

A large, light blue water tower stands in a grassy field under a bright sky with soft clouds. The tower is the central focus of the background image. The text is overlaid on this image.

CITY OF WOOSTER

UTILITIES DIVISION

ANNUAL REPORT FOR YEAR 2011

Prepared by

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Contributions from

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June 1st, 2012

EXECUTIVE SUMMARY

After the staffing losses following the Voluntary Separation Plan, one of the main objectives was to begin recovering some of the “institutional knowledge” that was lost with the departure of our most experienced employees. The new Operator Trainees were given intensive “on the Job” training along with various off site and correspondence classes through our professional organizations; AWWA, OWEA and OTCO. Rick Shilling and Chad Frank, transfers from Public Properties Maintenance Department, received Ohio EPA Wastewater Operator Class I certificates. In addition, three operators earned their Ohio EPA Chemical Laboratory Certification to help maintain compliance and lessen the strain on our only water certified Lab Technician, Michael Shultz. Michael has been splitting his time between the water and wastewater plants for the past few years. The Water Lab also saw three operators gain certification for our Microbiology Testing, giving the city flexibility for response during boil order events and required monthly bacteria sampling.

The Water Plant produced a total of 1.176 billion gallons of potable water in 2011. This total is a decrease of 62.02 million gallons from 2010. The average daily production was 3.223 million gallons with a peak of 4.21 million gallons on June 7th. The average per capita usage was 121 gallons per day based on the current population estimate of 26,619. Production costs for chemicals alone totaled \$218.47/Million Gallons (MG) of water produced; however, total plant expenses (minus capital improvements) put the costs at \$1432.59/MG produced. Unaccounted water losses continue to be a problem for the City water system. In 2011, 33% of the water treated and pumped from the plant was not billed to an account. These losses are attributed to distribution line losses (main leaks), service leaks, unmetered accounts, unauthorized use and meter inefficiency. Past practice has been conducting a leak detection survey in designated “weak spots” in the distribution system. In 2011, the entire system was examined and over 30 leaks were identified and repaired.

In total, the WPCP treated 2.206 billion gallons of wastewater in 2011 with the average daily flow being 6.044 million gallons per day and receiving a peak daily flow of 23.76 million gallons on March 10, 2011. This is an increase of 127 million gallons over 2010. In addition the plant treated 5.6 million pounds of biological oxygen demanding (BOD) substances and 4.2 million pounds of suspended solids from the wastewater.

During 2011, the WPCP experienced two separate flooding events causing damage to the operations building basement and the influent screening structure. On February 27th and 28th, over 2 inches of rain fell in the Wooster area. A power failure, in conjunction with the high flow and storm pump malfunctions, caused influent water to spill into the operations building basement. The almost five feet of water submerged 3 storm pumps, 2 vacuum pumps, the elevator hydraulic system and the 1965 motor control center (MCC). It was determined that the MCC could not reliably continue to operate and would need to be replaced. The pumps and motors were dried out, repaired and returned to service. The MCC replacement project has been bid and is under contract. The second flood was due to a failed power supply in the operations building during a rain event. The level sensors that control the influent pumps were inoperable when the power supply shorted out. The plant computer system (SCADA) continued to operate the pumps using the last data point it was given from the level sensors. As the the flow and levels increased, the SCADA system never detected a change and the on duty operator was never notified of a problem. The water submerged the screening equipment motors, control panels, and 2 refrigerated samplers. The City IT Department has installed an additional redundant system to prevent future flooding caused by failed data communication.

WATER POLLUTION CONTROL PLANT

Our Mission: As a team, efficiently serve the public and protect our natural resources through proper treatment and preservation of our water resources.

SUMMARY TREATMENT OPERATIONS

In 2011, the Water Pollution Control Plant struggled at times to remain in compliance even with the addition of the Biotower constructed on West Old Lincoln Way to reduce the organic load from the Frito Lay production facility. The Biotower was started in February 2011 and became fully operational by the end of April. From June through December 2011, the Biotower averaged 79.3% removal of CBOD which correlates to 4,500 pounds less loading per day to the WPCP (almost 1/3 of the plant design organic load). While the reduction in organic load helps diminish peak loads at the plant, it exacerbates the existing solids handling problems. The Biotower, as part of its treatment process, converts the soluble organic load to a solid particulate form. These solids are removed at the WPCP in the primary treatment tanks and sent to the anaerobic digesters.

In total, the WPCP treated a total of 2.206 billion gallons of wastewater with the average daily flow being 6.043 million gallons per day receiving a peak daily flow of 23.75 million gallons on March 10, 2011. This represents a total increase of 127 million gallons over 2010. In addition, the plant removed 3.9 million pounds (design is 5.02 million pounds) of biological oxygen demanding (BOD) substances and 5.9 million pounds (design is 3.65 million pounds) of suspended solids from the wastewater. The design of the facility is for 7.5 million gallons per day with a hydraulic maximum of 27 million gallons.

In contrast to the wastewater treated at this facility, the Water Treatment Plant produced on average 3.223 million gallons per day. The reasons for this obvious disparity of 2.82 million gallons per day between water produced and wastewater treated in 2011 is attributed to a combination of precipitation entering the WPCP through the combined sewer system, collection system infiltration and un-metered sources. The infiltration component of this disparity continues to be actively addressed the Utility and Engineering Divisions jointly continue to pursue the implementation of a sewer separation program. Un-metered sources are being identified and metered as part of the continuing meter upgrade program; however, some areas of the system (i.e. Killbuck South sewer district and some areas in Madisonburg) will not be metered as they are sewer only accounts and receive a flat rate billing.

The typical strength of wastewater is calculated in relationship to three basic attributes, Carbonaceous Biochemical Oxygen Demand (CBOD), Suspended Solids (SS) and Ammonia (NH₃). An additional indication of wastewater strength, Chemical Oxygen Demand (COD) is used primarily at our industrial users due to the repeatability and speed in which information can be derived by testing. The average daily strength of the wastewater treated at this facility in calendar year 2011 was 10,896 pounds of CBOD, 16,243 pounds of SS and

756 pounds of NH₃. When comparing to the design of the facility, the plant is operating at 73% CBOD loading, 162% TSS loading and 86% Ammonia loading.

WPCP cost's per million gallons of treated wastewater in 2011 was \$591 for O&M costs and the total cost of WPCP operations and personnel was \$974/MG.

Given that based on design criteria, a person contributes 0.167 lbs of BOD and 0.2 pounds of SS per day. Looking at 10,896 lbs per day influent BOD and 16,243 pounds per day of SS load to the plant, the plant is treating the equivalent waste stream of 65,245 people for BOD and 81,215 people for SS.

INDUSTRIAL PRETREATMENT / BIOSOLIDS PROGRAM

The City is required by the NPDES permit to maintain an Industrial Pretreatment Program and a Biosolids program. Both programs are coordinated by one WPCP employee and involve the inspection, oversight and enforcement of the City's ordinances pertaining to industrial discharges to the collection (sewer) system. Simply put, various materials can not be treated at the City's WPCP and a permitting program is in place to protect the WPCP, the Killbuck Creek and local agricultural lands from potentially harmful compounds.

The City of Wooster's Sewer Use Ordinance and Enforcement Response Guide provide the legal authority to enforce the OEPA approved pretreatment program of the city as well as USA EPA regulations

A conscious effort is made through training and the Internet to keep current with rule changes pertaining to pretreatment, and modification requests will be submitted for EPA approval, when deemed necessary.

Pretreatment operating procedures in place are adequate and followed to meet program goals. All sampling, reporting, and inspection requirements were met in 2011.

All industrial users that meet the criteria, as established by the EPA, of a Categorical Industrial User (CIU) or Significant Industrial User (SIU) are monitored for compliance with categorical and/or local limits for conservative and conventional pollutants. In addition, additional sampling is done to insure non-domestic wastewater dischargers are in compliance with local limits. Currently the city has two permitted CIU's and two SIU's and monitors other non-significant dischargers for compliance.

In addition to quarterly compliance sampling, several industrial users discharging higher than normal conventional pollutants are sampled weekly for Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS). The analytical results of those samplings are averaged for each month and a sewer surcharge for high strength waste is billed accordingly. In 2012, industrial user questionnaires will be mailed to industries and commercial users to update the city's user list and assure permitting is done as required. Background sampling is also planned in 2012 to use for our Local Limits development as we have submitted application for our new NPDES permit.

This year The City of Wooster published four Significant Industrial Users for discharge violations. Three of these (ArtiFlex, Buckeye Container & Wooster Products) were one time violations with pH probe malfunctions and one violation was contributed to line cleaning. All the industries with violations attributed to pH calibrations were back in compliance upon re-sampling and new procedures were recommended to prevent such events in the future. The Wooster Brush had a violation attributed to line cleaning. Although it is no longer an SIU, is still monitored.

The other SIU published was Enviro Clean which had numerous violations and was given a warning of escalated enforcement should these continue. There were several samples out of compliance and then some back in several times and the industry thought they had identified the source of the violations, therefore escalated enforcement was postponed.

The City of Wooster with a court order and in agreement with Enviro Clean, monitored this industry all year long for sulfur odors because of constant complaints from residents in the area. Legal proceedings are in the progress to resolve the odor issues believed to be emanating from the industry.

Considerable extra sampling was done throughout the year in an effort to help the sewer plant achieve and maintain compliance with the NPDES permit after a major upgrade completed in 2007. Some effort has been required to get the plant to perform as designed. Excessive loadings of organics from Frito Lay are suspected to be the major problem by our process designer. A bio-tower to reduce COD loadings to the plant was built and is monitored daily.

The City of Wooster Pretreatment Program is financed through the city sewer fund. No financing problems were experienced in 2011 or are anticipated for the year 2012. All financing needed for the administration of the program is available. Approximate costs for the program in the year 2011 were: payroll-\$65,000; training-\$120; outside lab work-\$8,000; and misc.-\$200; totaling \$73,320 not counting vehicle expense. Approximately fifty percent of the Pretreatment Coordinators time is spent on Pretreatment with the remaining time used to cover vacations for technicians in the lab, monitoring and reporting bio-solids, and working on the F O G program. A van is always available for the program to do sampling, inspections, etc.

The City of Wooster experienced no spills, interferences or pass through of toxins directly attributable to industrial discharges. All U. S. and Ohio EPA sampling and reporting requirements for the City of Wooster's bio-solids program were met in 2011.

Listed in the following table are the gallons, percent solids and dry tonnage of the Class B bio-solids that were land applied in 2011 to farms in Wayne, Holmes, and Ashland counties by Agri-Sludge Inc, the city's contract land applicator. Anaerobically digested sludge is mixed with spent lime sludge, from the city's water production plant, in the storage lagoons before land application as fertilizer for crops. No complaints were received from the land application of bio-solids. Unannounced inspections at some of the application sites were made to ensure compliance with the standards set forth in 40 CFR 503.

Month	Gallons	Avg % Solids	Dry Ton
January	1,634,650	9.2	583.27
February	812,000	6.4	230.96
March	1,910,520	5.6	460.26
April	2,862,600	6.1	765.90
May	1,062,500	4.5	200.98
June	410,000	2.5	42.92
July	1,292,750	3.6	201.26
August	1,150,050	7.0	344.80
September	401,550	8.0	127.53
October	811,050	8.2	336.07
November	1,356,700	8.7	451.26
December	1,060,860	4.4	192.37
Total	14,765,230		3,937.58

**WATER POLLUTION CONTROL PLANT
EMPLOYEE ROSTER as of 1/1/12
(Certification level)**

MANAGEMENT:

Utilities Manager

James Borton (WW IV)

Assistant Utilities Manager

Kevin Givins (WW III)

LABORATORY TECHNICIANS:

Michael Shultz (WW III)

Rod Musser (WWIII)

PRETREATMENT/BIOSOLIDS COORD.:

Lee Troyer (WW III)

CHIEF OPERATOR:

Steve Carathers (WW III)

OPERATORS:

Chad Frank (WW I)

Rick Shilling (WW I)

Adam Wilford (WW II)

OPERATOR TRAINEES:

Charlie Scott

PLANT MECHANICS (shared with WTP):

Bob King (WW I)

Ray Windsor (WWII)

ACCOUNT CLERK (shared with PPMD):

Janell Cooper

WATER TREATMENT PLANT TREATMENT OPERATIONS

The City of Wooster's Water Treatment Plant (WTP), now in its 13th year of operation, continues to perform well. The overall reliability of the plant systems has been excellent with the aid of our well trained and attentive operations and maintenance staff.

Finished water pumped to the city in 2011 decreased by 62.02 million gallons from the previous year for a total of 1.176 billion gallons. The high duty pumps sent an average of 3.222 million gallons per day of finished water into the distribution system. The peak-pumping day occurred on June 7 when 4.21 million gallons of finished water was pumped into the city. The average per capita usage of water in 2011 was 121 gallons per day (based on population data of 26,619).

The chemical cost per million gallons of treated water in 2011 was \$218.47 while the total cost of WTP operations and personnel was \$1432.59/MG. The increase of chemical costs from the previous year (\$205.46) was due to increased bid prices because of rising energy and production costs to our suppliers. The 2012 chemical bids were also substantially higher and will add to future operating expenses. The sodium hypochlorite bid increased 53%, from \$.62/gallon to \$.95/gallon. The other treatment chemicals (lime, soda ash and CO₂) increased 8%, 4% and 21% respectively.

Avg. chemical cost per million gallons finished water

YEAR	LIME	SODA ASH	CHLORINE	CO ₂
2003	\$59.48	\$15.77	\$17.36	\$7.25
2004	\$72.31	\$17.95	\$21.46	\$9.91
2005	\$114.06	\$23.59	\$31.73	\$10.56
2006	\$121.44	\$25.82	\$31.05	\$8.52
2007	\$114.16	\$31.80	\$22.58	\$9.95
2008	\$122.28	\$35.32	\$22.38	\$13.47
2009	\$127.19	\$38.54	\$30.87	\$14.83
2010	\$125.71	\$37.69	\$29.41	\$12.65
2011	\$140.69	\$41.73	\$23.44	\$12.59

Annual chemical usage (in pounds)

YEAR	LIME	SODA ASH	CHLORINE (in gallons)	CO ₂
2003	2,250,126	340,446	41,896	178,309
2004	2,436,907	306,616	46,896	219,410
2005	2,607,260	320,853	52,155	210,899
2006	2,417,440	311,940	45,883	170,141
2007	2,322,350	317,163	49,313	198,571
2008	2,482,800	330,000	44,856	261,200
2009	2,501,644	308,622	42,026	280,971
2010	2,604,814	309,347	50,066	279,712
2011	2,433,240	304,865	44,468	284,815

Annual Water Plant Production 2003-2011

YEAR	TOTAL MILLION GALLONS RAW WATER	TOTAL MILLION GALLONS FINISHED WATER	AVERAGE CHEMICAL COST PER MILLION GALLONS	AVERAGE HARDNESS RAW WATER mg/L	AVERAGE HARDNESS FINISHED WATER mg/L
2003	1391	1378	\$ 99.86	371	111
2004	1278	1267	\$121.10	389	117
2005	1303	1290	\$179.94	389	119
2006	1260	1249	\$186.83	379	114
2007	1252	1240	\$186.83	365	110
2008	1260	1248	\$193.45	371	110
2009	1197	1185	\$211.43	374	112
2010	1281	1269	\$205.46	369	108
2011	1188	1176	\$218.47	369	108

Sludge, a byproduct of the lime and soda ash softening process, is pumped to the sludge lagoon at the Water Pollution Control Plant. There was 12.84 million gallons of lime and soda ash sludge pumped to the WPCP in 2011. The sludge is mixed with the biosolid residuals from the Water Pollution Control Plant and land applied on agricultural fields throughout Wayne, Holmes and Ashland counties.

The city well fields continue to provide sufficient water. The North Well Field average water level was 34.4 feet. Its lowest level was in August at 24.6 feet, and the high was at 42.5 feet in December. The S-1 Well in the South Well Field averaged 41.6 feet of water peaking at 49.2 feet in May and a low of 32 feet in January. The S-2 Well in the South well field averaged 47.2 feet, peaking at 56.5 feet in May, and a low of 32.4 feet in January. The S-3 Well averaged 57.1 feet, peaking at 63.6 feet in May to a low of 49.8 in January.

Average water well levels (in feet)

WELLS	2003	2004	2005	2006	2007	2008	2009	2010	2011
North Well Field	23.2	28.6	30.3	29.9	31.0	33.2	31.4	30.1	34.4
South Well Field S-1	54.4	64.5	60.4	58.8	58.8	40.2	38.3	37.9	41.6
South Well Field S-2	28.5	54.8	46.1	43.2	43.2	45.1	42.8	42.8	47.2
South Well Field S-3					54.1	54.1	59.3	54.3	57.1

The OARDC reports of 2011 show 44.9 inches of precipitation in the Wooster area compared to 34.1 inches in 2010. The average rainfall is 38.9 inches for the Wooster community. For the year 2011, the area was 6 inches above the normal precipitation. The increased precipitation contributed to the 3.8 inch overall increase in well levels compared to the previous year.

Wooster, Ohio annual precipitation (OARDC weather station)

YEAR	TOTAL ANNUAL PRECIPITATION	CHANGE FROM NORMAL (38.9") PRECIPITATION
2003	43.2	+11.1%
2004	46.8	+20.3%
2005	34.0	-12.6%
2006	37.0	-4.9%
2007	35.4	-9.0%
2008	35.6	-8.5%
2009	34.5	-11.3%
2010	34.1	-12.3%
2011	44.9	+15.4%

Production of safe and satisfactory drinking water throughout 2011 was indicated by negative E-Coli bacteria results in samples of finished water collected from representative points of the distribution system. There were a total of 1254 bacteria tests completed including Wooster Distribution, new water lines, water line breaks, depressurization events, boil advisories, outside water systems, and private wells. In 2011, the OEPA certified three additional analysts for testing of E-Coli and Total Coliform. These certifications will allow additional flexibility in the laboratory and should eliminate some overtime when a weekend bacteria analysis is required.

SOUTH WELLFIELD CONTAMINATION

Since 1985, the city has operated interceptor wells and packed media stripping towers to remove volatile organic contamination from the South Wellfield. The interceptor wells protect the City's production wells from the contamination plume migrating further into the South production wells. In addition, the operations staff conducts a semiannual testing event of monitoring wells in and around the South Wellfield to record movement and levels of contaminants found in the ground water. Forty test wells are measured for water depth, tested for turbidity, pH, conductivity and sampled for volatile organics.

In 2011, the packed media stripping towers treated 499.2 million gallons of contaminated water then discharged into the Little Apple Creek.

SPECIAL PROJECTS COMPLETED IN 2011

- ❖ Pressure washed Long, Madison, and both Clearwell storage tanks to remove mildew and protect coating from corrosion.
- ❖ Repaired leaks in treatment plant potable and nonpotable water system.
- ❖ Removed and rebuilt both wash water basin recovery pumps.
- ❖ Repaired #1 pump bearings at Buckeye Booster Pump Station.
- ❖ Replaced #2 Interceptor blower with rebuilt model.

- ❖ Raised Buckeye Booster Station antenna tower 40 feet and installed new antenna and cable to minimize communication errors.
- ❖ Calibrated flow meters on the Plant Raw, East & West Finished, Supplemental Wash Water, Filter Influent piping and all Booster Stations to verify water losses and coordinate plant production numbers with actual billing.
- ❖ Replaced damaged antenna tower, antenna and coaxial cable at the Winter Street Storage Tank. The new tower and antenna have been raised an additional 40 feet to improve signal strength and reliability of telemetry system.
- ❖ Calibrated all tank level transmitters and verified readings on the plant SCADA system.

**WATER TREATMENT PLANT
EMPLOYEE ROSTER
(Certification level)**

MANAGEMENT:

Utilities Manager
Assistant Utilities Manager

James Borton (WS III)
Kevin Givins (WS III)

LABORATORY TECHNICIAN:

Michael Shultz (WS III)

CHIEF OPERATOR:

Robert Lance (WS III)

OPERATORS:

Michael Stebelton (WS II)
James Phillips (WS I)
Dave Mosher (WS II)
DJ Reichert (WS I)

OPERATOR TRAINEE:

Tim Breneman

PLANT MECHANICS (shared with WPCP):

Bob King (WS III)
Ray Windsor (WDII)

ACCOUNT CLERK (shared with PPMD):

Janell Cooper