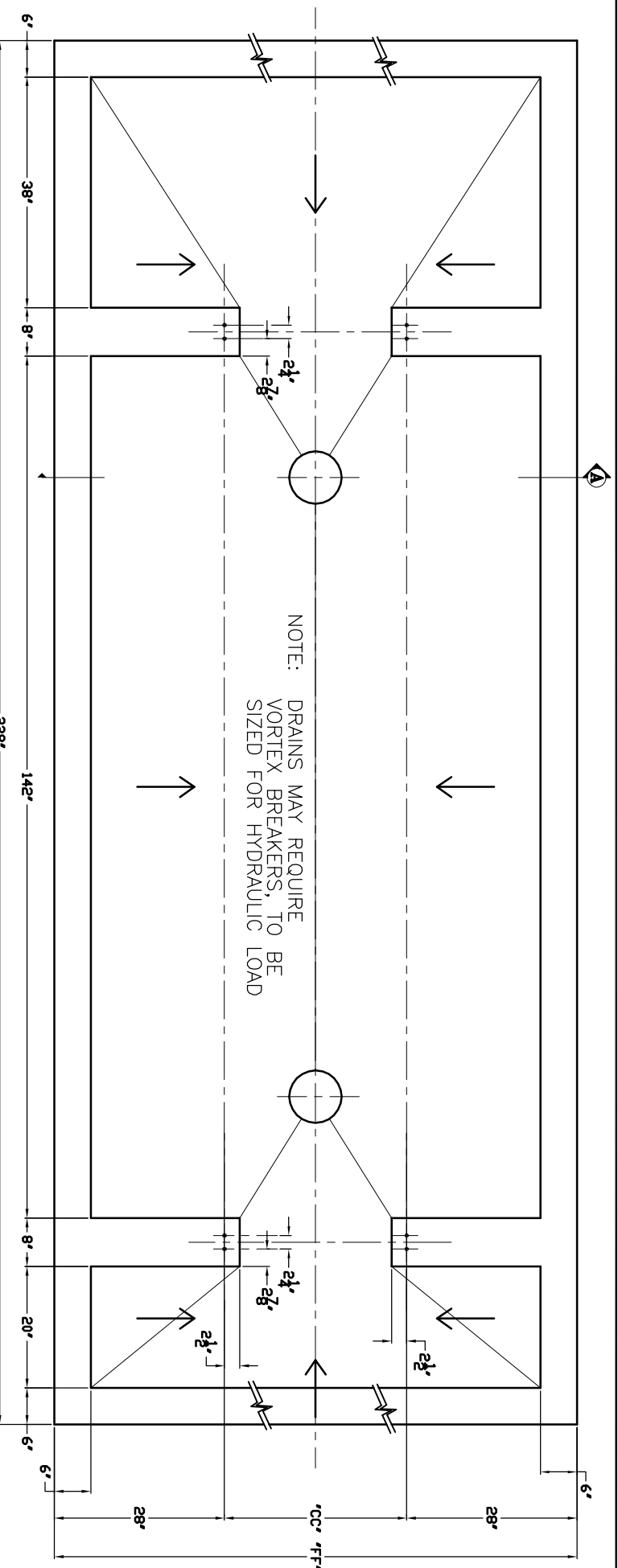
9. FORCE MAJURE

Any delay or failure in the performance by PHOENIX hereunder shall be excused if and to the extent caused by the occurrence of a Force Majeure. For purposes of this Agreement, Force Majeure shall mean a cause or event that is not reasonably foreseeable or otherwise caused by or under the control of the Party claiming Force Majeure, including acts of God, fires, floods, explosions, riots, wars, hurricane, sabotage terrorism, vandalism, accident, restraint of government, governmental acts, injunctions, labor strikes, other than those of PHOENIX or its suppliers, that prevent PHOENIX from furnishing the materials or equipment, and other like events that are beyond the reasonable anticipation and control of PHOENIX affected thereby, despite PHOENIX's reasonable efforts to prevent, avoid, delay, or mitigate the effect of such acts, events or occurrences, and which events or the effects thereof are not attributable to PHOENIX's failure to perform its obligations under this Agreement.

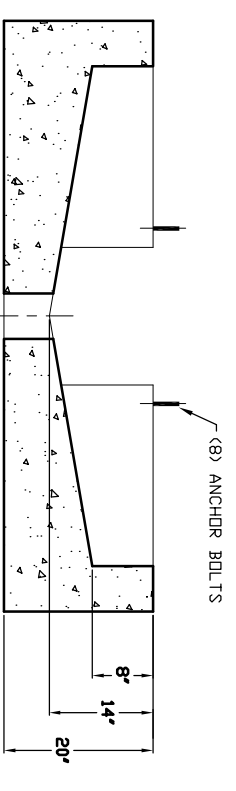
10. COMPLETE AGREEMENT

This complete agreement between PHOENIX and Purchaser is contained herein and no additional or different term or condition stated by Purchaser will be binding unless agreed to by PHOENIX in writing. It is agreed that no other agreement expressed or implied exists between PHOENIX and Purchaser which would supersede this agreement. The failure of PHOENIX to insist upon strict performance of any of the terms or conditions stated herein will not be considered a continuing waiver of any such terms or condition or any of its rights, nor will it imply a course of performance between the parties.

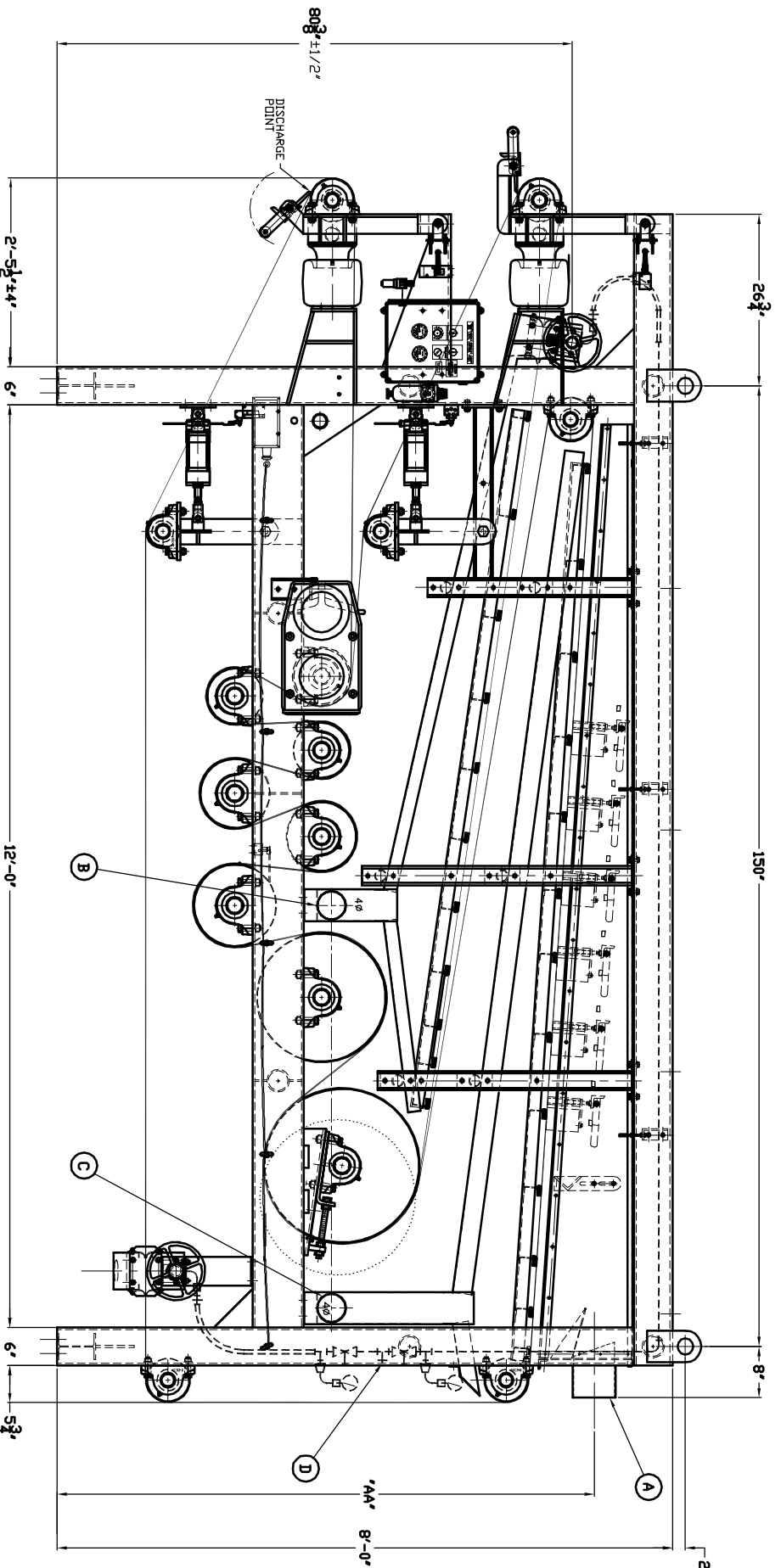
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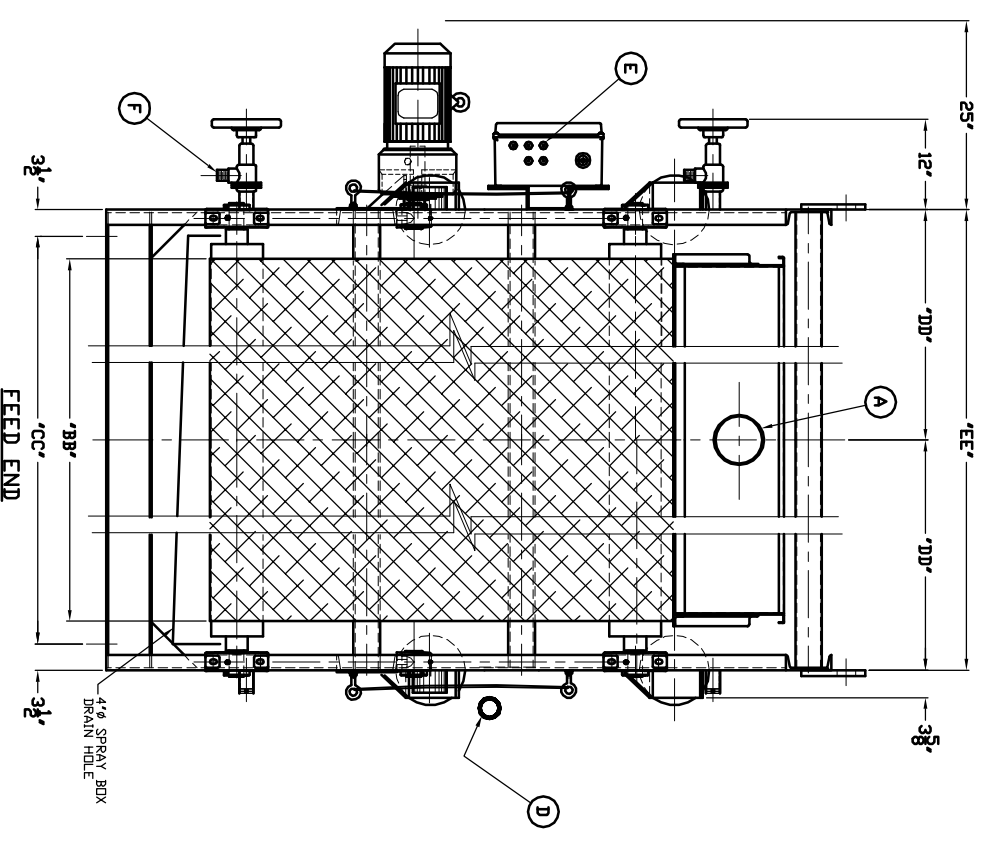
SUGGESTED SUMP ARRANGEMENT.
(ACTUAL SUMP BY OTHERS)



SECTION "A-A"



SIDE ELEVATION



FOR CUSTOMER REVIEW
NOT FOR CONSTRUCTION

FEED INLET Ø		DIMENSION SCHEDULE									
PRESS SIZE	A	B	C	D	E	F	G	H	I	J	K
1.2 METER	6"	1.2 METER	80 1/2"	48"	54"	30"	61"	110"	A	1	SE
1.7 METER	8"	1.7 METER	81 1/2"	68"	74"	40"	81"	130"	B	2	4"
2.2 METER	10"	2.2 METER	82 1/2"	88"	94"	50"	101"	150"	C	2	4"

NOZZLE SCHEDULE		PURPOSE	
ITEM	QTY.	SIZE	SCH.
A	1	SE	FEED INLET
B	2	4"	GRAY ZONE DRAIN TRAY
C	2	4"	WEDGE ZONE DRAIN TRAY
D	1	1 1/2"	SPRAYWATER PIPE INLET
E	1	3/8"	100 PSI. COMPR. AIR
F	2	1 1/2"	SPRAY BAR
G	2	4"	BOTTOM DRAIN PAN

PHOENIX PROCESS EQUIPMENT CO.
W061,28W-W062,28W
BELT FILTER PRESS

SCALE: 1"=12"

DATE: 4/8/03

REV: WX1,2-2,269W-SALS

Appendix C

Memorial Parkway Treatment Plant (MPTP) Belt Filter Press Rehabilitation Budgetary Quote

June 16, 2014



Northern Kentucky Water
700 Alexandria Pike
Fort Thomas, KY 41075

Attention: Kevin Owen

Reference: Northern Kentucky W.T.T.P.
Budget Reconditioning Proposal
Klampsess Type 85/890 2.0 meter
Ashbrook Quote No. **39082**

Alfa Laval Inc.
11600 East Hardy Road
Houston, TX 77093-1098
USA
Tel: +1 800-362-9041
Fax: +1 281-449-1324
www.alfalaval.us
www.as-h.com

Dear Mr. Owen,

Alfa Laval Ashbrook Simon-Hartley Inc. ("Ashbrook") is pleased to offer its budget proposal on site machine reconditioning of your existing (1) Klampsess Type 85/890 at the above referenced location. Ashbrook's experience in designing and building new belt filter presses and repairing/rebuilding earlier model belt filter presses, can only enhance our position in offering the services and parts needed to provide additional years of service to your existing unit(s).

Ashbrook started its "Rebuild Program" to provide customers with "today's technology" on earlier model belt filter presses as an alternative to purchasing new replacement equipment. Over the past eighteen years Ashbrook has completed rebuild projects consisting of partial site repairs, complete site machine reconditioning, complete factory machine reconditioning, partial factory machine reconditioning and site machine upgrades.

Equipment on these projects includes Bellmer Winklepresses (German), English Belt Filter Presses, Ashbrook's MKII, Type 85, and Type 94 Klampsesses, Aquabelt gravity belt thickeners and other Belt Filter Presses.

All parts supplied by Ashbrook for reconditioning your machine(s), shall meet Ashbrook's latest O.E.M. design standards. All parts will be made to Ashbrook's standard level of quality under ISO9001 certified procedures. All labor shall be performed by qualified Ashbrook trained service technicians who are experienced in the disassembly/reassembly of the Klampsess

Ashbrook's scope for reconditioning (1) Klampsess Type 85/890 including using only new O.E.M. (Original Equipment Manufacturer) parts, site labor for disassembly/reassembly, and inbound/outbound freight charges.

Typical rebuilds will include roller and bearing assembly parts, hydraulic system parts, drive system parts, belt wash system parts, poly wear items, rubber seals, and possibly retrofit or upgrade items. The particular scope of supply depends on the actual condition of the customer's machine at the time of the rebuild. A firm proposal will be issued at that time to tie down a firm scope of supply and allow our customers to issue a contract or purchase order so that work may proceed on their equipment.

Ashbrook
Simon-Hartley

Budget costing is important to allow our customer's to plan for the future needs of their facility. As such we have constructed budgetary pricing that will provide guidance on the financial resources that will need to be in place for the reconditioning of our customer's machines. For this specific project we would like to propose a budget cost of **\$ 120,000.00** per machine. **This pricing is for budgetary purposes only and a firm proposal will be provided at the customer's request when their budget is in place.** The scope of supply on your project is as detailed on page 3.

We appreciate the opportunity to be of assistance in the planning for the future of your facility's equipment. We hope that we have addressed your needs in a suitable manner. If you have any questions please feel free to contact your Ashbrook representative, Derek Francis at 609-841-3885.

Best Regards,

Derek Francis

Derek Francis

Aftermarket Territory Manager

BUDGET

Scope of supply:

- New set of filter belts.
- New set of O.E.M. rollers.
- New set of O.E.M. bearing housing assemblies.
- New fiberglass steering/tensioning cylinders.
- Recondition existing hydraulic unit with new return filters and hydraulic fluid.
- Pivot Plates
- Site labor for 2 men 2 weeks 1 trip
- Site expenses for 2 men 2 weeks 1 trip
- Inbound freights

BUDGET

Appendix D

New Screw Press Budgetary Quote

Osborne, David

From: Jim E. Pelton <JimPelton@peltonenv.com>
Sent: Tuesday, May 12, 2015 3:00 PM
To: Osborne, David
Subject: RE: NKWD Screw Press Budgetary Cost Estimate
Attachments: 7 - ES353 GA.PDF; 7 - ES-352 GA.PDF; 9 -ES352 Data Sheet.pdf; 9 -ES353 Data Sheet.pdf

Categories: Filed by Newforma

David,

Per your request I have provided a budgetary cost for the PW Tech Volute press. This application falls between two of our units, so we have budgeted both. Assuming we move forward with a pilot that will clear up any doubt as to which unit is the correct size. We expect it will be an ES-35-3, but if the sludge doesn't dewater as well as we anticipate it may require (2) ES-35-2.

The ES-35-3 has (3) 35mm screws. The ES-35-2 has (2) 35mm screws.

Budgetary pricing is as follows:

- (1) ES353 with a Velodyne polymer system and controls: \$475,000
- (2) ES352 with a Velodyne polymer system and controls: \$620,000 and would offer full redundancy.

Please call with any questions.

Thanks
Jim

From: Osborne, David [mailto:DOsborne@grwinc.com]
Sent: Thursday, May 07, 2015 8:56 AM
To: Jim E. Pelton
Subject: NKWD Screw Press Budgetary Cost Estimate

Jim,

Good morning. We are looking into the budgetary costs for sludge dewatering for the Taylor Mill Treatment Plant for NKWD. Presently, the existing belt filter press is in need of repairs or replacement. I am aware that samples were gathered and tested but the City is not ready at this time to perform pilot testing. Nevertheless, I was hoping you could provide me with rough budgetary costs for a screw press that fits the following characteristics:

Number of Units	1
Capacity	2,000 lbs/hr (at 3% feed of TSS)
Inlet Consistency	2.0 – 8.0 % TSS
Min. Cake Solids	35%
Min. Solids Capture	95%

These characteristics were included in the RFP. Additionally, please include a rough budgetary cost for a new electrical control panel in your estimate.

Again, this evaluation is based solely off budgetary estimates, therefore, a comprehensive proposal is not needed.

If you have any questions, please let me know.

Thank you for your time,

David Osborne, EIT

GRW | [engineering](#) | [architecture](#) | [geospatial](#)

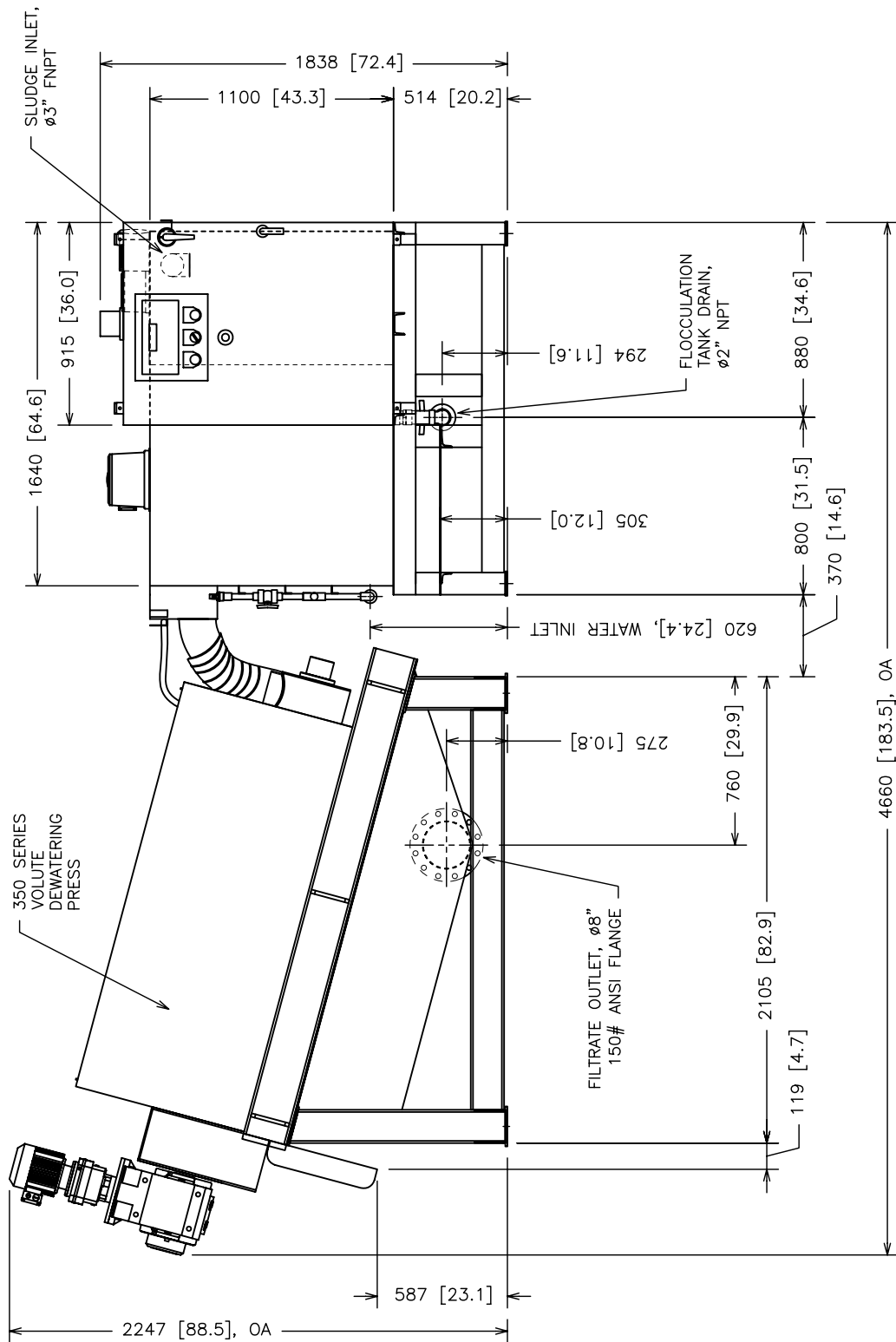
801 Corporate Drive | Lexington, KY 40503

P 859.223.3999 | C 859.630.6131

Email: DOsborne@grwinc.com | Website: www.grwinc.com

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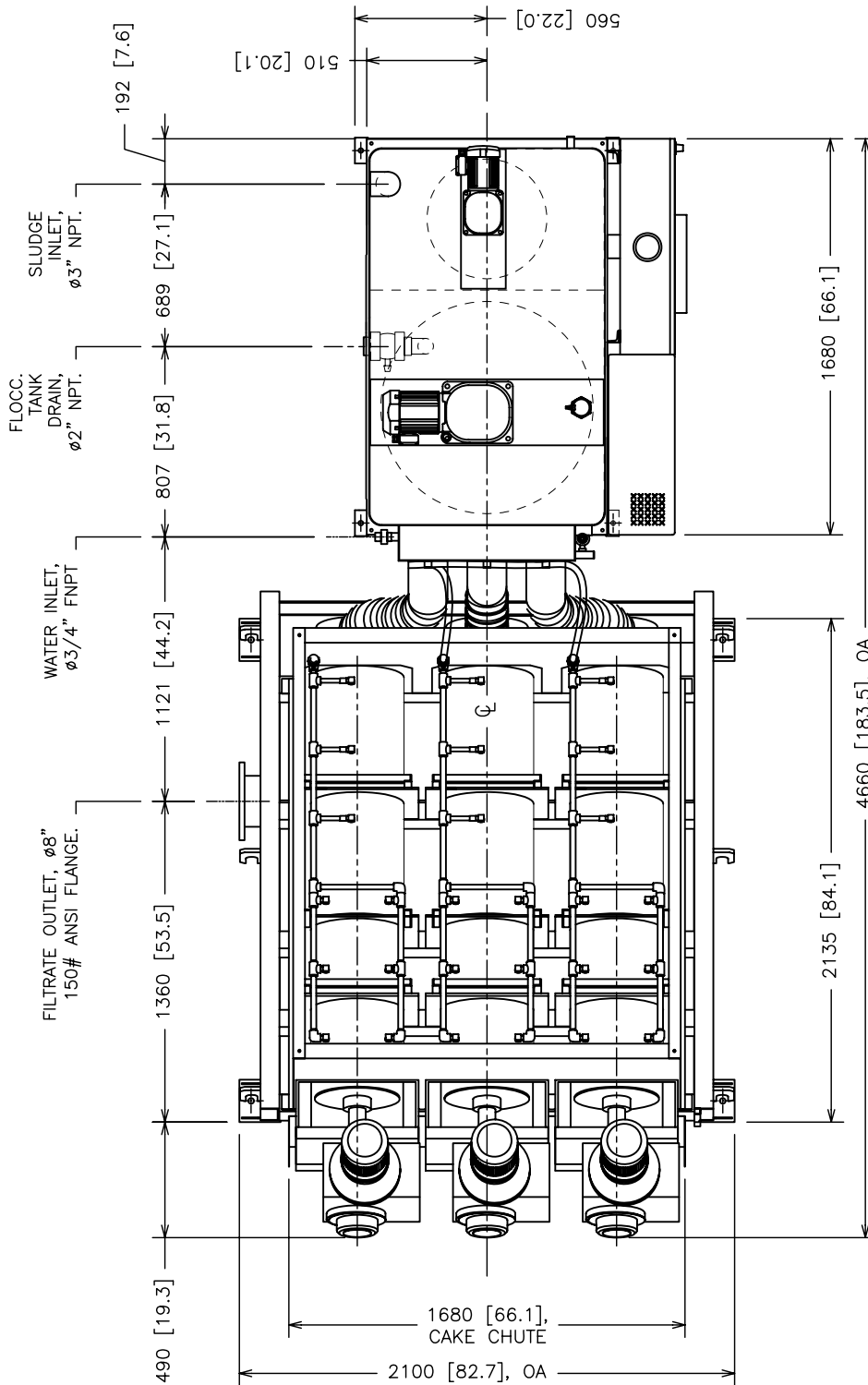
SIDE ELEVATION

DIMENSIONS: MM [INCHES]



VOLUTE DEWATERING PRESS
 ES353 GA DRAWING
 ELEVATION VIEW

JOB# PWT VDP ES353	SCALE
DATE 17 MAY 2012	NTS
DRAWN PWTech Inc.	SHEET
APPROV. ALEX DAVEY	1 OF 4



PLAN VIEW

DIMENSIONS: MM [INCHES]



VOLUTE DEWATERING PRESS
ES353 GA DRAWING
PLAN VIEW

JOB# PWT VDP ES353

DATE 17 MAY 2012

DRAWN PWTech Inc.

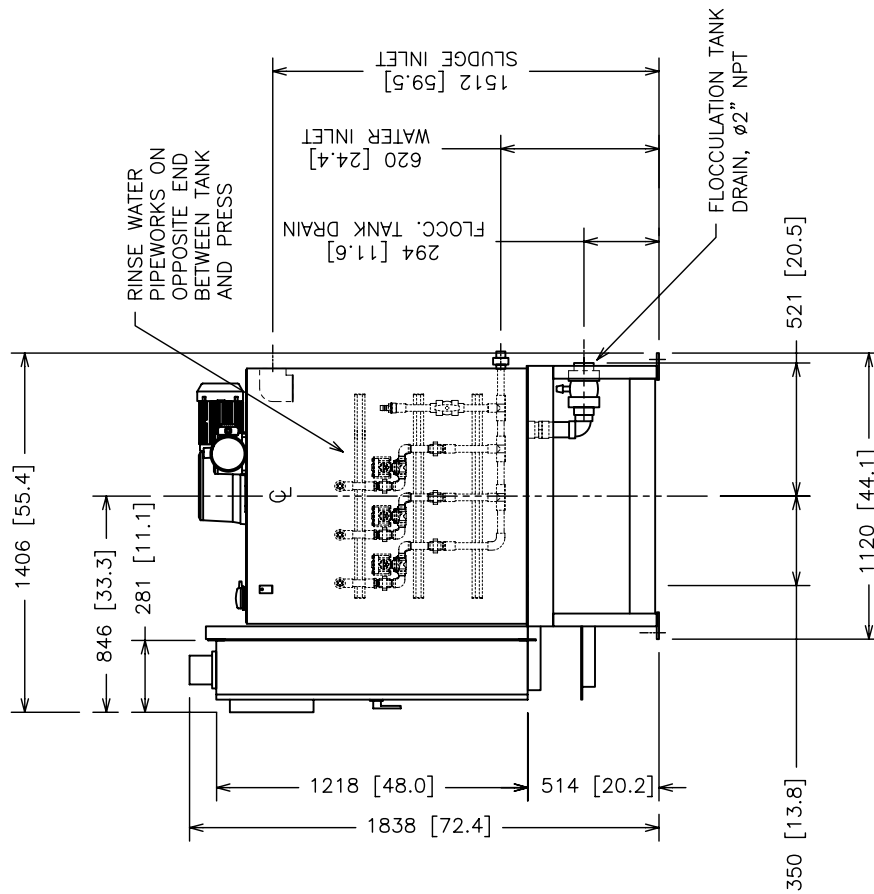
APPROV. ALEX DAVEY

SCALE

NTS

SHEET

2 OF 4



END ELEVATION

DIMENSIONS: MM [INCHES]



VOLUTE DEWATERING PRESS
ES353 GA DRAWING
END ELEVATION

JOB# PWT VDP ES353

DATE 17 MAY 2012

DRAWN PWTech Inc.

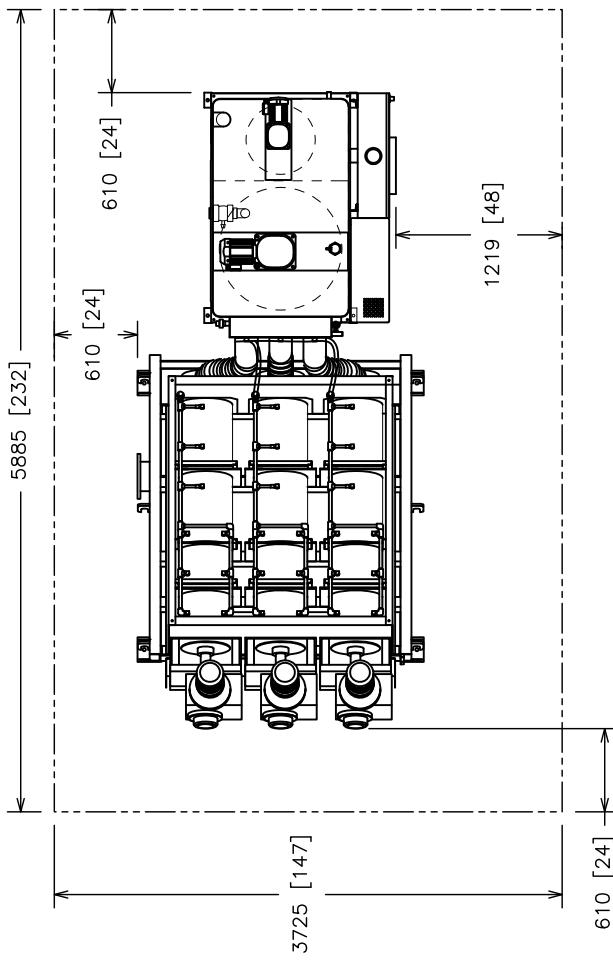
APPROV. ALEX DAVEY

SCALE

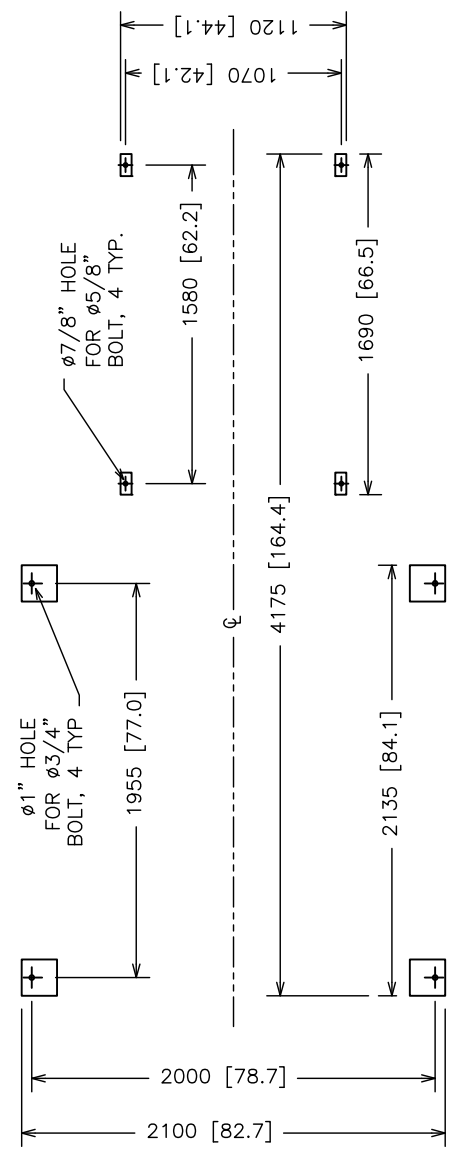
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SHEET

3 OF 4



RECOMMENDED SPACE



ANCHOR POINTS

DIMENSIONS: MM [INCHES]



VOLUTE DEWATERING PRESS
ES353 GA DRAWING
REC. SPACE & ANCHORS PTS.

JOB# PWT VDP ES353	SCALE
DATE 17 MAY 2012	NTS
DRAWN PWTech Inc.	SHEET
APPROV. ALEX DAVEY	4 OF 4



Volute Dewatering Press Specification Sheet - ES353

General Data	Model Information	Model:	ES353	
		Over All Dimensions:	183" x 83" x 88" (L x W x H)	
		Optimal Space requirement of installation:	244" x 167" x 120" (L x W x H)	
		Minimum Opening dimensions for installation:	60" x 84"	
		Weight	Empty:	7480 lbs
			Operating:	11,550 lbs
		Solids throughput:	2100 Dry pounds per hour	
		Hydraulic throughput:	200 GPM	
		Power use:	12.4 HP	
Washwater use:	6GPM intermittent, 15 GPH total			

Dewatering Drum	General	Dimension:	13.75" diameter x 72" long	
		Quantity:	3	
		Material:	Thickening Zone:	Type 304 Stainless Steel
			Dewatering Zone:	Type 304 Stainless Steel
			Screw:	304 Stainless Steel with CoCr coating
	Drive info	Gear Motor Supplier:	SEW Eurodrive	
		Model:	KH97 R57 DV100M4	
		Motor Power:	2.2 kW (3.0HP) 4-Pole	
		Insulation:	TEFC / IP65	
		Gear Reduction:	199 : 1	

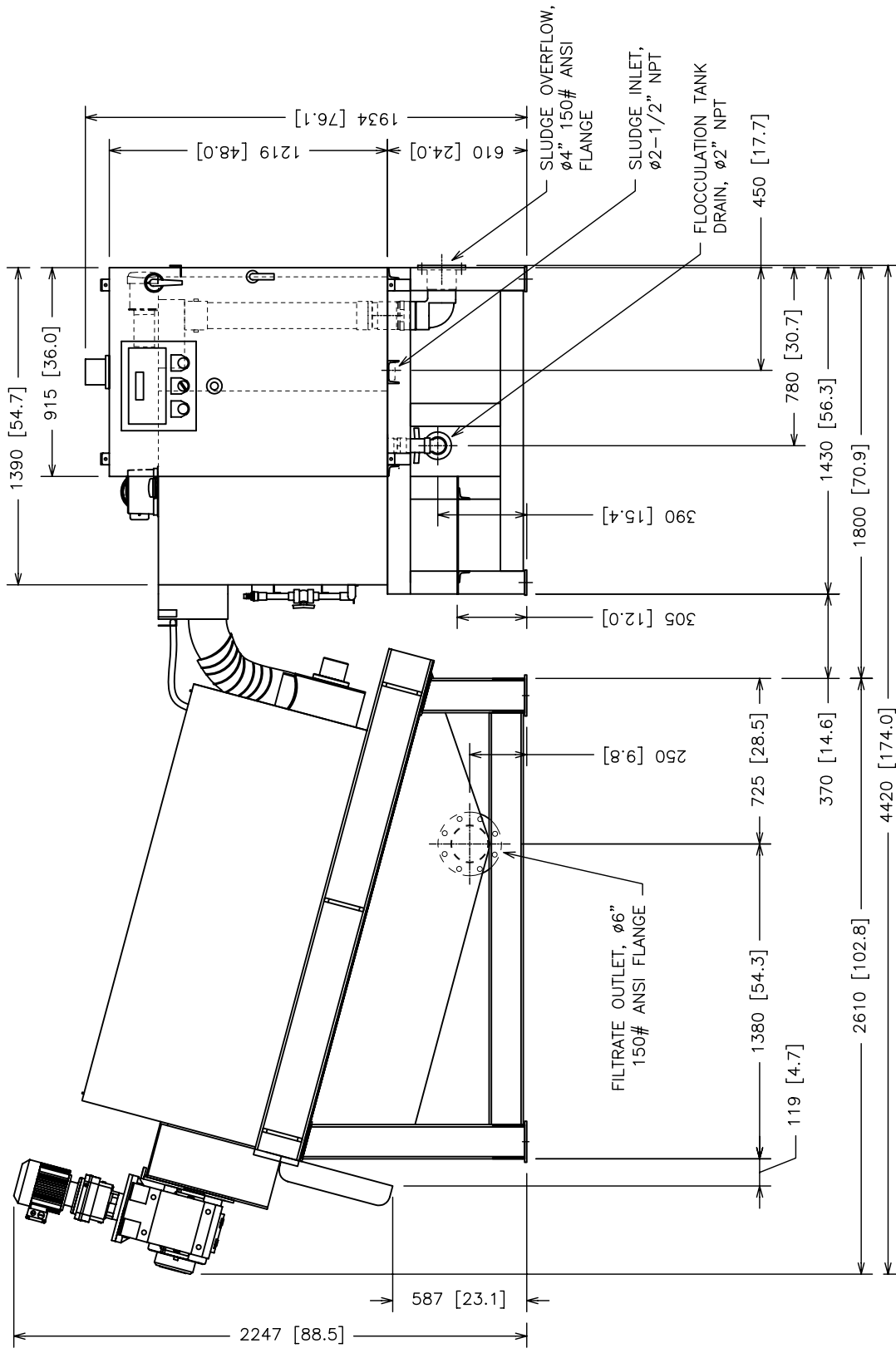
Flash mixing tanks	General	Dimensions:	24" x 39" x 43" (L x W x H)
		Volume	174.4 Gallons
		Working Volume:	154.6 Gallons
		Material	Type 304 Stainless Steel
	Drive Info	Gear Motor Supplier:	Nissei Corporation
		Model:	FSW-35-15-T040 WEX
		Motor Power:	0.4 kW 4-Pole
		Motor Insulation:	TENV / IP65
		Gear Reduction:	15 : 1

Flocculation tank	General	Dimensions:	39" x 39" x 43" (L x W x H)
		Volume	290.6 Gallons
		Working Volume:	154.6 Gallons
		Material	Type 304 Stainless Steel
	Drive Info	Gear Motor Supplier:	Nissei Corporation
		Model:	FSW-55-60-150 WEX
		Motor Power:	1.5 kW (2.0HP) 4-Pole
		Motor Insulation:	TEFC / IP65
	Gear Reduction:	60 : 1	

Electrical	General	Supply Voltage:	208/240/440/480 VAC
		Service:	3-Phase, 3-Wire (No Neutral)
		Control Voltage:	Dual - 24VDC & 115VAC
		Minimum Required Breaker Size:*	39 Amps * 480 VAC
	Panel	Panel Size:	36"(w) x 48"(h) x 12"(d)
		Panel Material:	Type 304 Stainless Steel
		Panel Rating:	Nema 4X
		Control Module:	Unitronics Vision 570 PLC

Polymer System	Supplier:	Velocity Dynamics, Inc.
	Model:	VM-10P-1200-X0D
	Mixing Type:	Variable - Mechanical & Hydraulic
	Feed Pump Type:	Progressive Cavity
	Polymer Feed Capacity:	0.5 - 10 Gallons per hour
	Water Use:	120 - 1200 Gallons per hour
	Dimensions:	24" x 34" x 42" (L x W x H)
	Weight:	~200 lbs

Connections	Feed Sludge:	3" ANSI 150# Flange
	Filtrate:	8" ANSI 150# Flange
	Drain:	2" FNPT Coupling
	Water:	3/4" FNPT Coupling
	Polymer Water Inlet:	1" FNPT
	Polymer Solutions Outlet:	1"FNPT
	Raw Polymer Feed Inlet:	1"FNPT



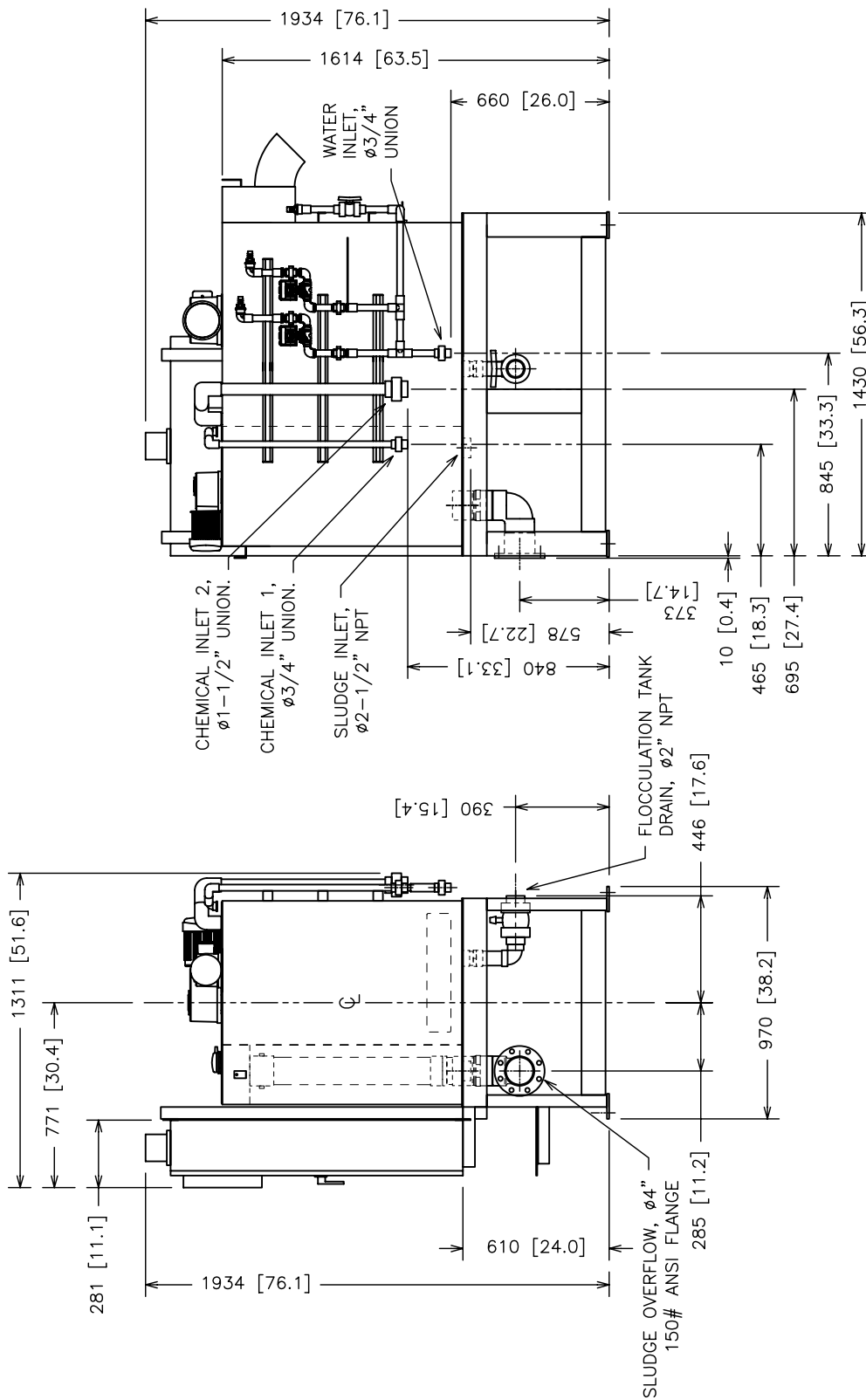
SIDE ELEVATION

DIMENSIONS: MM [INCHES]



VOLUTE DEWATERING PRESS
 ES-352 GA DRAWING
 ELEVATION VIEW

JOB# PWT VDP ES-352	SCALE
DATE 13 MAR 2009	NTS
DRAWN PWTech Inc.	SHEET
APPROV. ALEX DAVEY	1 OF 4



DIMENSIONS: MM [INCHES]



**VOLUTE DEWATERING PRESS
 ES-352 GA DRAWING
 END ELEV. AND INLET DETAIL**

JOB# PWT VDP ES-352

DATE 13 MAR 2009

DRAWN PWTech Inc.

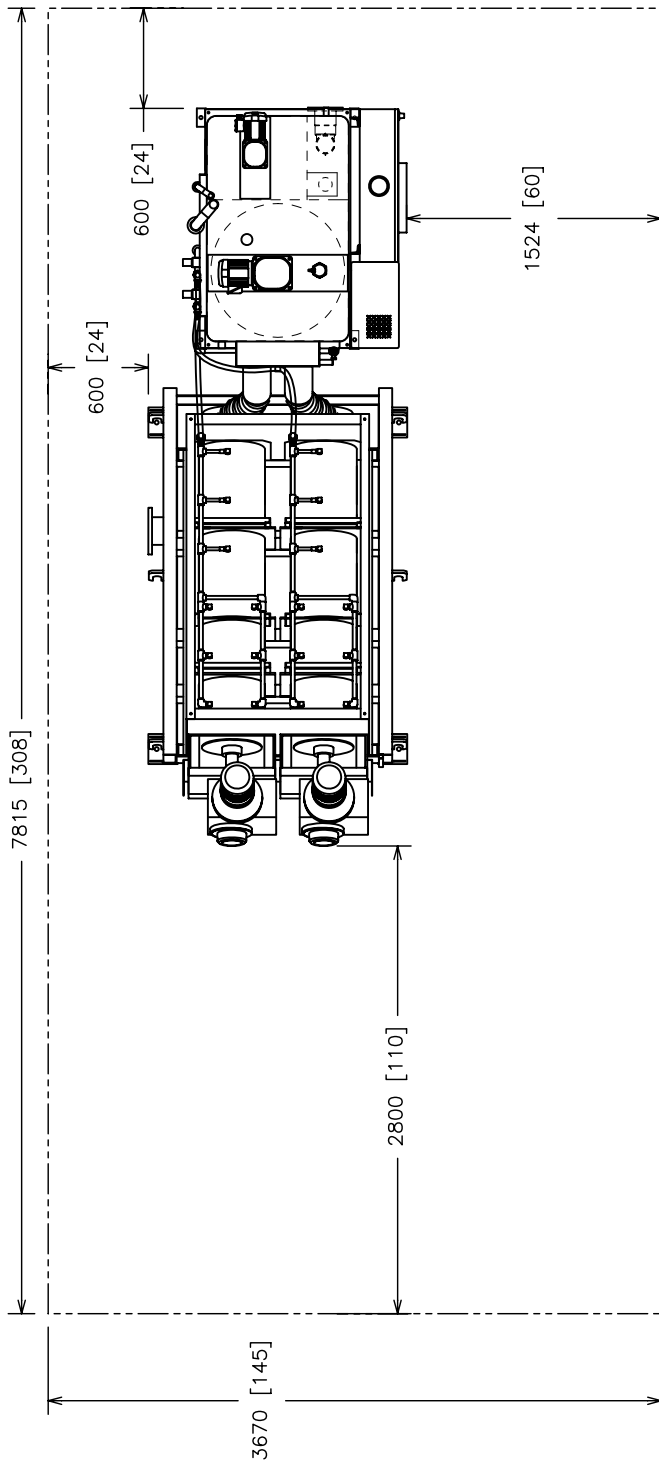
APPROV. ALEX DAVEY

SCALE

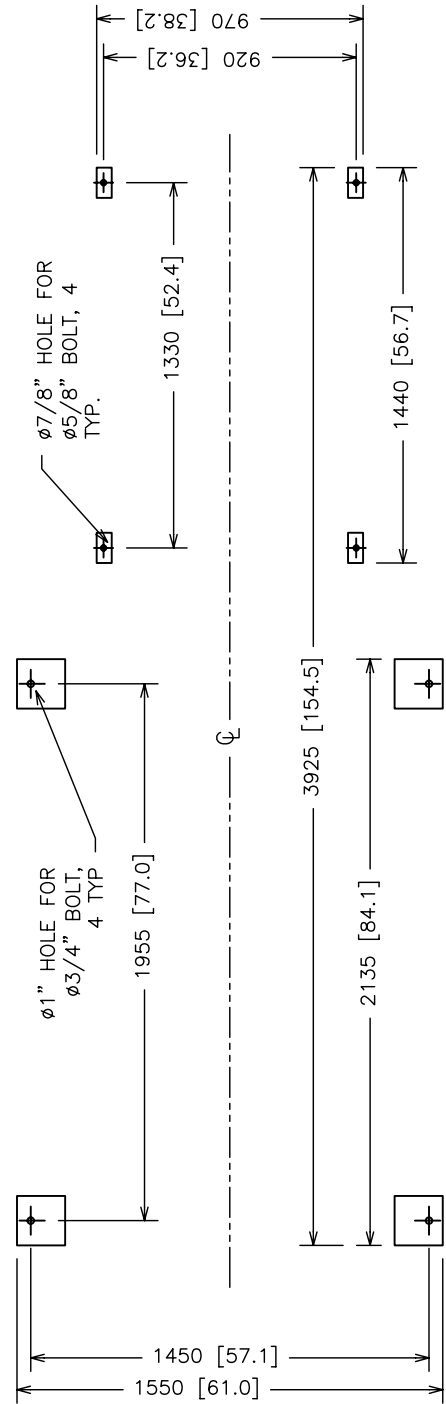
NTS

SHEET

3 OF 4



RECOMMENDED SPACE



ANCHOR POINTS

DIMENSIONS: MM [INCHES]



VOLUTE DEWATERING PRESS
ES-352 GA DRAWING
REC. SPACE & ANCHORS PTS.

JOB# PWT VDP ES-352	SCALE
DATE 13 MAR 2009	NTS
DRAWN PWTech Inc.	SHEET
APPROV. ALEX DAVEY	4 OF 4



Volute Dewatering Press Specification Sheet - ES352

General Data	Model Information	Model:	ES352	
		Over All Dimensions:	174" x 61" x 88" (L x W x H)	
		Optimal Space requirement of installation:	237" x 228" (L x W)	
		Minimum Opening dimensions for installation:	48" x 74"	
		Weight	Empty: 5500 lbs Operating: 8140 lbs	
		Solids throughput:	1400 Dry pounds per hour	
		Hydraulic throughput:	130 GPM	
		Power use:	8.2 HP	
Washwater use:	6GPM intermittent, 15 GPH total			
Dewatering Drum	General	Dimension:	13.75" diameter x 72" long	
		Quantity:	2	
		Material:	Thickening Zone:	Type 304 Stainless Steel
			Dewatering Zone:	Type 304 Stainless Steel
	Drive info	Screw:	304 Stainless Steel with CoCr coating	
		Gear Motor Supplier:	SEW Eurodrive	
		Model:	KH97 R57 DV100M4	
		Motor Power:	2.2 kW (3.0HP) 4-Pole	
		Insulation:	TEFC / IP65	
		Gear Reduction:	199 : 1	
Flash mixing tanks	General	Dimensions:	20" x 33" x 39" (L x W x H)	
		Volume	112.3 Gallons	
		Working Volume:	98.2 Gallons	
		Material	Type 304 Stainless Steel	
	Drive Info	Gear Motor Supplier:	Nissei Corporation	
		Model:	FSW-30-15-T020 WEX	
		Motor Power:	0.2 kW 4-Pole	
		Motor Insulation:	TENV / IP65	
Gear Reduction:	15 : 1			

Flocculation tank	General	Dimensions:	33" x 33" x 39" (L x W x H)
		Volume	190.9 Gallons
		Working Volume:	167.0 Gallons
		Material	Type 304 Stainless Steel
	Drive Info	Gear Motor Supplier:	Nissei Corporation
		Model:	FSW-45-60-075 WEX
		Motor Power:	0.75 kW (1.0HP) 4-Pole
		Motor Insulation:	TEFC / IP65
	Gear Reduction:	60 : 1	

Electrical	General	Supply Voltage:	208/240/440/480 VAC
		Service:	3-Phase, 3-Wire (No Neutral)
		Control Voltage:	Dual - 24VDC & 115VAC
		Minimum Required Breaker Size:*	TBD
	Panel	Panel Size:	TBD
		Panel Material:	Type 316 Stainless Steel
		Panel Rating:	Nema 4X
		Control Module:	Unitronics Vision 570 PLC

Polymer System	Supplier:	Velocity Dynamics, Inc.
	Model:	VM-10P-1200-X0D
	Mixing Type:	Variable - Mechanical & Hydraulic
	Feed Pump Type:	Progressive Cavity
	Polymer Feed Capacity:	0.5 - 10 Gallons per hour
	Water Use:	120 - 1200 Gallons per hour
	Dimensions:	24" x 34" x 42" (L x W x H)
	Weight:	~200 lbs

Connections	Feed Sludge:	2.5" FNPT Coupling
	Filtrate:	6" ANSI 150# Flange
	Drain:	2" FNPT Coupling
	Water:	3/4" FNPT Coupling
	Polymer Water Inlet:	1" FNPT
	Polymer Solutions Outlet:	1"FNPT
	Raw Polymer Feed Inlet:	1"FNPT

Appendix E

New Polymer Feed System Budgetary Quote

Osborne, David

From: Tim Walker <Tim@jtguthrie.com>
Sent: Friday, June 12, 2015 3:09 PM
To: Osborne, David
Subject: RE: Acrison Polymer Feed System Northern KY WWTP
Attachments: N KY Polymer.pdf

Categories: Filed by Newforma

David,

Attached is the information you requested covering Acrison Model 515 Dry Polymer Feed System for this project. Budget price for the Model 515 polymer feed system with 100 gallon stainless steel mix tank, 200 gallon stainless steel storage tank, and control panel is \$47,000.00. If new metering pumps are required add \$10,000. Let me know if you need any additional information.

Tim Walker
J T Guthrie & Son Inc
615-377-3952 office
615-351-5742 cell
tim@jtguthrie.com

From: Osborne, David [mailto:DOsborne@grwinc.com]
Sent: Wednesday, June 10, 2015 9:55 AM
To: Tim Walker
Subject: Acrison Polymer Feed System Quote

Tim,

Good morning. GRW has been hired by a client to look at preliminary costs associated with replacing their existing polymer feed system. Their preference is an Acrison system. They currently & plan to continue to dry polymer. Their existing system has the following characteristics:

Dosing Rate: 183.9 gph
Pump Capacity: 696 L/H

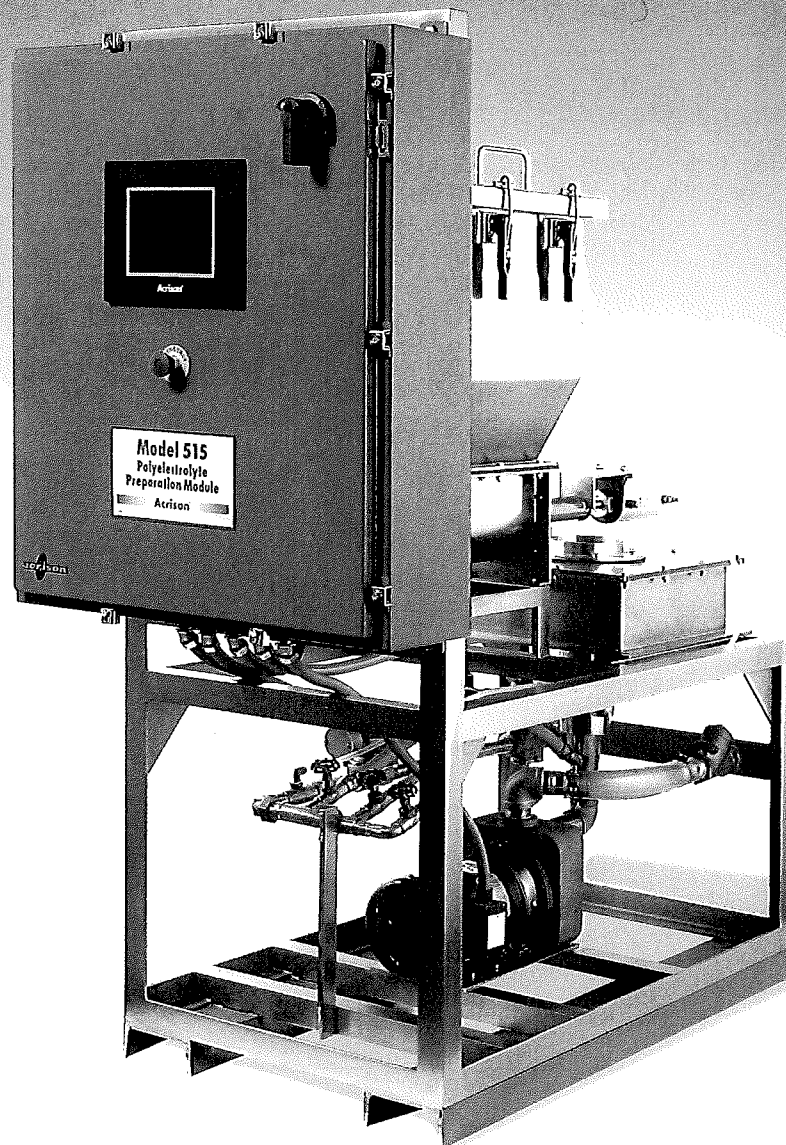
The two screenshots below give more information on the existing polymer feed system. As stated hereinbefore, we are looking for **budgetary cost estimates** associated with the Acrison system. Please call me with any questions.

Acrison®

Bulletin 515

Model 515 Polyelectrolyte Preparation Module

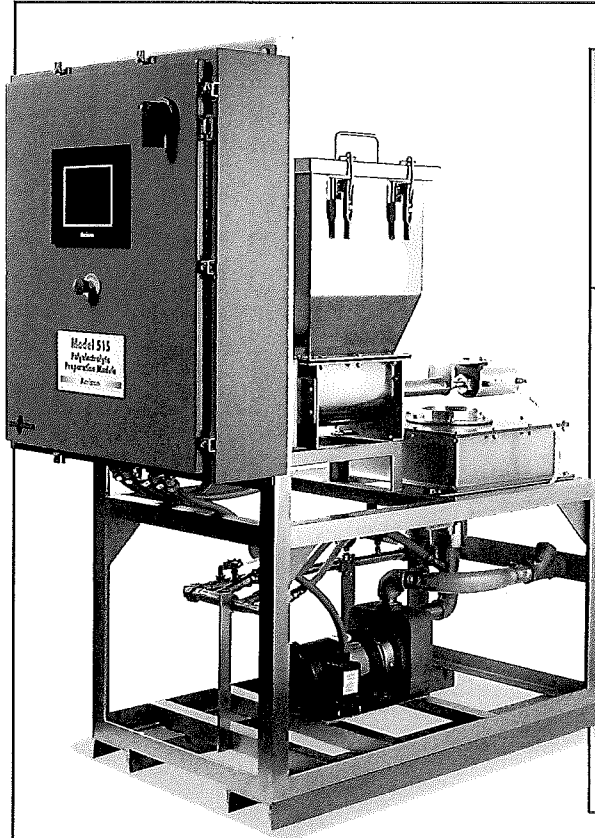
For Dry and Liquid Polymers



Industrial and municipal chemical feed equipment.

Acrison®
Acrison®

Model 515 Packaged Polyelectrolyte Preparation Module



Cuts water and wastewater treatment cost by accurate feeding, positive dispersion, and complete wetting of dry and liquid polyelectrolytes.

The Model 515 Polyelectrolyte Preparation Module automatically prepares a homogeneous and precise solution from dry or liquid polyelectrolytes.

To accomplish this, a dry solids volumetric feeder meters polymer into a unique Wetting Chamber where the polymer combines with high energy, swirling water to form a thoroughly wetted solution, accomplished without eductors or other static restrictive orifices. When processing liquid polymer, a metering pump is used in conjunction with Acrison's novel "Dispersion-Injector" to blend the polymer and water. The prepared solution is transferred to the required arrangement of Mixing/Aging Tanks immediately upon wetting. The Model 515 Preparation Module is a complete packaged assembly mounted onto a "skid" type base, and includes control logic for most Tank Systems.

Features	Benefits
Model 105 Series Feeder	Double Concentric Auger, Dissimilar Speed Metering Mechanism ensures positive, accurate and reliable feed of dry polymer to the wetting chamber.
Wetting Chamber - Swirling Water Vortex	Ensures complete and thorough wetting without any agglomeration or "fisheyes"
Wetting Chamber - No Moving Parts	Maintenance-free operation
Wetting Chamber Containment Box	Includes level probe to prevent overflow conditions
Hydraulically Operated Slam Gate	Seals off the feeder discharge cylinder during periods of unused to prevent the hygroscopic polymer from absorbing moisture
Transfer Pump	Conveys wetted polymer to mix tank without damaging the fragile polymer chains
Water Pressure Switch	Prevents the system from operating should the water pressure drop
Flow Meter	Provides visual indication of water volume flowing through the Model 515 module
Hopper Low Level Probe	Warns the operator when polymer supply is low
Mix and Age Tanks Sized Based on Application	Customized systems allow for greater flexibility, especially in rooms with height or footprint limitations
Rugged Tank Construction	11 gauge stainless steel tanks ensure extended life and durability
Completely Enclosed Tanks	Prevents items and debris from falling in, and prevents solution from splashing out
Slow Speed Mixer	Gently mixes polymer solution without damaging the fragile polymer chains
Liquid Polymer Pump Assembly	Optional for the accurate metering and blending of neat liquid polymer
Advanced Control System	Allen-Bradley PLC, Ethernet capability, and 8" color touchscreen operator interface provide complete automatic control of the system with the latest technology
Model 515 Module - Compact Design	Minimizes floor space and headroom requirements
Open-Frame Design	Provides easy access to all system components
Convenient Polymer Filling Height	Facilitates operator loading of hopper
Various Hopper Sizes and Hopper Loading Devices Available	Bulk bag (super-sac) unloaders, extra-large hoppers, dust collectors with bag dump stations, and more...
Ultrasonic Level Transmitters	Optional for system control and continuous level display

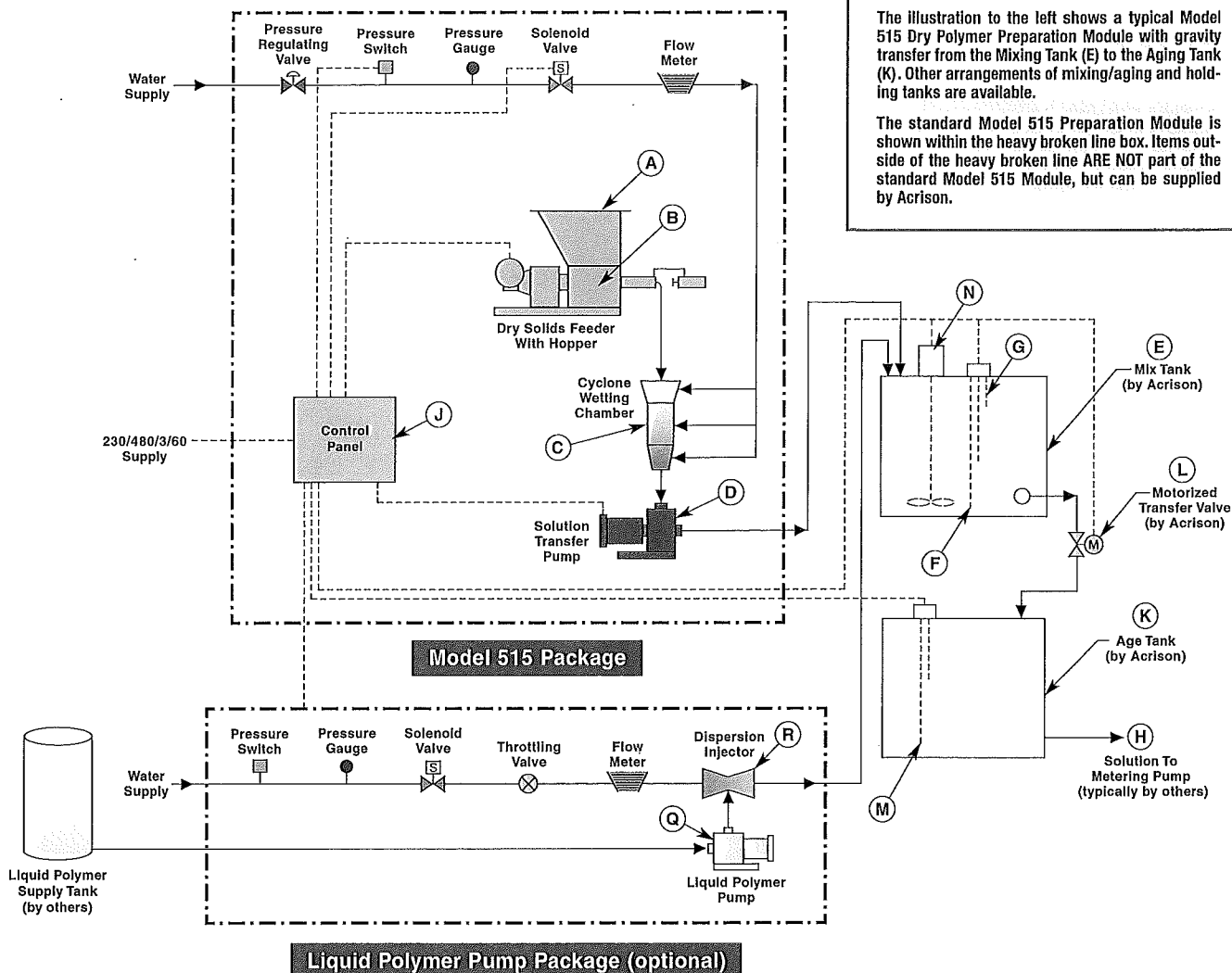
Provides Value to System Functionality/Operation

Facilitates Maintenance/Increases Safety

Provides System/Application Flexibility

A compact, economical and advanced Polyelectrolyte Preparation Module for the highly efficient preparation of both dry and liquid polymers.

Model 515 System Operation



The illustration to the left shows a typical Model 515 Dry Polymer Preparation Module with gravity transfer from the Mixing Tank (E) to the Aging Tank (K). Other arrangements of mixing/aging and holding tanks are available.

The standard Model 515 Preparation Module is shown within the heavy broken line box. Items outside of the heavy broken line ARE NOT part of the standard Model 515 Module, but can be supplied by Acrison.

Principle of Operation

Standard Dry Mode

The Model 515 System operation can be easily understood by following the Flow Diagram above. Dry polymer is loaded into the Feeder Hopper (A) and then accurately metered at a preset rate by Feeder (B) into Wetting Chamber (C) where it mixes with water.

Within Wetting Chamber (C), turbulently flowing water effectively and efficiently wets the polymer without clumping, agglomeration or "fisheyes." The completely wetted polymer then drops directly into Solution Transfer Pump (D) and is immediately and continuously transferred into a Mixing Tank (E) without in any way damaging the polymer chains. A slow speed Mixer (N) is included in this tank.

Low Level Probe (F), located in the Mixing Tank (E), initiates start-up of the system; its High Level Probe (G) shuts-off the Processing Module. Logic for the automatic transfer of solution to the Aging Tank (K), through Transfer Valve (L), is provided upon command from Level Probe (M). The entire Model 515 System operation is performed from a Control Panel (J). Prepared polymer solution is then fed into the process at the desired rate by a Metering Pump (H).

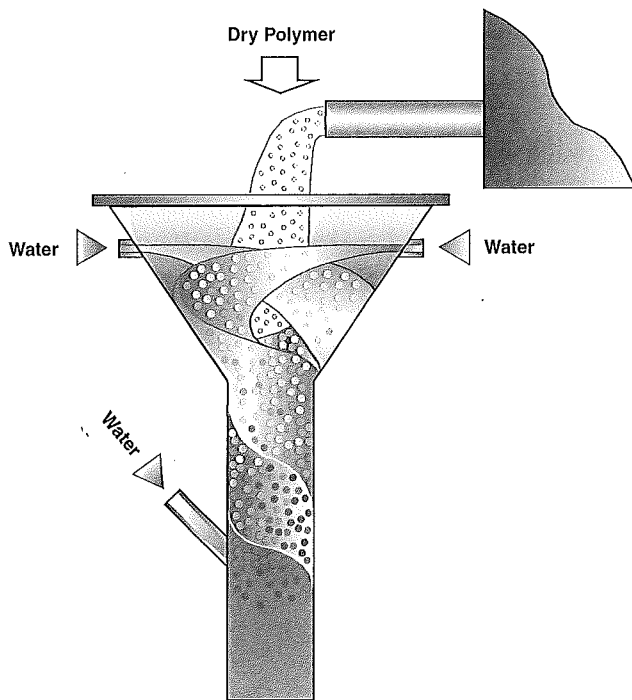
Principle of Operation

Optional Liquid Mode

As indicated in the above Flow Diagram for liquid polymer addition, Pump (Q) accurately meters liquid polymer directly into Acrison's unique *Dispersion-Injector* (R) where the polymer is simultaneously dispersed and mixed with vigorously flowing water to produce a superior, high quality solution. The solution is then immediately transferred into the Mix Tank (E), typically provided with an Acrison Model 515 Polyelectrolyte Preparation System.

Constructed of clear Acrylic so that its internal area is entirely visible, the *Dispersion-Injector* (R) also contains and completely isolates the liquid polymer whenever the Metering Pump (Q) is not operating, or when the Liquid Polymer Preparation System is not in use. Very notably, Acrison's *Dispersion-Injector* is also non-clogging, self-cleaning, corrosion-proof and maintenance-free.

Cyclone Wetting Chamber



Cyclone Wetting Chamber

Acrison's Polymer Cyclone Wetting Chamber

Referring to the illustration, swirling water is combined with polymer for complete and thorough wetting.

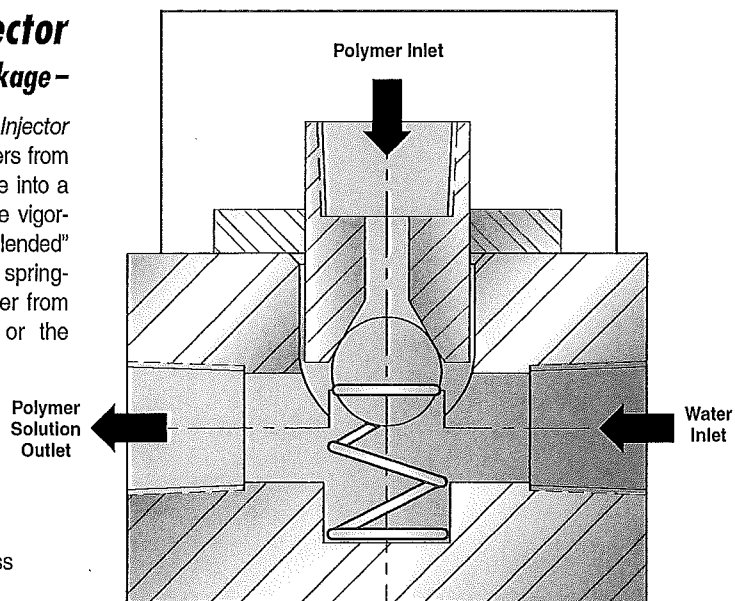
- Based on original wetting device designed by Acrison in 1974.
- Swirling water vortex ensures sufficient surface area for proper wetting of the polymer particles.
- Suction of pump mounted below the wetting chamber creates a downdraft which atomizes the polymer, eliminates splashing, and ensures dust control.
- Eliminates agglomerate formation.
- No restrictive orifices ensures non-clogging operation of wetting chamber.
- Constructed of 316 stainless steel.
- No moving parts - Maintenance Free.

Dispersion-Injector

Acrison's Polymer* Dispersion-Injector - Provided with the optional liquid polymer package -

Referring to the illustration, water flows into the *Dispersion-Injector* from one end. In the central section of the unit, polymer enters from around a spring-loaded ball causing the polymer to disperse into a thin, fine conical stream that instantaneously blends with the vigorously flowing water, exiting the *Dispersion-Injector* as a "pre-blended" solution at the end opposite the water inlet. In addition, the spring-loaded ball completely seals and isolates the liquid polymer from contact with water anytime the polymer pump is off or the Preparation Module shut-down.

- Efficient Solution Reduces Long-Term Polymer Use
- Full Polymer Activation
- Self-Cleaning and Non-Clogging
- Polymer isolated from water during shutdown
- Clear Synthetic Housing allows visual observation of process
- Corrosion-Proof
- Low-Maintenance
- Reliable Rugged Design



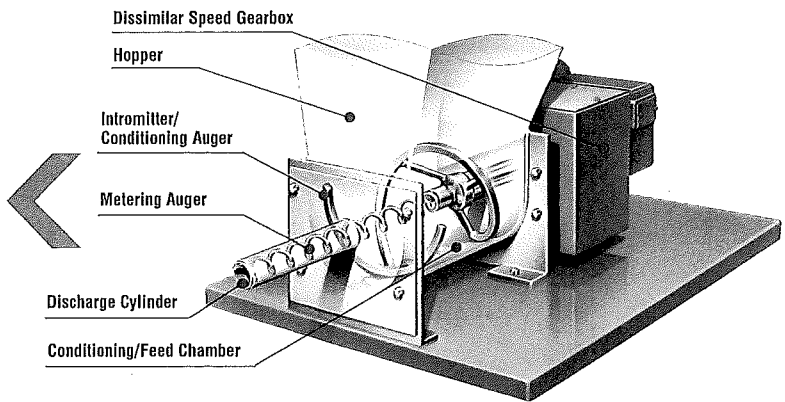
Acrison's Dispersion-Injector

* Patents issued and pending.

Model 515 Polyelectrolyte Preparation Module

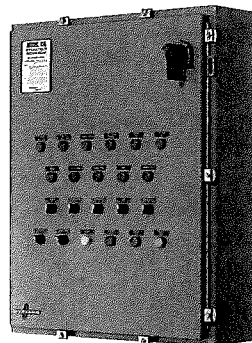
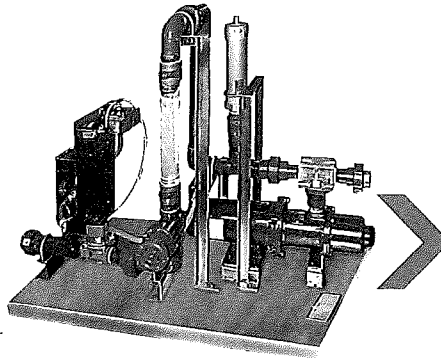
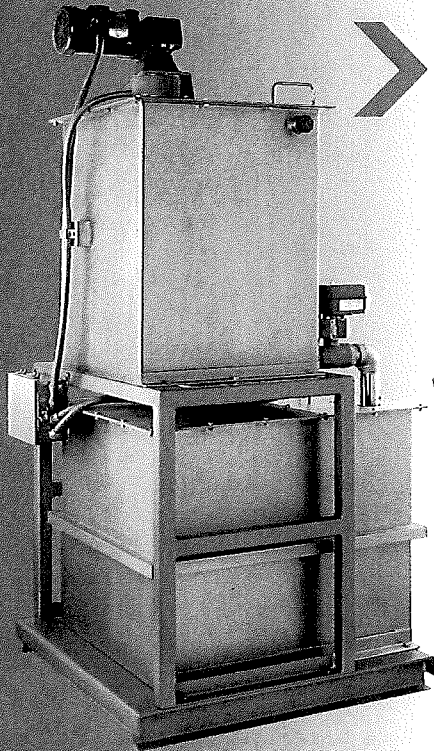
Basic Specifications

- **Construction:** As standard, product contact surfaces of the dry polymer feeder and wetting chamber are stainless steel.
- **Dry Polymer Feeder:** Dry polymer is metered by an Acrison Model 105 Series, dissimilar speed, Double Concentric Auger Volumetric Feeder. The standard feeder hopper capacity is two cubic feet, and the entire feeder is dust-tight. Metering accuracy is usually within ± 1 to 2 percent (error) or better based on a given number of consecutive one minute weighments.
- **Wetting Chamber:** Utilizes swirling turbulent water and a multitude of converging water jets to provide complete wetting of polymer.
- **Wetting rate:** Up to 4 pounds per minute (nominal) of dry polymer.
- **Transfer Pump:** Constant speed, direct coupled. The transfer pump motor is totally enclosed.
- **Control System:** Allen-Bradley Micrologix PLC with 8" color touchscreen operator interface and Ethernet capability standard. Provides complete control of system and run/alarm indication of all system components through an operator-friendly platform.
- **Control Panel Enclosure:** NEMA 4 is standard. NEMA 4X optional.



- **Power requirements:** 230/460/3/60.
- **Base dimensions:** 26 x 47 inches.
- **Filling height:** 60 inches to the top of the dry polymer supply hopper.
- **Water requirements:** 15-20 psi minimum. Standard systems require 16 gpm minimum water flow. Systems with liquid polymer option require 30 gpm minimum. Water flow requirements for larger systems with rapid-fill logic are calculated on a project-by-project basis.

Optional Equipment

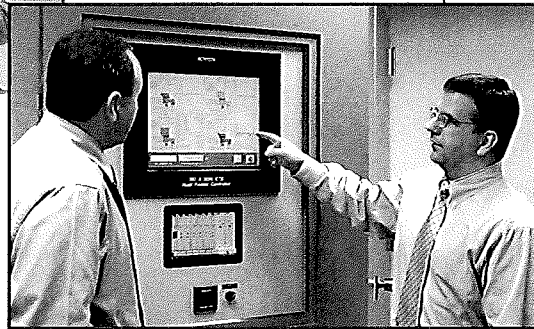
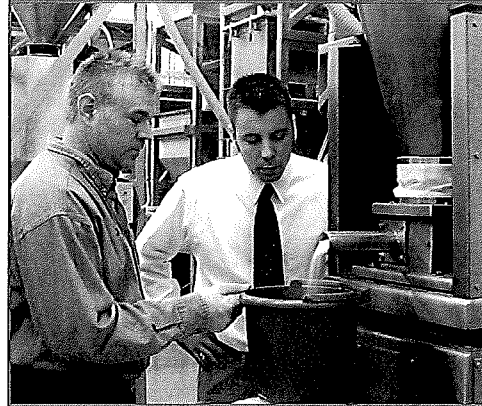


- **Mixing/Aging Tanks** – when supplied by Acrison, these tanks are furnished independent of the Model 515 Processing Module. All necessary accessories, including the mixing tank mixer, level probes and transfer valve are fitted to the tank system at the factory. As standard, the Model 515 Control System includes all necessary control logic for operation with mixing/aging tanks.
- **Liquid Polymer Blending Package** – allows for the use of liquid emulsion type polymers. The package uses Acrison's unique *Dispersion-Injector* to blend liquid polymer with water prior to discharge into the mix tank.
- **Polymer Solution Metering Pump** – furnished as a separate item, the pump receives prepared solution from the aging tank. Post-dilution accessories can also be provided.
- **Ultrasonic Level Transmitters** – used in place of the standard conductance type level probes on the mix and age tanks, the ultrasonic transmitters provide non-contacting operation, changeable set-points, and continuous level measurement.
- **Original Control Package** – in lieu of the PLC and touchscreen interface, the panel can be provided with original relay control logic, and door-mounted lights and switches.

Discover the difference!

We cordially invite you to witness a test in Acrison's state-of-the-art Customer Demonstration Facilities handling your actual product(s) with the specific equipment we recommend for the application. Usually, there is no cost or obligation for this service.

Discover the difference in technology, quality and performance of Acrison equipment.



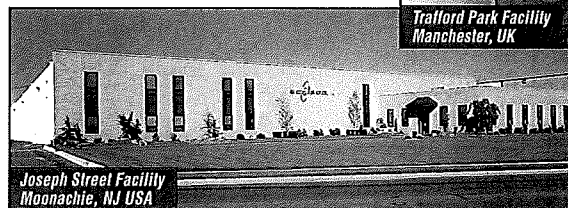
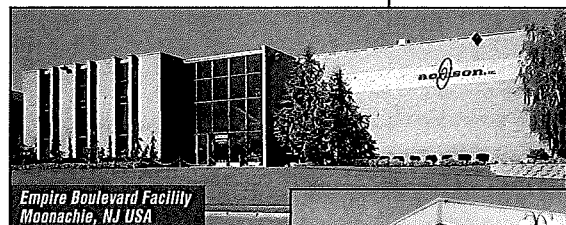
Acrison products...

- Models 101 and 130 Volumetric Feeders
- Models V101 and V130 Volumetric Feeders
- Model 1015 Volumetric Feeder Series
- Model 105 Volumetric Feeder Series
- Model W105 Volumetric Feeder Series
- Model 120 Volumetric Feeder
- Model 140 Volumetric Feeder Series
- Model 170 Volumetric Feeder Series
- Bin Discharger Feeders
- Model 200 Series of Weigh Belt Feeders
- Model 203B Series of Weigh Auger Feeders
- Model 270 Series of In-Line Weigh Feeders
- Models 402, 404, A405, 406 and 407 Series ("Weight-Loss-Differential") Weigh Feeders
- Model Series 403 ("Weight-Loss-Differential") Weigh Feeders
- Model 403B(D) Batch/Dump Weighing Systems
- Model 404BZ(BU) Bulk Bag Unloader Batch Weigher
- Models 350 and 301 Continuous Blenders and Blending Systems
- Multiple Auger Bin Dischargers and Multiple Auger Bin Discharger Hoppering Systems
- Vibratory Bin Dischargers
- Model 500 Series of Polyelectrolyte Preparation Systems
- Water and Waste Water Treatment Systems
- Volumetric and Gravimetric Feeder Controllers and Control Systems
- Accessory Equipment for Acrison Products
- Systems Engineering

"Visibly Different... Measurably Better"

Acrison[®], Inc.

20 Empire Blvd.
Moonachie, NJ 07074 USA
201-440-8300 • Fax: 201-440-4939
Email: informail@acrison.com
Website: www.acrison.com



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NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

Engineer's Opinion
Of Probable
Construction Cost

 GRW Engineers, Inc.	Project: Taylor Mill Treatment Plant Belt Filter Press Replacement			
	Owner: Northern Kentucky Water District			
	Project No.: 4384			
Opinion of Project Cost	Date: February 2016		Dwg. No.: All	
	Estimator: DCO		Type: Construction	
Item Description	No. of Units	Units of Measure	Unit Cost	Total Cost
Replace BFP with New Pneumatic BFP				
New Pneumatic Belt Filter Press (Includes Electrical Control Package & Assembly)	1	LS	\$260,000	\$260,000
New Belt Conveyor	1	LS	\$35,000	\$35,000
New Air Compressor	1	LS	\$5,000	\$5,000
New Sludge Piping, Foundation Reconfiguration & Misc. costs	1	LS	\$50,000	\$50,000
New Pneumatic Lines	1	LS	\$10,000	\$10,000
Removal of Existing BFP & Control Panel at TMTP	1	LS	\$20,000	\$20,000
Access Option 2 - Double Leaf Doors & Monorail	1	LS	\$75,000	\$75,000
Trolley Hoist & Control Panel	1	LS	\$5,000	\$5,000
Dry Polymer Feed System with Mix tank, Storage tank, Control Panel, Metering Pumps, Piping, etc.	1	LS	\$80,000	\$80,000
Renovation & Reconfiguration of Existing Utility Room & Bathroom	1	LS	\$27,500	\$27,500
Plumbing - Eye Wash, Backflow Preventer, etc.	1	LS	\$25,000	\$25,000
Mechanical - Unit Heaters, Mixing Valves, Vents, etc.	1	LS	\$30,000	\$30,000
Architecture - Aluminum Guardrails, Louvers, Gates, Masonry Walls, Grating, etc.	1	LS	\$35,000	\$35,000
Demolition of Existing Polymer Equipment & Mixing Tanks	1	LS	\$15,000	\$15,000
Floor Coating System - Epoxy Coating & Slip-resistant Top-coat	2100	SF	\$5.00	\$10,500
Equipment Installation (20%)	1	LS	\$76,000	\$76,000
New Ceiling Light Fixtures	17	EA	\$750	\$12,750
Electrical Installation	1	LS	\$65,000	\$65,000
			Sub-Total	\$837,000
Contractor OH&P (20%)	1	LS	\$167,400	\$167,400
TOTAL CONSTRUCTION COSTS FOR ALTERNATIVE 2				\$1,004,000



NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

Plans titled “Taylor Mill Treatment Plant Belt Filter Press Replacement” dated January 2017, sealed by a P.E.

And

Specifications titled “Taylor Mill Treatment Plant Belt Filter Press Replacement Project” dated January 2017, sealed by a P.E.

(Included as separate file)

NORTHERN KENTUCKY
WATER DISTRICT

Project

**Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky**

184-0488

CERTIFIED STATEMENTS

Affidavit (B.1)

Franchises (B.2)

Plan Review and Permit Status (B.3)

Easements and Right-of-Way Status (B.4)

Construction Dates and Proposed Date In Service (B.5)

Plant Retirements (B.6)

State Debt Officer Notification (B.7)

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

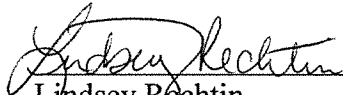
184-0488

Affidavit

AFFIDAVIT

Taylor Mill Treatment Plant Belt Filter Press Replacement Project

Affiant, Lindsey Rechten, being the first duly sworn, deposes and says that she is the Vice President of Finance and Support Services of the Northern Kentucky Water District, which she is the Applicant in the proceeding styled above; that she has read the foregoing "Taylor Mill Treatment Plant Belt Filter Press Replacement Project" Application and knows the contents thereof, and that the same is true of her own knowledge, except as to matters which are therein stated on information or belief, and that as to those matters she believes them to be true.



Lindsey Rechten.
Vice President, Finance & Support Services
Northern Kentucky Water District

Subscribed and sworn to before me in said County to be her act and deed by Lindsey Rechten, Vice President of Finance and Support Services of the Northern Kentucky Water District, this

22nd day of March 2017.



NOTARY PUBLIC
Kenton County, Kentucky
My commission expires 12-18-18

524676

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

Franchises (B.2)

Plan Review and Permit Status (B.3)

Easements and Right-of-Way Status (B.4)

Construction Dates and Proposed Date In Service (B.5)

Plant Retirements (B.6)

Franchises required – None

Plan Review and Permit Status –

The District has reviewed and approved the plans and specifications prepared by GRW, Inc., titled “Taylor Mill Treatment Plant Belt Filter Press Replacement” dated January 2017, sealed by a P.E.

The District submitted an Application for Building Permit to the Planning and Development Services of Kenton County (PDS) which has been approved. PDS is waiting until the project has been awarded to release the permit to the selected contractor.

Easements and Right-of-Way Status – No easements will be needed for this project.

Start date of construction – June 2017

Proposed date in service – July 2018

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

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

State Debt Officer Notification

Northern Kentucky Water District

March 27, 2017

Honorable Sandra K. Dunahoo
Commissioner and State Local Debt Officer
1024 Capital Center Drive, Suite 340
Frankfort, Kentucky 40601

Re: Northern Kentucky Water District, PSC Case No. 2017-00147
Notice of Intent to Issue Securities

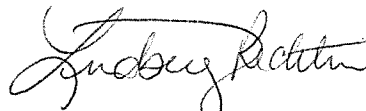
Dear Ms. Dunahoo:

Pursuant to the regulations of the Kentucky Public Service Commission, specifically 807 KAR 5:001: Section 18(1)(g), please be advised that the Northern Kentucky Water District (the "District") hereby notifies the State Local Debt Officer that the District intends on issuing securities in the form of a bond anticipation note (a "BAN") in 2017 for the purpose of funding several projects necessary for the District, including the Taylor Mill Treatment Plant Belt Filter Press Replacement with an estimated budget of \$1,075,000.

We will file the appropriate documents with your office in accordance with the requirements of KRS 65.117 once the securities are issued.

Very truly yours,

The Northern Kentucky Water District



By: Lindsey Rechten

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

BID INFORMATION

Bid Tabulation (C.1)

Engineer's Recommendation of Award (C.2)

Board Resolution (C.3)

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

Bid Tabulation

BID TAB

Northern Kentucky Water District
Taylor Mill Treatment Plant
Belt Filter Press Replacement Project

January 25, 2017

<u>CONTRACTOR</u>	<u>BID AMOUNT</u>
Dugan & Meyers	\$886,800.00
Building Crafts, Inc.	\$916,086.00
Danis Construction	\$982,900.00
Structural Systems Repair Group	\$1,580,000.00

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

Engineer's Recommendation of Award



GRW | engineering | architecture | geospatial

9710 Bunsen Parkway | Louisville, KY 40299

502.489.8484 | www.grwinc.com

January 27, 2017

Amy Kramer, P.E.
V.P., Engineering, Production & Distribution
Northern Kentucky Water District
2835 Crescent Springs Road
P.O. Box 18640
Erlanger, KY 41018

Re: Taylor Mill Treatment Plant
Belt Filter Press Replacement Project
Recommendation of Award for
Dugan & Meyers, LLC
GRW Project No. 4384

Dear Ms. Kramer:

As you are aware, construction bids for the referenced project were received on January 25, 2017. The apparent low bid was submitted by Dugan & Meyers, LLC of Cincinnati, OH. In addition to the Bid, Dugan & Meyers, LLC submitted all required information including the contractor's questionnaire, the bid bond and the subcontractors list. A summary of Dugan & Meyers, LLC's bid is as follows:

Base Bid Amount	\$886,800.00
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For your information, we have enclosed a copy of the Bid Tabulation.

As is customary, GRW has contacted references provided by Dugan & Meyers, LLC. The results of our reference check are as follows:

General

Dugan & Meyers, LLC has been in business as a General Contractor for 82 years and has completed a number of various utility (water & wastewater) projects throughout the states of Kentucky and Ohio for a number of different Cities and Municipalities.

Project References

As an engineering consultant company bidding construction work, GRW has had the opportunity to work with Dugan & Meyers, LLC on many water and wastewater projects in the past. Below are a few of their most recent projects that GRW has completed with them.

1. 2015 Frankfort, KY, Generator Building, Water Treatment Plant
Contract Amount: \$2,512,740
GRW Project No. 4199
2. 2012 Sanitation District No. 1 of N. KY, Western Regional Water Reclamation Facility
Contract Amount: \$69,200,000
GRW Project No. 2886
3. 2011 Oldham County, KY, Water Treatment Plant
Contract Amount: \$4,000,144
GRW Project No. 3869

Dugan & Meyers, LLC has performed satisfactorily on these previous projects and showcased a professional working environment.

Surety Reference

Mr. Jerry Macholtz of Alliant Insurance Services (516-414-8900) indicated that Liberty Mutual has been writing bonds for Dugan & Meyers, LLC for approximately 40 years. Mr. Macholtz stated that the Taylor Mill Treatment Plant Belt Filter Press Replacement project was very much within Dugan & Meyers, LLC's bonding capacity and that they have never had any claims or forfeitures with any Dugan & Meyers, LLC's bonds.

Banking Reference

Mr. James Carty of Fifth Third Bank (513-534-2462) indicated that Dugan & Meyers, LLC, has conducted business with Fifth Third Bank for more than 20 years. Mr. Carty indicated that Dugan & Meyers, LLC has always maintained their accounts in good standing and have always paid as agreed.

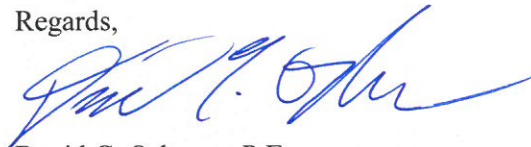
Supplier Reference

Mr. Brad Slabaugh of Hilltop Basic Resources (513-684-8224) indicated that Dugan & Meyers, LLC has conducted business with Hilltop Basic Resources for approximately 50 years. Mr. Slabaugh indicated that Dugan & Meyers, LLC has always maintained their accounts in good standing and have always paid as agreed.

Based upon the above, it appears that Dugan & Meyers, LLC has a capable record of performance on similar projects and are capable of successfully completing the Taylor Mill Treatment Plant Belt Filter Press Replacement project.

If you have any questions concerning this matter, please contact me.

Regards,



David C. Osborne, P.E.
Project Engineer

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

Board Resolution

**Northern Kentucky Water District
Board of Commissioners
Regular Meeting
February 16, 2017**

A regular meeting of the Board of Commissioners of the Northern Kentucky Water District was held on February 16, 2017 at the Northern Kentucky Water District located at 2835 Crescent Springs Road, Erlanger, Kentucky. All Commissioners were present, except for Commissioner Cunningham. Also present were Amy Kramer, Kevin Owen, Jeff Schuchter, Mary Carol Wagner, Kyle Ryan, Stacey Kampsen, Brian Dunham, Kim Clemons and Elizabeth Younger.

Chairperson Macke called the meeting to order at 12:19 p.m., and Kevin Owen led the pledge of allegiance.

The Board reviewed correspondence received and articles published since the last special Board meeting on January 19, 2017.

On motion of Commissioner Wagner, seconded by Commissioner Koester, the Commissioners unanimously approved (with Chairperson Macke abstaining) the minutes for the regular board meeting held on January 19, 2017.

The Board was provided a copy of the District's check registers, which included the check number, check date, payee, check amount and description of the reason for each payment, detailing the District's expenditures for the periods January 1, 2017 through January 31, 2017. On motion of Commissioner Sommerkamp, seconded by Commissioner Spaulding, and after discussion, the Commissioners unanimously approved the expenditures of the District for the month of January, 2017.

On motion of Commissioner Spaulding, seconded by Commissioner Sommerkamp, the Commissioner's unanimously approved the bid by and awarding a contract to Smith & Brown Contractors, Inc. for the Water Main Extension Project, with a project budget of \$3,400,000, and authorized staff to execute the appropriate documents.

On motion of Commissioner Wagner, seconded by Commissioner Sommerkamp, the Commissioner's unanimously authorized the purchase of distribution inventory materials from the vendors listed in the bid summary, and authorized staff to execute the appropriate documents.

On motion of Commissioner Wagner, seconded by Commissioner Sommerkamp, the Commissioners unanimously approved the District's acceptance of the bid by and awarding a contract to Dugan & Meyers, LLC for the Taylor Mill Treatment Plant Belt Filter Press Replacement project, with a project budget of \$1,075,000, and authorized staff to execute the appropriate contract documents.

On motion of Commissioner Wagner, seconded by Commissioner Spaulding, the Commissioners unanimously approved the District's acceptance of the agreement between the District and the City of Newport for reimbursement totaling \$20,650 owed by the District to the City for restoration required as part of the Woodlawn Water Main Replacement Project, and authorized staff to execute the appropriate documents.

On motion of Commissioner Sommerkamp, seconded by Commissioner Koester, the Commissioners unanimously approved the District's acceptance of the bid by and awarding a contract to Jack Gemmer & Sons, Inc. for the Dudley Road Water Main Improvements project, with a total project budget of \$210,000, and authorized staff to execute the appropriate documents.

On motion of Commissioner Spaulding, seconded by Commissioner Wagner, the Commissioners unanimously approved the District's acceptance of the bid by and awarding a contract to Jack Gemmer & Sons, Inc. for the Hudson Avenue Water Main Replacement project, with a total project budget of \$130,000, and authorized staff to execute the appropriate documents.

On motion of Commissioner Koester, seconded by Commissioner Sommerkamp, the Commissioners unanimously approved the District's acceptance of the bid by and awarding a contract to Smithcorp, Inc. for the Wedgewood Drive and Clubhouse Drive Water Main Replacement project, with a total project budget of \$415,000, and authorized staff to execute the appropriate documents.

On motion of Commissioner Spaulding, seconded by Commissioner Sommerkamp, the Commissioners unanimously approved (with Chairperson Macke abstaining) the District's acceptance of the bid by and awarding a contract to Wessel Lawn Care & Landscaping, LLC for the maintenance of the pump stations and water towers, with a total project budget of \$22,890, and authorized staff to execute the appropriate documents.

On motion of Commissioner Wagner, seconded by Commissioner Koester, the Commissioners unanimously approved the District's authorization of the Resolution for the issuance of a Revenue Bond Anticipation Note (BAN), Series 2017, for up to \$26,000,000, and authorized staff to execute the appropriate documents.

On motion of Commissioner Spaulding, seconded by Commissioner Wagner, the Commissioners unanimously approved the District's authorization of the Resolution for the issuance of a Revenue Bond, Series 2019, for up to \$28,000,000, and authorized staff to execute the appropriate documents.

Ms. Clemons provided the Board with a summary of the employee reviews and corresponding pay raises based on prior Board action. The results are as follows: 51 employees received an "Exemplary" review rating and are entitled to a 3.50% pay raise; 64 employees received a "Commendable" review rating and are entitled to a 3.00% pay raise; 19 employees

received a “Meets Standards” review rating and are entitled to a 2.50% pay raise; and 0 employees received a “Needs Improvement” review rating, which would have been entitled to a 0.00% pay raise.

Other departmental reports were then provided. As part of her report, Ms. Kramer reviewed with the Commissioners the status of on-going projects within the 2016 5-Year Capital Budget, including highlighting there had been no change orders since the last Board meeting and highlighting the expenses incurred to date.

Mr. Lovan provided an update to the Board regarding discussions with SD1 over possible merged billing systems.

On a motion of Commissioner Spaulding, seconded by Commissioner Wagner, the Board unanimously agreed to go into executive session under the provisions of KRS 61.810(1)(c) to discuss pending or proposed litigation against or on behalf of the District and to protect the District’s legal interests and strategy in connection with such litigation. The executive session commenced at 1:36 p.m. and ended at 1:51 p.m.

Ms. Kramer and Ms. Wagner provided the Board with an update on the lead testing program of the Kenton County Schools.

On a motion of Commissioner Spaulding, seconded by Commissioner Wagner, the meeting was adjourned at 1:58 p.m.

CHAIRMAN

SECRETARY

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

PROJECT FINANCE INFORMATION

Customers Added and Revenue Effect

Debt Issuance and Source of Debt

Additional Costs for Operating and Maintenance

USoA Plant Account

Depreciation Cost and Debt Service After Construction

Northern Kentucky Water District

Customers Added and Revenue Effect: There will be zero new customers added and no revenue effect as a result of the Taylor Mill Treatment Plant Belt Filter Press Replacement Project.

Debt Issuance and Source of Debt: This project will be paid from the District's Five-Year Capital Budget, PSC No. 186 "TMTP Sludge Conveyors and Press" with a budget of \$1,075,000 which includes construction cost, engineering, and contingencies. A summary of the project costs is provided below:

○ Design Engineering	\$ 100,000
○ Construction Engineering	\$ 10,000
○ Contractor's Bid	\$ 886,800
○ Misc. & Contingencies	\$ 78,200
Total Project Cost	\$1,075,000

The project will be funded using \$1,075,000 from a future Bond Anticipation Note.

USoA Accounts: The anticipated amounts for the project cost of \$1,075,000 will fall under the following Uniform System of Accounts Codes:

Code 304 "Structures and Improvements"	\$285,000
Code 320 "Water Treatment Equipment"	\$790,000

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

Power	\$ 0
Labor	\$ 0
Maintenance	<u>\$18,000 (2% of construction)</u>
	\$18,000

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

Depreciation: \$7,600.00/year over 37.5 years for Code 304 "Structures and Improvements" and \$26,333.33/year over 30 years for Code 320 "Water Treatment Equipment"

Annual Debt Service: \$64,802 over 25 years (conventional 3.5% loan).

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

SCHEDULE OF MORTGAGES, BONDS, NOTES, AND
OTHER INDEBTEDNESS

**Northern Kentucky Water District
Bonds
Effective March 1, 2016 - February 28, 2017**

Bond Numbers	Par Value of Actual Issue	Cash Realized on Actual Issue	Par Value of Amt. Held by or for Respondent	Actually Outstanding February 28, 2017	Interest During Year Accrued	Interest During Year Actually Paid
Bond 1997	11,225,000	11,131,694	-	-	-	-
Bond 1998	11,355,000	11,141,619	-	-	-	-
USDA 2000	2,287,000	2,287,000	-	1,831,000	91,900	92,600
Bond 2001A	16,325,000	15,835,250	-	-	-	-
Bond 2002A	45,485,000	44,121,624	-	-	-	-
Bond 2002B	10,575,000	10,525,204	-	-	-	-
Bond 2003A	1,615,000	1,583,553	-	-	-	-
Bond 2003B	30,270,000	30,068,115	-	-	-	-
Bond 2003C	23,790,000	23,532,357	-	-	-	-
Bond 2004	10,455,000	10,195,116	-	-	-	-
Bond 2006	29,000,000	28,736,444	-	-	672,687	442,444
Bond 2009	29,290,000	27,430,236	-	-	557,467	672,425
Bond 2011	30,830,000	28,862,016	-	25,490,000	1,130,237	1,132,562
Bond 2012	54,840,000	-	-	44,950,000	2,367,466	2,374,000
Bond 2013A	26,400,000	25,807,113	-	23,845,000	1,071,764	1,073,376
Bond 2013B	24,120,000	-	-	16,535,000	851,534	859,950
Bond 2014B	15,805,000	-	-	10,015,000	571,784	534,138
Bond 2016	41,905,000	-	-	39,450,000	354,756	354,756
Total	415,572,000	271,257,341	-	162,116,000	7,669,596	7,536,251

**Northern Kentucky Water District
Long Term Debt
Effective February 28, 2017**

Description of Obligation	Issue Date	Mature Date	Interest Expense for Year Rate	Interest Expen: for Year Amount	Principal Balance Effective February 28, 2017
Notes Payable Taylor Mill	March 2004	2018	0%	-	225,000
KIA F06-03 MPTP Project	June 2008	2028	3%	88,281	2,778,045
KIA F08-07 Various	June 2009	2029	1%	42,343	3,449,668
KIA C08-01 AMR Project	June 2009	2019	3%	94,326	3,174,424
KIA F09-02 GAC MPTP & FTTP	June 2010	2030	2%	475,905	21,495,741
KIA F13-012	N/A	N/A	2%	88,411	45,222,999
KIA F14-015	N/A	N/A	2%	23,797	3,287,143
KIA F15-011	N/A	N/A	2%	3,725	2,162,858
Total Long Term Debt				816,788	81,795,878

Northern Kentucky Water District
FmHA Loan \$2,287,000 - 2000

Attachment 23.01

Year	Maturity Date	Interest Rate	Principal Amount	Amounts Paid	Outstanding February 28, 2017
2002			21,000.00	21,000.00	0.00
2003			22,000.00	22,000.00	0.00
2004			24,000.00	24,000.00	0.00
2005			24,000.00	24,000.00	0.00
2006			26,000.00	26,000.00	0.00
2007			27,000.00	27,000.00	0.00
2008			28,000.00	28,000.00	0.00
2009			30,000.00	30,000.00	0.00
2010			31,000.00	31,000.00	0.00
2011			33,000.00	33,000.00	0.00
2012			34,000.00	34,000.00	0.00
2013			36,000.00	36,000.00	0.00
2014			38,000.00	38,000.00	0.00
2015			40,000.00	40,000.00	0.00
2016			42,000.00	42,000.00	0.00
2017			44,000.00		44,000.00
2018			46,000.00		46,000.00
2019			49,000.00		49,000.00
2020			51,000.00		51,000.00
2021			54,000.00		54,000.00
2022			56,000.00		56,000.00
2023			59,000.00		59,000.00
2024			62,000.00		62,000.00
2025			65,000.00		65,000.00
2026			68,000.00		68,000.00
2027			72,000.00		72,000.00
2028			75,000.00		75,000.00
2029			79,000.00		79,000.00
2030			83,000.00		83,000.00
2031			87,000.00		87,000.00
2032			92,000.00		92,000.00
2033			96,000.00		96,000.00
2034			102,000.00		102,000.00
2035			107,000.00		107,000.00
2036			112,000.00		112,000.00
2037			118,000.00		118,000.00
2038			124,000.00		124,000.00
2039			130,000.00		130,000.00
Totals			2,287,000.00	456,000.00	1,831,000.00

Northern Kentucky Water District			Series 2006A		Attachment 23.02
Bond Issue	9/1/2006	\$29,000,000.00			
Bond	Maturity	Interest	Principal	Amounts	Outstanding
Number	Date	Rate	Amount	Paid	February 28, 2017
Registered	2/1/2007	4.000%	300,000.00	300,000.00	0.00
Registered	2/1/2008	4.000%	720,000.00	720,000.00	0.00
Registered	2/1/2009	4.000%	750,000.00	750,000.00	0.00
Registered	2/1/2010	4.000%	775,000.00	775,000.00	0.00
Registered	2/1/2111	4.000%	805,000.00	805,000.00	0.00
Registered	2/1/2012	4.000%	835,000.00	835,000.00	0.00
Registered	2/1/2013	4.000%	870,000.00	870,000.00	0.00
Registered	2/1/2014	4.000%	900,000.00	900,000.00	0.00
Registered	2/1/2015	4.000%	940,000.00	940,000.00	0.00
Registered	2/1/2016	4.000%	980,000.00	22,105,000.00	0.00
Registered	2/1/2017	4.000%	1,020,000.00		0.00
Registered	2/1/2018	4.000%	970,000.00		0.00
Registered	2/1/2019	4.000%	1,010,000.00		0.00
Registered	2/1/2020	4.125%	1,320,000.00		0.00
Registered	2/1/2021	4.125%	1,205,000.00		0.00
Registered	2/1/2022	4.125%	1,255,000.00		0.00
Registered	2/1/2023	4.125%	1,420,000.00		0.00
Registered	2/1/2024	4.125%	1,375,000.00		0.00
Registered	2/1/2025	4.125%	1,440,000.00		0.00
Registered	2/1/2027	4.250%	3,075,000.00		0.00
Registered	2/1/2029	4.250%	3,360,000.00		0.00
Registered	2/1/2031	4.273%	3,675,000.00		0.00
TOTALS			29,000,000.00	29,000,000.00	0.00

Northern Kentucky Water District			Series 2009		Attachment 23.03
Bond Issue	01/06/09	\$29,290,000.00			
Bond	Maturity	Interest	Principal	Amounts	Outstanding
Number	Date	Rate	Amount	Paid	February 28, 2017
Registered	2/1/2009	3.750%	1,000,000.00	1,000,000.00	0.00
Registered	2/1/2010	3.750%	645,000.00	645,000.00	0.00
Registered	2/1/2011	3.750%	670,000.00	670,000.00	0.00
Registered	2/1/2012	3.750%	695,000.00	695,000.00	0.00
Registered	2/1/2013	3.750%	720,000.00	720,000.00	0.00
Registered	2/1/2014	4.000%	750,000.00	750,000.00	0.00
Registered	2/1/2015	4.125%	780,000.00	780,000.00	0.00
Registered	2/1/2016	4.250%	815,000.00	24,030,000.00	0.00
Registered	2/1/2017	4.750%	850,000.00		0.00
Registered	2/1/2018	5.000%	895,000.00		0.00
Registered	2/1/2019	5.000%	940,000.00		0.00
Registered	2/1/2020	5.125%	990,000.00		0.00
Registered	2/1/2021	5.250%	1,040,000.00		0.00
Registered	2/1/2022	5.375%	1,100,000.00		0.00
Registered	2/1/2023	5.500%	1,160,000.00		0.00
Registered	2/1/2024	5.700%	1,225,000.00		0.00
Registered	2/1/2025	5.775%	1,300,000.00		0.00
Registered	2/1/2027	5.750%	1,375,000.00		0.00
Registered	2/1/2029	6.000%	1,460,000.00		0.00
Registered	2/1/2031	6.000%	1,550,000.00		0.00
Registered	2/1/2029	6.000%	1,645,000.00		0.00
Registered	2/1/2030	6.000%	1,745,000.00		0.00
Registered	2/1/2031	6.000%	1,855,000.00		0.00
Registered	2/1/2032	6.500%	1,975,000.00		0.00
Registered	2/1/2033	6.500%	2,110,000.00		0.00
TOTALS			29,290,000.00	29,290,000.00	0.00

Northern Kentucky Water District			Series 2011		Attachment 23.04
Bond Issue	05/31/11	\$30,830,000.00			
Bond	Maturity	Interest	Principal	Amounts	Outstanding
Number	Date	Rate	Amount	Paid	February 28, 2017
Registered	2/1/2012	3.000%	825,000.00	825,000.00	0.00
Registered	2/1/2013	3.000%	850,000.00	850,000.00	0.00
Registered	2/1/2014	3.000%	875,000.00	875,000.00	0.00
Registered	2/1/2015	3.000%	900,000.00	900,000.00	0.00
Registered	2/1/2016	3.000%	930,000.00	930,000.00	0.00
Registered	2/1/2017	3.000%	960,000.00	960,000.00	0.00
Registered	2/1/2018	3.000%	985,000.00		985,000.00
Registered	2/1/2019	3.000%	1,015,000.00		1,015,000.00
Registered	2/1/2020	4.000%	1,055,000.00		1,055,000.00
Registered	2/1/2021	4.000%	1,095,000.00		1,095,000.00
Registered	2/1/2022	4.000%	1,140,000.00		1,140,000.00
Registered	2/1/2023	4.000%	1,185,000.00		1,185,000.00
Registered	2/1/2024	4.000%	1,235,000.00		1,235,000.00
Registered	2/1/2025	4.000%	1,285,000.00		1,285,000.00
Registered	2/1/2027	4.125%	1,340,000.00		1,340,000.00
Registered	2/1/2029	4.250%	1,395,000.00		1,395,000.00
Registered	2/1/2031	4.250%	1,460,000.00		1,460,000.00
Registered	2/1/2029	4.250%	1,520,000.00		1,520,000.00
Registered	2/1/2030	4.500%	1,590,000.00		1,590,000.00
Registered	2/1/2031	4.500%	1,660,000.00		1,660,000.00
Registered	2/1/2032	5.000%	3,580,000.00		3,580,000.00
Registered	2/1/2033	5.000%	3,950,000.00		3,950,000.00
TOTALS			30,830,000.00	5,340,000.00	25,490,000.00

Northern Kentucky Water District			Series 2012		Attachment 23.05
Bond Issue	06/21/12	\$54,840,000.00			
Bond	Maturity	Interest	Principal	Amounts	Outstanding
Number	Date	Rate	Amount	Paid	February 28, 2017
Registered	2/1/2013	4.000%	1,725,000.00	1,725,000.00	0.00
Registered	2/1/2014	4.000%	1,800,000.00	1,800,000.00	0.00
Registered	2/1/2015	4.000%	1,875,000.00	1,875,000.00	0.00
Registered	2/1/2016	4.000%	1,960,000.00	1,960,000.00	0.00
Registered	2/1/2017	5.000%	2,530,000.00	2,530,000.00	0.00
Registered	2/1/2018	5.000%	3,475,000.00		3,475,000.00
Registered	2/1/2019	5.000%	3,650,000.00		3,650,000.00
Registered	2/1/2020	5.000%	4,150,000.00		4,150,000.00
Registered	2/1/2021	5.000%	4,365,000.00		4,365,000.00
Registered	2/1/2022	5.000%	4,590,000.00		4,590,000.00
Registered	2/1/2023	5.000%	4,720,000.00		4,720,000.00
Registered	2/1/2024	5.000%	4,970,000.00		4,970,000.00
Registered	2/1/2025	5.000%	5,220,000.00		5,220,000.00
Registered	2/1/2026	5.000%	5,495,000.00		5,495,000.00
Registered	2/1/2027	5.000%	4,315,000.00		4,315,000.00
TOTALS			54,840,000.00	9,890,000.00	44,950,000.00

Northern Kentucky Water District			Series 2013A	Attachment 23.06	
Bond Issue	01/27/13	\$26,400,000.00			
Bond	Maturity	Interest	Principal	Amounts	Outstanding
Number	Date	Rate	Amount	Paid	February 28, 2017
Registered	2/1/2014	2.000%	615,000.00	615,000.00	0.00
Registered	2/1/2015	2.000%	630,000.00	630,000.00	0.00
Registered	2/1/2016	3.000%	645,000.00	645,000.00	0.00
Registered	2/1/2017	3.000%	665,000.00	665,000.00	0.00
Registered	2/1/2018	4.000%	685,000.00		685,000.00
Registered	2/1/2019	5.000%	720,000.00		720,000.00
Registered	2/1/2020	5.000%	755,000.00		755,000.00
Registered	2/1/2021	5.000%	795,000.00		795,000.00
Registered	2/1/2022	5.000%	835,000.00		835,000.00
Registered	2/1/2023	5.000%	880,000.00		880,000.00
Registered	2/1/2024	5.000%	925,000.00		925,000.00
Registered	2/1/2025	5.000%	970,000.00		970,000.00
Registered	2/1/2026	5.000%	1,020,000.00		1,020,000.00
Registered	2/1/2027	4.000%	1,070,000.00		1,070,000.00
Registered	2/1/2028	4.000%	1,110,000.00		1,110,000.00
Registered	2/1/2029	4.000%	1,155,000.00		1,155,000.00
Registered	2/1/2030	4.000%	1,205,000.00		1,205,000.00
Registered	2/1/2031	4.125%	1,255,000.00		1,255,000.00
Registered	2/1/2032	4.500%	2,680,000.00		2,680,000.00
Registered	2/1/2033	4.250%	1,430,000.00		1,430,000.00
Registered	2/1/2034	4.125%	1,490,000.00		1,490,000.00
Registered	2/1/2035	4.125%	1,555,000.00		1,555,000.00
Registered	2/1/2036	4.250%	1,620,000.00		1,620,000.00
Registered	2/1/2037	4.250%	1,690,000.00		1,690,000.00
TOTALS			26,400,000.00	2,555,000.00	23,845,000.00

Northern Kentucky Water District			Series 2013B		Attachment 23.07
Bond Issue	06/21/12	\$24,120,000.00			
Bond	Maturity	Interest	Principal	Amounts	Outstanding
Number	Date	Rate	Amount	Paid	February 28, 2017
Registered	2/1/2014	5.000%	2,000,000.00	2,000,000.00	0.00
Registered	2/1/2015	5.000%	1,920,000.00	1,920,000.00	0.00
Registered	2/1/2016	5.000%	2,020,000.00	2,020,000.00	0.00
Registered	2/1/2017	5.000%	1,645,000.00	1,645,000.00	0.00
Registered	2/1/2018	5.000%	1,170,000.00		1,170,000.00
Registered	2/1/2019	5.000%	1,230,000.00		1,230,000.00
Registered	2/1/2020	5.000%	1,295,000.00		1,295,000.00
Registered	2/1/2021	5.000%	1,355,000.00		1,355,000.00
Registered	2/1/2022	5.000%	1,430,000.00		1,430,000.00
Registered	2/1/2023	5.000%	1,500,000.00		1,500,000.00
Registered	2/1/2024	4.000%	1,570,000.00		1,570,000.00
Registered	2/1/2025	4.000%	1,635,000.00		1,635,000.00
Registered	2/1/2026	4.000%	1,700,000.00		1,700,000.00
Registered	2/1/2027	5.000%	1,780,000.00		1,780,000.00
Registered	2/1/2028	5.000%	1,870,000.00		1,870,000.00
TOTALS			24,120,000.00	7,585,000.00	16,535,000.00

Northern Kentucky Water District			Series 2014B	Attachment 23.08	
Bond Issue	12/23/14	\$15,805,000.00			
Bond	Maturity	Interest	Principal	Amounts	Outstanding
Number	Date	Rate	Amount	Paid	February 28, 2017
Registered	2/1/2015	5.000%	2,000,000.00	2,000,000.00	0.00
Registered	2/1/2016	5.000%	1,850,000.00	1,850,000.00	0.00
Registered	2/1/2017	5.000%	1,940,000.00	1,940,000.00	0.00
Registered	2/1/2018	5.000%	1,880,000.00		1,880,000.00
Registered	2/1/2019	5.000%	1,980,000.00		1,980,000.00
Registered	2/1/2020	5.000%	1,505,000.00		1,505,000.00
Registered	2/1/2021	5.000%	440,000.00		440,000.00
Registered	2/1/2022	5.000%	465,000.00		465,000.00
Registered	2/1/2023	3.000%	485,000.00		485,000.00
Registered	2/1/2024	3.000%	495,000.00		495,000.00
Registered	2/1/2025	4.000%	515,000.00		515,000.00
Registered	2/1/2026	4.000%	540,000.00		540,000.00
Registered	2/1/2027	3.000%	550,000.00		550,000.00
Registered	2/1/2028	3.000%	570,000.00		570,000.00
Registered	2/1/2029	3.125%	590,000.00		590,000.00
TOTALS			15,805,000.00	5,790,000.00	10,015,000.00

Northern Kentucky Water District			Series 2016		Attachment 23.09
Bond Issue	11/02/16	\$41,905,000.00			
Bond	Maturity	Interest	Principal	Amounts	Outstanding
Number	Date	Rate	Amount	Paid	February 28, 2017
Registered	2/1/2017	5.000%	2,455,000.00	2,455,000.00	0.00
Registered	2/1/2018	5.000%	1,910,000.00		1,910,000.00
Registered	2/1/2019	5.000%	2,005,000.00		2,005,000.00
Registered	2/1/2020	5.000%	2,380,000.00		2,380,000.00
Registered	2/1/2021	5.000%	2,325,000.00		2,325,000.00
Registered	2/1/2022	5.000%	2,450,000.00		2,450,000.00
Registered	2/1/2023	5.000%	2,685,000.00		2,685,000.00
Registered	2/1/2024	5.000%	2,715,000.00		2,715,000.00
Registered	2/1/2025	5.000%	2,865,000.00		2,865,000.00
Registered	2/1/2026	5.000%	3,015,000.00		3,015,000.00
Registered	2/1/2027	5.000%	3,170,000.00		3,170,000.00
Registered	2/1/2028	3.000%	3,300,000.00		3,300,000.00
Registered	2/1/2029	4.000%	3,425,000.00		3,425,000.00
Registered	2/1/2030	3.000%	3,545,000.00		3,545,000.00
Registered	2/1/2031	3.000%	3,660,000.00		3,660,000.00
TOTALS			41,905,000.00	2,455,000.00	39,450,000.00

NORTHERN KENTUCKY
WATER DISTRICT

Project

*Taylor Mill Treatment Plant Belt Filter Press
Replacement Project, Kenton County, Kentucky*

184-0488

CURRENT BALANCE SHEET AND
INCOME STATEMENT

**NORTHERN KENTUCKY WATER DISTRICT
STATEMENT OF NET POSITION**

	ASSETS	
	Month Ended February 2017	Month Ended January 2017
Current Assets		
Cash and Cash Equivalents	\$ 20,201,036	\$ 19,890,893
Investments	668,862	918,485
Accounts Receivable	-	-
Customers	3,760,950	4,106,046
Unbilled Customers	6,100,000	6,100,000
Others	190,729	201,962
Assessments Receivable	131,088	131,088
Inventory Supplies for New Installation and Maintenance, at Cost	1,660,476	1,635,171
Prepaid Items	343,028	323,260
Total Current Assets	33,056,169	33,306,905
Restricted Assets		
Bond Proceeds Fund	2,337,739	2,337,559
Debt Service Reserve Account	19,026,993	32,527,414
Debt Service Account	7,528,913	5,834,091
Improvement, Repair & Replacement	3,209,505	2,768,341
Total Restricted Assets	32,103,150	43,467,405
Noncurrent Assets		
Capital Assets:		
Land, System, Buildings and Equipment	466,224,583	466,179,216
Construction in Progress	21,243,151	21,220,739
Total Capital Assets	487,467,734	487,399,955
Less Accumulated Depreciation	142,651,043	141,644,283
Total Capital Assets, Net of Acc Dep	344,816,691	345,755,672
Total Noncurrent Assets	344,816,691	345,755,672
Total Assets	\$ 409,976,010	\$ 422,529,982
Deferred Outflows of Resources		
Contributions Subsequent to the Measurement Date	2,343,773	2,343,773
Total Deferred Outflows of Resources	2,343,773	2,343,773
Total Assets and Deferred Outflows of Resources	412,319,783	424,873,755

**NORTHERN KENTUCKY WATER DISTRICT
STATEMENT OF NET POSITION**

	LIABILITIES	
	Month Ended February <u>2017</u>	Month Ended January <u>2017</u>
Current Liabilities		
Bonded Indebtedness	\$ 44,000	\$ 10,239,000
Notes Payable	2,136,148	2,187,669
Accounts Payable	1,217,655	1,532,927
Accrued Payroll and Taxes	360,800	381,315
Other Accrued Liabilities	104,727	125,266
Customer Deposits	997,196	1,026,776
Total Current Liabilities	<u>4,860,526</u>	<u>15,492,953</u>
Liabilities Payable-Restricted Assets		
Accounts Payable	382,792	407,074
Accrued Interest Payable	780,630	3,437,438
Total Liabilities Payable From Restricted Assets	<u>1,163,422</u>	<u>3,844,512</u>
Long-Term Liabilities (Net of Current Portion)		
Bond Indebtedness	164,705,963	164,234,858
Notes Payable	34,826,581	34,826,581
Total Long-Term Liabilities	<u>199,532,544</u>	<u>199,061,439</u>
Non-Current Liability		
Net Pension Liability	14,819,690	14,819,690
Miscellaneous Deferred Charges	5,716,064	5,685,932
Total Liabilities	<u>226,092,246</u>	<u>238,904,526</u>
Net Position		
Invested in Capital Assets, Net of Related Debt	143,103,999	134,267,564
Restricted, Net of Related Debt	30,939,728	39,622,893
Unrestricted	12,183,810	12,078,772
Total Net Position	<u>186,227,537</u>	<u>185,969,229</u>
 Total Liabilities and Net Position	 <u>\$ 412,319,783</u>	 <u>\$ 424,873,755</u>

NORTHERN KENTUCKY WATER DISTRICT
STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN NET POSITION

	<u>Month Ended</u> <u>February</u> <u>2017</u>	<u>Month Ended</u> <u>January</u> <u>2017</u>
Operating Revenues		
Water Sales	\$ 3,226,569	\$ 3,728,396
Forfeited Discounts	59,805	70,045
Rents From Property	30,345	36,486
Other Water Revenues	17,970	29,110
	<u>3,334,689</u>	<u>3,864,037</u>
Operating Expenses		
Operating and Maintenance Expense	1,977,980	1,977,393
Depreciation Expense	1,006,760	1,006,760
	<u>2,984,740</u>	<u>2,984,153</u>
Net Operating Income	<u>349,949</u>	<u>879,884</u>
Other Income (Expense)		
Investment Income	50,703	84,616
Unrealized (Loss)/Gain on Investments	1,932	(3,545)
Miscellaneous Non-Operating Income	4,175	11,011
Interest on Long-Term Debt	(243,915)	(637,534)
Amortization of Debt Discount and Expense	65,234	65,234
	<u>(121,871)</u>	<u>(480,218)</u>
Change in Net Position Before Capital Contributions	228,078	399,666
Capital Contributions	30,230	27,700
Change in Net Position	258,308	427,366
Net Position - Beginning of Month	<u>185,969,229</u>	<u>185,541,863</u>
Net Position - End of Month	<u>\$ 186,227,537</u>	<u>\$ 185,969,229</u>

**NORTHERN KENTUCKY WATER DISTRICT
STATEMENTS OF WATER OPERATING REVENUE**

	Month Ended February <u>2017</u>	Month Ended January <u>2017</u>
Operating Revenues		
Metered Sales		
Sales to Residential Customers	\$ 2,078,579	\$ 2,487,338
Sales to Commercial Customers	331,084	441,436
Sales to Industrial Customers	223,399	105,421
Sales to Public Authorities	115,765	197,356
Sales to Multiple Family Dwellings	350,805	353,029
Sales Through Bulk Loading Stations	<u>6,103</u>	<u>3,376</u>
Total Metered Sales	3,105,735	3,587,956
Fire Protection Revenue	615	6,878
Sales For Resale	<u>120,219</u>	<u>133,562</u>
Total Sales of Water	3,226,569	3,728,396
Forfeited Discounts	59,805	70,045
Rents from Water Property	30,345	36,486
Other Water Revenue	<u>17,970</u>	<u>29,110</u>
Total Operating Revenues	\$ <u>3,334,689</u>	\$ <u>3,864,037</u>

**NORTHERN KENTUCKY WATER DISTRICT
STATEMENTS OF COMBINED OPERATION AND MAINTENANCE EXPENSES**

	Month Ended February <u>2017</u>	Month Ended January <u>2017</u>
Operation and Maintenance Expenses		
Salaries and Wages	\$ 583,597	\$ 695,390
Employee Pensions and Benefits	374,144	370,529
Taxes Other Than Income Taxes	43,016	50,987
Purchased Power	199,427	222,798
Chemicals	178,784	182,997
Materials and Supplies	165,163	132,316
Contractual Services	282,270	236,531
Rent	2,821	
Transportation Expenses	32,914	29,179
Insurance	82,759	9,123
Advertising	507	
Bad Debt Expense	13,650	33,226
Miscellaneous Expense	8,827	4,216
Regulatory Commission Assessment	10,101	10,101
	<u> </u>	<u> </u>
Total Operation and Maintenance Expenses	\$ <u>1,977,980</u>	\$ <u>1,977,393</u>