South Sangamon

YEAR 1 2015-2016 ANNUAL REPORT

Prepared for:
South Sangamon Water Commission

WOODARD &CURRAN

October 2016

Contents

Section 1

EXECUTIVE SUMMARY

This Annual Report summarizes the Operation and Maintenance activities at the South Sangamon Water Commission (SSWC) for the period of May 1, 2015 – April 30, 2016. This was the first contract year for Woodard & Curran and transition activities were initiated prior to the actual startup in order to ensure a smooth transition. This past year was a very busy and challenging year with the transition of employees, implementation of a safety program, operations and maintenance programs, addressing the water quality concerns, developing a Capital Improvement Plan, and working through a Modified Comprehensive Plant Evaluation all while maintaining a safe work environment and producing water quality that met or exceeded Illinois Environmental Protection Agency (IEPA) regulatory requirements.

The SSWC provides water to the Village of Chatham, Village of New Berlin, 44 retail customers and 1 wholesale customer. The plant was designed for a capacity to meet a maximum day demand estimate of 3.3 million gallons per day by 2029. Water pumped from the well field passes through aeration, is dosed with sodium permanganate prior to filtration, filtered by membranes for removal of bacteria, iron, and manganses, then exchange units for softening, and then dosed with chlorine prior to entering the clear well. When the water leaves the plant, an Ortho-Phosphate is added for corrosion control and Fluoride as required by the state of Illinois.

A summary of the years highlights are:

1. There were no safety incidents or loss of time incidents and all annual safety training was completed. A safety audit was conducted in May 2015. 89 items were identified and approximately 85% have been addressed.

2. Water quality produced consistently met regulatory requirements and all required reporting was submitted in a timely manner. The annual Consumer Confidence Report was issued on May 17, 2016. IEPA issued a letter to Mayor Gray confirming the water plant has consistently met regulatory requirements for water quality and reporting.

3. Computerized operations and maintenance systems were installed as part of Woodard & Curran's transition. The systems are utilized by staff for process control, regulatory reporting, communications with SSWC, and preventative and corrective maintenance. A Comprehensive Plant Evaluation (CPE) was conducted in March and the final report was issued in April. Woodard & Curran worked with Meco Engineering, SSWC and the Village of Chatham to respond to the CPE final report.

4. A flushing program was implemented in April 2016 with valve exercising and hydrant assessment. Other changes to the operation of the treatment plant were implemented such as switching the from hypochlorite to sodium permanganate as an oxidant for the removal of manganese and the change in chemistry and dosage for the phosphate feed system.

5. The plant produced a total of 386.1 gallons during the contract year with a peak of 1.60 MGD and an average of 1.058 MGD.
6. The annual operations cost were $927,698 which was $2,328 under budget for the year. Additional detail is provided later in this report.
7. Dan Held was transitioned to Woodard & Curran and Keith Sommers was hired as a full time operator on July 15, 2015. In addition to Dan and Keith, Woodard & Curran has developed a dedicated support staff to assist in providing the day-to-day service.
8. Woodard & Curran worked closely with Meco Engineering and SSWC to develop a Capital Improvement Plan. The Plan continues to be revised and updated to provide the SSWC the ability to pro actively plan for future needs. Several projects were completed during the year and a copy of the Plan can be found in Appendix D.

Woodard & Curran appreciates the opportunity to serve the SSWC and its customers and we look forward to another successful year of operations

Section 2

HEALTH & SAFETY

SUMMARY OF LOST TIME/SAFETY INCIDENTS

There were no safety incidents or lost time accidents at the South Sangamon Water Commission treatment plant during Year 1. Since the plant opened in May of 2012, there has not been a safety incident or lost time accident. The number of days worked at the facility without a lost time accident now stands at 365 days for Woodard & Curran.

As part of the transition, Woodard & Curran's safety program was implemented with a hard copy and electronic available for plant personnel to access. Vendors and contractors safety programs and credentials were reviewed in order for them to "Approved" to do business with SSWC.

Employees were required to complete the Woodard & Curran site-specific training as well as other elements such as Qualified Electrical Training and Confined Space.

As part of the transition plan, a safety audit was performed shortly after Woodard & Curran assumed responsibility. Eighty-Nine safety items were identified. Approximately 85 percent of these items have been addressed. A copy of the Safety Audit is attached in Appendix A and a summary of the major safety items addressed is provided below.

SUMMARY OF TRAINING

Woodard & Curran provides continuous safety training for personnel at the plant. This is accomplished by requiring daily safety meetings, weekly safety updates are emailed to the plant and safety videos are assigned to all employees and are required to be completed.

Throughout the year, both Dan Held and Keith Sommers participated in Puresafety topics provided by Woodard & Curran. Topics included, but are not limited to:

- Electrical awareness
- Confined Space Entry
- PPE Hazard Assessment
- Back Injuries, Slip, Trips, and Falls
- Machine Guarding
- Hearing Conservation
- Bloodborne Pathogens
- Emergency Evaluation Plan
- Contractor Safety Orientation Plan
- Pandemic/Epidemic Plan

Section 3

COMPLIANCE

The finished water quality was within regulatory limits and all reporting and sampling requirements were met for Year 1. Summaries of the influent and effluent water quality are provided in the tables below. The Consumer Confidence Report was provided to the South Sangamon Water Commission in June 2015.

Woodard & Curran worked with an outside vendor to conduct bench top testing on September 21, 2015 to evaluate the effectiveness of alternate oxidation chemistries in an effort to improve the removal of manganese from the water. The IEPA mandated that Manganese levels be below 0.05 mg/L prior to Ion Exchange. The bench top testing determined sodium permanganate was more effective than sodium hypochlorite due to a shorter reaction time. MECO Engineering submitted a permit application to IEPA to change the chemistry on November 6, 2015 and IEPA approved the change on February 3, 2016. Woodard & Curran implemented the change on February 17, 2016. The Manganese concentration in the plant effluent dropped by 30-50%. A graph showing the drop in manganese concentrations can be found in later in this section Prior to implementing the change, Woodard & Curran worked with WesTech and Polymem to ensure the change in chemistry would not affect the integrity of the Ultrafilter membranes. Based on the results, Woodard & Curran has included the modification of the chemical feed system in the Capital Improvement Plan for permanent use moving forward.

Woodard & Curran has also worked with Tonka Equipment with regard to Manganese removal. Tonka Water was on-site in August 2015 and performed a pilot study using Manganese Greensand filters. The results of the studies concluded Greensand Filters could remove iron and manganese below detectable levels utilizing chlorine. The Commission has met the IEPA's mandate with regard to Manganese removal and has tested an alternative to membrane filtration should the Commission decide to pursue that avenue moving forward.

IEPA conducted an Engineering Evaluation on August 20, 2015 and a Non-Compliance Advisory was issued on September 21, 2015. A response letter was drafted by Woodard & Curran and sent back to IEPA on November 5, 2015 addressing the comments in the Advisory letter. A copy of the letter is provided in Appendix B.

Curry & Associates, IEPA representative John Bartolomucci, and Village of Chatham representative Shane Hill conducted a Comprehensive Plant Evaluation (CPE) on March 28-30, 2016 and the final report was issued on April 21, 2016. The CPE was required by IEPA in a February 22, 2015 letter to the SSWC. On the same date, IEPA issued a letter to the Village of Chatham confirming the Water Quality from the SSWC has consistently met regulatory standards and that all regulatory reporting has been submitted in a timely manner. Copies of these letters can be found in Appendix B. Woodard & Curran staff worked closely with the CPE team to provide requested water quality analysis, plant

records, operational data, and site tours. IEPA will provide a response to the CPE and Woodard & Curran will follow up on any required items as a result of IEPA's direction.

Woodard & Curran continues to work closely with Water Solutions Unlimited and the Village of Chatham to monitor the addition of the Phosphate Inhibitors for corrosion control of the distribution system. A minor change was made in the corrosion control program in July 2015 based on coupon study results and Water Solutions Unlimited recommendation. A meeting with the Village of Chatham and Water Solutions was conducted on March 2, 2016 to review chemistry, feed rates, and opportunities for improvement. Water Solutions primary recommendations from the meeting were to increase the hardness in the water leaving the plant and to flush the distribution system.

Three boil orders were experienced throughout the year due to unexpected pressure loss in the transmission main pressure. The loss of pressure was due to Master PLC communication failures. These instances took place on July 17, August 4, and November 3, 2015 and were due to SCADA system failures which shut the High Service pumps off for 10 – 20 minutes and caused the pressure to drop below the acceptable limits. Only the customers between the plant and the ground reservoir east of Chatham were effected. Boil orders were not required for the Villages of Chatham or New Berlin.

WATER QUALITY

For Year 1 the plant treated 386.1 million gallons of water compared to 387.8 million the previous fiscal year that is a one percent decrease. The Average Raw Water Quality parameters for Year 1 are included in the table below:

Average Raw Water Quality

Month	Free CL2	Total CL2	pH	Temperature	Iron	Manganese	Fluoride	Hardness	Alkalinity	Phosphate
May	-	-	7.36	14.7	0.90	0.212	0.24	354	266	-
June	-	-	7.49	15.0	0.83	0.206	0.27	352	279	-
July	-	-	7.55	15.9	0.86	0.202	0.26	360	281	-
August	-	-	7.74	15.7	0.79	0.209	0.22	363	282	-
September	-	-	7.80	15.2	0.79	0.219	0.22	362	279	-
October	-	-	7.82	14.8	0.74	0.214	0.24	366	282	-
November	-	-	7.85	14.4	0.82	0.230	0.23	365	280	-
December	-	-	7.76	14.2	0.74	.0234	0.24	367	282	-
January	-	-	7.70	13.6	0.62	0.222	0.22	363	282	-
February	-	-	7.60	13.4	0.71	0.284	.021	353	282	-
March	-	-	7.49	13.4	0.66	0.398	0.22	362	282	-
April	-	-	7.45	13.4	0.93	0.407	0.20	363	283	-
Average	**-**	**-**	**7.63**	**14.5**	**0.78**	**0.253**	**0.23**	**361**	**280**	**-**

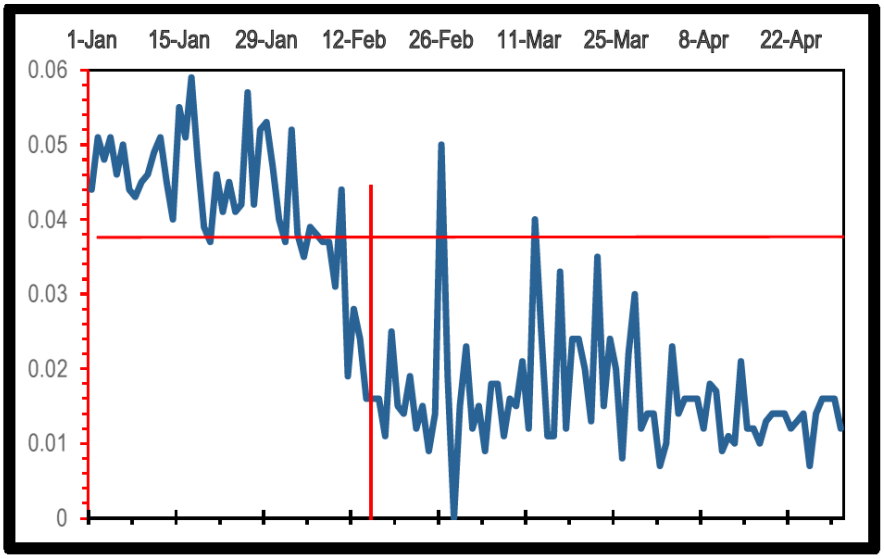
Copies of these letters can be found in Appendix B.

The Average Finished Water Quality parameters for Year 1 are included in the table below:

Average Finished Water Quality										
Month	**Free CL2**	**Total CL2**	**pH**	**Temperature**	**Iron**	**Manganese**	**Fluoride**	**Hardness**	**Alkalinity**	**Phosphate**
May	1.3	1.4	7.37	16.9	0.00	0.030	0.93	118	266	1.24
June	1.3	1.4	7.48	15.7	0.00	0.036	0.98	119	264	1.15
July	1.3	1.3	7.45	16.5	0.00	0.035	0.97	120	269	1.31
August	1.3	1.3	7.78	15.7	0.00	0.040	0.94	117	269	1.40
September	1.3	1.3	7.83	15.0	0.01	0.043	1.07	121	272	1.12
October	1.2	1.3	7.86	14.6	0.01	0.039	1.06	121	263	0.93
November	1.4	1.5	7.91	14.2	0.01	0.043	1.00	121	267	0.83
December	1.4	1.4	7.92	13.9	0.01	0.045	0.89	123	266	0.81
January	1.4	1.5	7.99	13.0	0.01	0.047	0.71	122	266	0.82
February	1.3	1.4	7.95	12.9	0.01	0.025	0.66	120	263	0.76
March	1.3	1.4	7.64	13.3	0.01	0.019	0.71	122	264	0.73
April	1.4	1.5	7.87	13.4	0.01	0.014	0.72	122	267	0.80
Average	**1.3**	**1.4**	**7.75**	**14.6**	**0.01**	**0.035**	**0.89**	**121**	**266**	**0.99**

Note: For the time period of May 2015 through February 2016, the average Manganese level in the finished water was 0.038 mg/L. Since February 17, 2016, when the Sodium Permanganate feed was placed in service, the Manganese level in the finished water average has been 0.016 mg/L.

As mentioned previously, Woodard & Curran began feeding Sodium Permanganate prior to the membranes on February 17, 2016. The IEPA has mandated the Manganese from the membrane filter effluent not exceed 0.05 mg/L. The chart below shows how the Manganese has dropped on the filter effluent since the addition of Sodium Permanganate and meets the IEPA mandate.



The SSWC plant continues to experience a slight exceedance of the maximum allowable Chlorine residual allowed by the NPDES lagoon discharge permit. The table below provides an average by month for Year 1:

Lagoon Discharge Water Quality						
Month	**Iron (mg/L)**	**Mn (mg/L)**	**Chloride (mg/L)**	**CL2 (mg/L)**	**pH (S.U.)**	**TSS (mg/L)**
May	0.800	0.359	415	0.353	8.06	3.75
June	0.750	0.384	370	0.243	8.00	2.40
July	0.522	0.732	610	0.570	7.99	2.00
August	2.080	1.660	308	1.190	7.61	9.70
September	1.370	0.480	437	0.290	7.77	3.25
October	2.280	0.820	339	0.490	7.79	6.63
November	0.760	0.159	341	0.090	7.86	0.80
December	0.555	0.134	276	0.162	7.91	0.00
January	1.540	0.521	288	0.375	7.70	1.25
February	1.356	0.679	304	0.571	7.85	3.10
March	0.452	0.274	285	0.299	7.83	1.38
April	0.338	0.190	252	0.208	7.95	0.00
Average	**1.070**	**0.533**	**352**	**0.403**	**7.86**	**2.86**
Monthly Limit	**2.000**	**1.000**	**-**	**-**	**-**	**15.00**
Daily Limit	**4.000**	**2.000**	**500**	**0.050**	**6.0-9.0**	**30.00**

Woodard & Curran's engineering staff submitted copies of the dechlorination system plans on April 7 to address the exceedances and received the construction permit on April 27, 2016.

Section 4

OPERATIONS SUMMARY

OVERVIEW

The first contract year was challenging from an operations perspective. We were able to implement several new systems and changes to the process all while improving water quality and cost efficiencies. Some of the new systems or changes were:

- Hach Wims OPS Database
- Implemented a Hydrant Flushing Program
- Implemented the Pressure Decay Test
- Switched Oxidation Chemistry from Chlorine to Sodium Permanganate
- Modification of the SCADA Program to change plant operations set points.

The installation of the computerized operations database system is an ongoing effort. Woodard & Curran will continue to build the operations database system as part of the implementation of process control, optimization, and regulatory reporting systems. All the assets at the South Sangamon Water Commission plant were loaded into the system as of July 1, 2015 and work orders are being generated.

The SSWC operations staff worked with Woodard & Curran resources to develop a flushing program. Flushing of the transmission main between the South Sangamon Water Commission plant and the Chatham Ground Reservoir took place between May 24, 2016 through June 1, 2016.

Mr. Dan Held and Mr. Troy Kepley were in Chatham from January 4 through January 8, 2016 to assist in the development of a unidirectional flushing program for the Village of Chatham's distribution system.

Woodard & Curran has worked extensively to try and keep all parties involved for the betterment of the entire water system. In addition to providing technical assistance for flushing on the mains, several meetings have been held regarding water quality and communications.

Woodard & Curran worked closely with Water Solutions Unlimited (WSU) to focus on water stability. Based on discussions with WSU and the results from coupon testing, SSWC switched from a 50/50 blend to a 75/25 blend in mid-July 2015. As you may recall, the steel corrosion rates are excellent. The change is an effort to improve on the copper corrosion rate. In the fall of 2015, water quality experts from Woodard & Curran recommended lowering the phosphate residual in the finished water to prevent it from being a possible food source. Woodard & Curran will continue to monitor the quality of the water leaving the plant in addition to coupon study results to ensure the chemical program is achieving desired results.

EVENTS IMPACTING OPERATIONS

Three boil orders were experienced throughout the year due to unexpected pressure loss in the transmission main pressure. The loss of pressure was caused was due to Master PLC shutting down. These instances took place on July 17, August 4 and November 3, 2015 and were due to SCADA system failures which shut the High Service pumps off for 10 – 20 minutes and caused the pressure to drop below the acceptable limit of 20 psi.

Woodard & Curran began work on December 7, 2015 to install a remote control panel for the high service pumps so they could be started and operated remotely by staff. Additional work included upgrading the GE Firmware, PLC programming, and a review of the entire plant PLC program for proper alarming and functionality. This provides operational staff with the ability to run the high service pumps in the event of a Master PLC failure and prevent the need for a boil order.

CUSTOMER INQUIRIES

During Year 1 there were 20 inquiries received. The inquiries were summarized as follows:

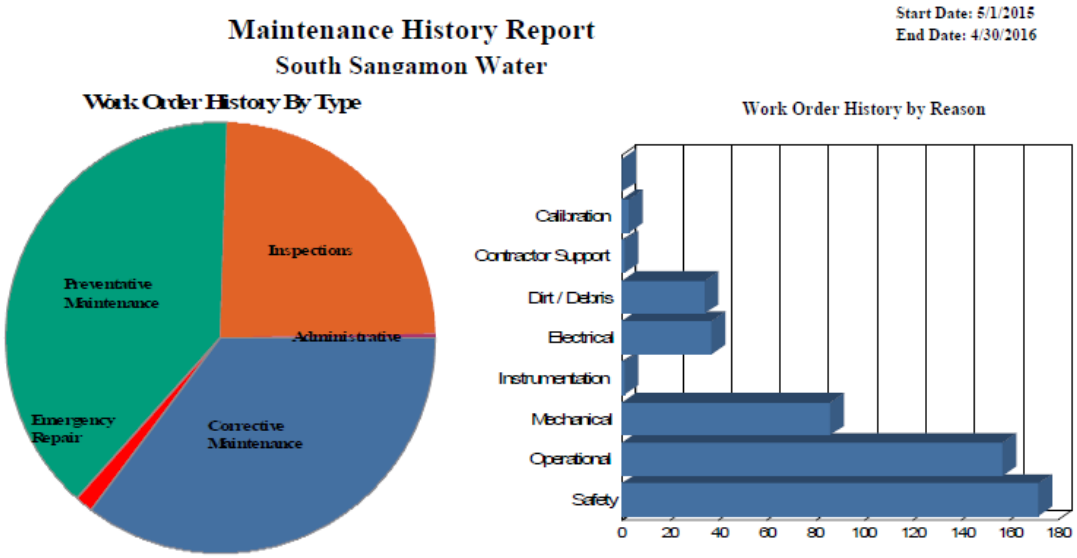
Category	Amount
Chlorine Residual	4
Transmission Main Pressure	1
Cyptosporidium	1
Hydroponic Plants	1
Website Question	1
Purchasing Water form SSWC	2
FOIA Request	1
Water Bill High	1
Request for Tour and/or Interview	1
Water Quality	7

Section 5

MAINTENANCE

Woodard & Curran implemented a computerized maintenance management system. A summary of the activities is provided below. For Year 1, there were 356 total work orders completed. This consisted of 126 Corrective, 5 Emergency, and 138 Preventive activities. There was also 1 Administrative and 85 Inspections. The table, chart and graph are an illustration of these activities during Year 1.

Administrative	1
Corrective Maintenance	126
Emergency Repair	5
Inspections	86
Preventative Maintenance	138
Total Work Orders	356



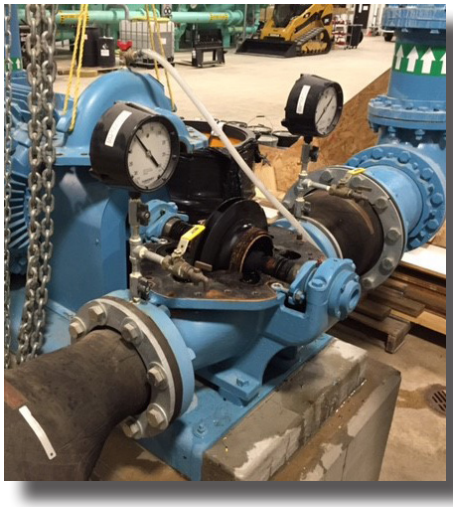
MAINTENANCE HIGHLIGHTS

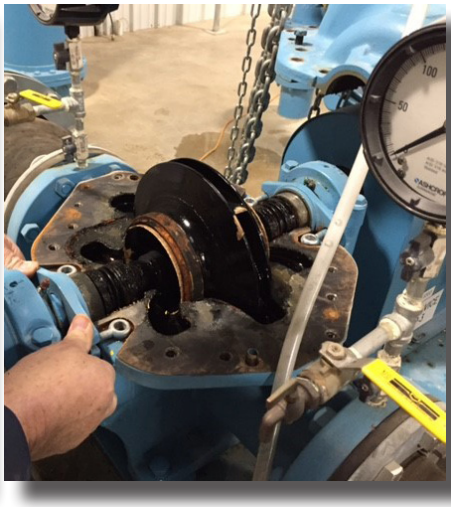
Well Maintenance Program: Prior to Woodard & Curran's arrival, the SSWC instituted a Well Rehabilitation Program. Woodard & Curran saw the value in this program and continued the program through Year 1. With the exception of Wells 1 and 2 which will be treated early in Year 2, the Specific Capacity of the wells treated is better than when the wells were new. The table below indicates the current data on each well:

Well Number	Present	New	% Loss	Last Test	% Loss
1	13	18	28%	17	24%
2	13	25	48%	33	61%
3	21	16	-	9	-
4	10	9	-	8	-
5	13	11	-	13	-
6	12	9	-	12	-
7	26	18	-	30	13%
8	31	23	13%	20	-
9	24	18	-	24	-
10	32	11	-	31	-

Sampling Stations: At the suggestion of the IEPA and due to the existing locations being a confined space, the South Sangamon Water Commission decided to move forward with installation of sampling stations in the well field. The cost of the stations were $16,170. Installation began on September 10, 2015 and was completed on September 16, 2015.

High Service Pump Program: Illinois Electric Works was on-site September 24, 2015 to disassemble and inspect High Service Pump #3 due to the high amount of air in the water as the water leaves the plant. Upon inspection, the pump was found to have signs of cavitation and the wrong wear rings were installed in the pumps. Stainless Steel wear rings were installed and other routine maintenance items were completed at total cost of $3,089.25. Rehabilitation of the remaining two pumps will be scheduled as time permits in the future.



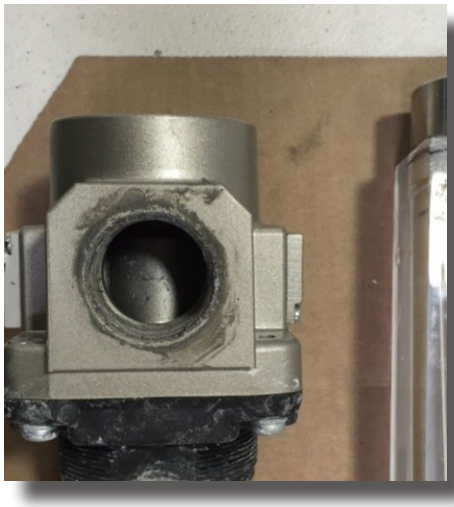


SERVICE CALLS AND CALL OUTS

In July 2015, Cummins Crosspoint was on-site to perform maintenance on the generator. This is the first year of a three year proposal approved by the SSWC board to keep this critical equipment in good working condition. Worked performed was changing the fuel filters, inspection of the fuel lines and connections, visually checking for fuel leaks, inspection of electrical connections, inspection of the battery system, overall maintenance of the system and training on maintenance to be performed weekly on the generator.

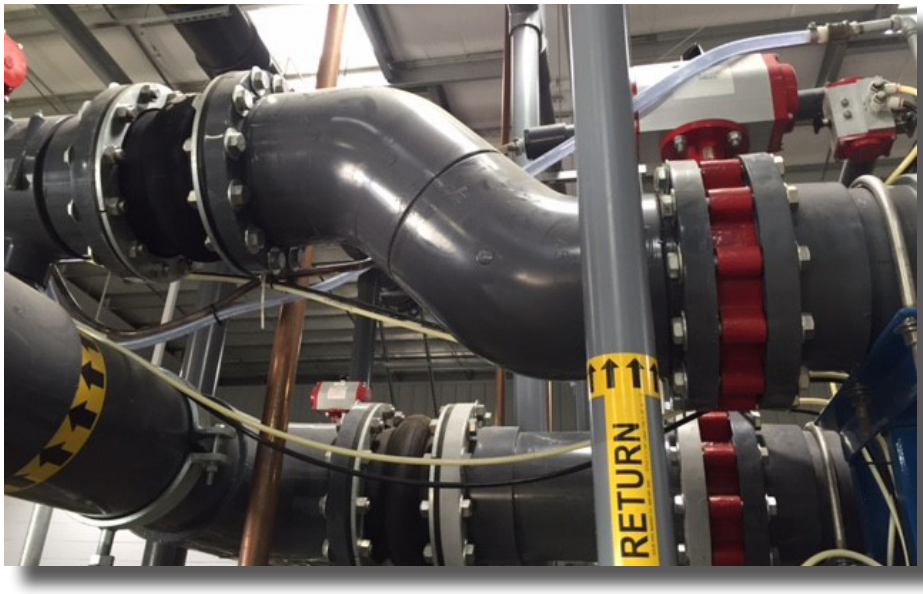
A number of repairs were accomplished during Year 1 on the filtration system. Those maintenance items are outlined below:

September 3, 2015 – Repair of a fitting that failed overnight on the Westech System.



September 3, 2015 – Repair of an air regulator on Filter Bank #1 broken.

October 12, 2015 – changed valves 105 and 107 to address CIP water level issues.



October 30, 2015 – Repair of s-curve on Bank #1.

March 2016 – Repair of leak on the lower manifold on Bank#1.

In addition to work above, Valve 104 was sticking which caused Bank 1 to shut down on September 5, 2015. The auto-drains on Bank #2 were replaced on November 13, 2015.

Section 6
PROJECT MANAGEMENT AND SUPPORT

STAFFING AND TRAINING

Woodard & Curran hired Dan Held prior to assuming responsibility of system and was successfully on-boarded as the Project Manager. Dan has an undergraduate degree from the University of Illinois in Springfield in Management and a Master of Public Administration from Southern Illinois University in Edwardsville. Dan started his career at Otter Lake Water Commission in 2006 as an operator. He moved to Taylorville Water Department in 2007 and was made Lead Operator in 2009. He joined Curran Gardner Township Public Water Supply in 2012 has been a Class A Water Operator since 2008. Dan was at the plant the day it went on-line in May 2012.

Woodard & Curran hired Mr. Keith Sommers as an Operator on July 15, 2015. Keith was a member of the United States military prior to attending the Environmental Resource Training Center in 2015. Keith has passed the Class A Water Operators examination and is considered a Class A Operator in Training by the state of Illinois until he's worked in a Class A plant for two full years. It is anticipated Keith well become a Class A Operator in the summer of 2017.

CORPORATE SUPPORT

The following Woodard & Curran employees have provided support to the South Sangamon Water Commission:

Administration	Controls Group (SCADA)
Doug McKeown	Ray Giguere
Engineering	Joe Hurley
Jennifer Anders	David Krause
Jason Dennis	**Accounting**
Operations	Stephanie Crowell
Roger Blackman	Joyce Garnett
Derek Burton	Amy Myshrall
Wendy Dalton	Brian Ravens
Andrew Jackson	Helen Whitcomb
Troy Kepley	**Health & Safety**
Celina McManus	Laura Bonk
Gary Miller	Shannon Eyler
Jason Muche	Wendy Foreman
Bobby Nichols	Joanna Wallace
Steve Niro	**Information Technology**
Paul Roux	Jeannie Dubois
Marc Thomas	Alan Fabiano
Human Resources	**Marketing**
Abby Feather	Brian Bzdawka
Cara Hanson	Jackie Smith
Chris Keneagy	**Training**
	Mike Cherniak

PROJECT COST

Woodard & Curran established a first year operations budget in conjunction with the SSWC. The necessary accounts for the operation and maintenance of the system were established with the vendors as part of the transition. Monthly reports were provided to SSWC with monthly and year to date actual cost versus budget spends. At the conclusion of the first year, the actual spend was $2,328 under budget.

Category	Estimate	Actual
Direct Salary, Benefits & Overhead	$232,810	$262,737
Chemical Costs	$196,655	$173,513
Maintenance & Repair Costs	$100,900	$99,655
Laboratory Costs	$18,355	$22,630
Brine Removal Costs	$142,046	$137,612
Miscellaneous Office Supplies	$2,750	$4,343
Miscellaneous Operating Expenses	$19,631	$17,899
Utility Costs	$101,060	$93,205
Other Operating Costs	$16,372	$16,663
Subtotal Costs	$830,579	$828,257
Fixed Fee	$83,058	$83,059
Transition Costs ($49,167 – 3 year amortization)	$16,389	$16,382
Total for Contract Year 1	**$930,026**	**$927,698**

The table below is a breakout of the chemicals used and the cost during Year 1:

Chemical	Actual Expense
Sodium Permanganate	$0
Sodium Hypochlorite	$10,547.14
Phosphate	$8,621.25
Fluoride	$4,018.77
Sodium Bisulfite	$27,086.88
Citric Acid	$28,694.68
Sodium Hydroxide	$143.75
Muriatic Acid	$656.58
Sodium Chloride	$93,743.70
Totals	**$173,512.75**

Section 7

CAPITAL PLANNING

Woodard & Curran worked closely with the SSWC and Meco Engineering to identify capital improvements required to address regulatory, water quality improvements, equipment nearing the end of its useful life, process optimization, and efficiency opportunities for the purpose of planning for the future. Several meetings of been conducted in conjunction with obtaining quotes from vendors to generate the capital plan. The Capital Plan continues to be reviewed and modified to allow the SSWC to pro actively plan for future needs.

A list of Priority 1 projects were submitted to the Board and approved implementation during the 2nd contract year.

A copy of the multi-year Capital Plan and Priority 1 Capital Improvements documents can be found in Appendix D.