

CITY OF WOOSTER

UTILITIES DIVISION

**ANNUAL REPORT
FOR YEAR 2012**

Prepared by

Kevin P. Givins
Utilities Manager

Contributions from
Robert Lance (Retired 12/31/2012)
Robert King
Water Treatment Supervisors

Steve Carathers
Wastewater Treatment Supervisor

Michael Schultz
Laboratory Technician

Lee Troyer
Pretreatment Coordinator

March 1st, 2013

EXECUTIVE SUMMARY

Personnel transitions continued in 2012 as Kevin Givins was promoted to Utilities Manager and Chief Operators at both WTP and WPCP (Robert Lance and Steve Carathers) moved into the newly created Plant Supervisor positions. The new positions will encompass duties and responsibilities of the vacant Assistant Utilities Manager and the former Chief Plant Operators. Benjamin Martin, Assistant Operator at WPCP, was hired in August and is learning plant operations and treatment theory. Charles Scott at WPCP and Tim Brenneman at WTP both earned their respective Class I OEPA Operations Certifications. WPCP operators, Chad Frank and Adam Wilford, achieved a passing score on the Class I Water Supply exam and are acquiring service time at the water treatment plant to meet the license requirements.

The Water Plant produced a total of 1.197 billion gallons of potable water in 2012. This total is an increase of 22 million gallons from 2011. The average daily production was 3.272 million gallons with a peak of 4.20 million gallons on June 15th. The average per capita usage was 123 gallons per day based on the current population estimate of 26,619. Production costs for chemicals alone totaled \$240.44/Million Gallons (MG) of water produced; however, total plant expenses (minus capital improvements) put the costs at \$1,662/MG produced.

Unaccounted water losses continue to be a problem for the City water system. In 2012, 34% 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. In 2012, the entire system was leak surveyed and 34 leaks were identified and repaired. In addition, the 60 largest meters in the system were checked for accuracy and calibrated in an attempt to reduce lost revenue. In 2013, the Division is planning to undertake an entire system audit to include billing, metering (plant and pump stations) and leak detection.

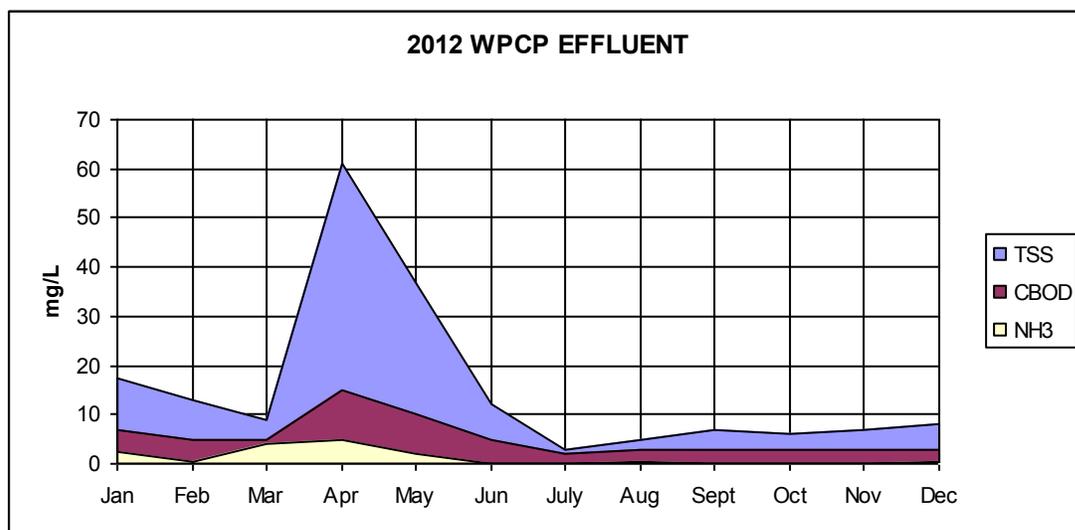
In total, the WPCP treated 1.536 billion gallons of wastewater in 2012 with the average daily flow being 4.197 million gallons per day and receiving a peak daily flow of 15.86 million gallons on January 27, 2012. This is a decrease of 670 million gallons over 2011 due to lower than average precipitation (-24%) and continued separation of the City's sanitary and storm water systems. In addition, the plant treated 3.3 million pounds of biological oxygen demanding (BOD) substances and 4.9 million pounds of suspended solids from the wastewater.

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

After struggling with treatment compliance since construction began at the plant in 2005, the decision was made to abandon the designed low sludge yield, low dissolved oxygen treatment process and attempt to move toward a more conventional aerobic process. The plant showed mild improvement with the changes and experienced no loading violations after May. The drier than normal weather pattern also aided with compliance and allowed the plant staff to concentrate on overdue maintenance, special projects and professional development.



In total, the WPCP treated a total of 1.536 billion gallons of wastewater with the average daily flow being 4.197 million gallons per day receiving a peak daily flow of 15.86 million gallons on January 27, 2012. This represents a total decrease of 670 million gallons from 2011. 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.

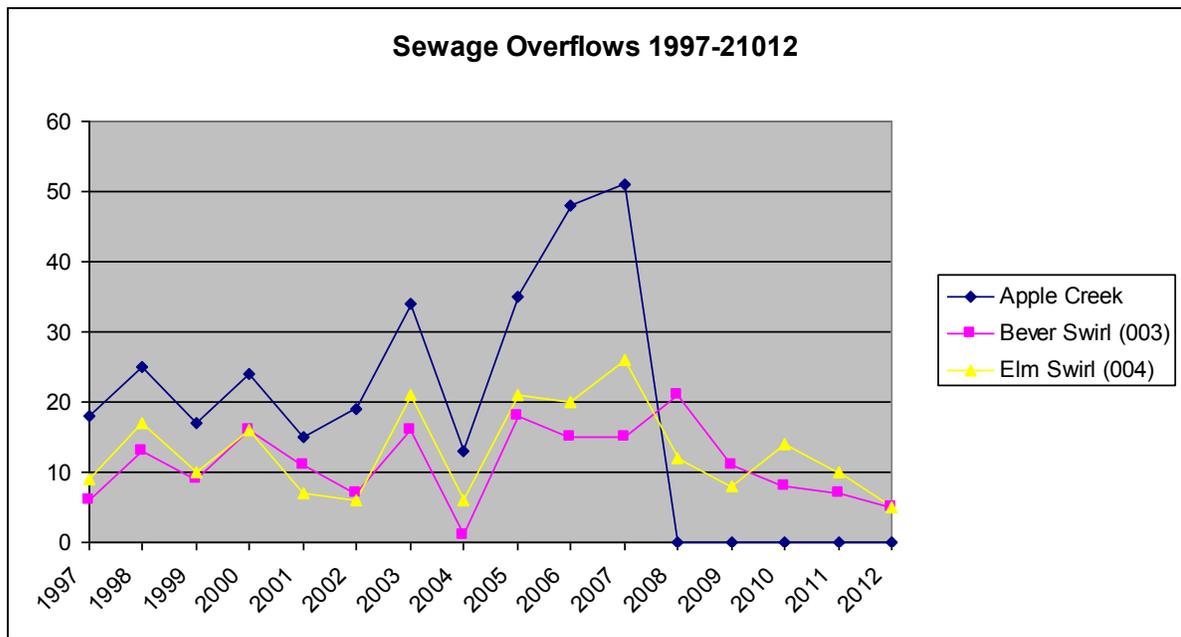
In contrast to the wastewater treated at this facility, the Water Treatment Plant produced on average 3.272 million gallons per day. The reasons for this obvious disparity of .925 million gallons per day between water produced and wastewater treated in 2012 is attributed to a combination of precipitation 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 2012 was 9,115 pounds of CBOD, 13,380 pounds of SS and 742 pounds of NH3. When comparing to the design of the facility, the plant is operating at 61% CBOD loading, 133% TSS loading and 85% Ammonia loading.

WPCP cost's per million gallons of treated wastewater in 2012 was \$801 for O&M costs and the total cost of WPCP operations and personnel was \$1,369/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 9,115 lbs per day influent BOD and 13,380 pounds per day of SS load to the plant, the plant is treating the equivalent waste stream of 54,580 people for BOD and 66,900 people for SS.

The ongoing sanitary/storm water separation projects continue to show improvement on controlling surface water from entering the City collection system and overloading the hydraulic capacity of the treatment plant. The combined sewer overflow structures that allow raw wastewater to enter the Apple Creek were activated 10 times in 2012. That total represents the lowest amount in the last 16 years. As part of the City's long term control plan, the goal is to only activate the overflows when a 5-year storm event occurs.



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 2012.

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.

This year The City of Wooster published one Significant Industrial User (EnviroClean) and two Non Significant Industrial Users (Buckeye Container and Ohio Agricultural Research and Development Center) for discharge violations.

The City of Wooster, in agreement with EnviroClean, monitored (as needed) for sulfur odors because of complaints from residents in the area. Legal proceedings are in the progress to resolve the odor issues believed to be emanating form the industry.

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 2012.

Listed in the following table are the gallons, percent solids and dry tonnage of the Class B bio-solids that were land applied in 2012 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	1,075,950	6.7	279.93
February	1,835,650	7.8	589.57
March	2,209,700	5.7	474.64
April	701,100	6.3	197.35
May	741,600	4.3	130.84
June	866,450	3.5	121.05
July	975,650	7.0	272.84
August	771,000	6.2	198.82
September	1,202,650	7.4	367.37
October	500,650	6.4	138.30
November	602,900	6.9	153.28
December	751,150	6.5	210.89
Total	12,234,450		3,134.88

Special Projects Completed in 2012

- ❖ Gravity Thickener drive unit was rebuilt and steel structure was reinforced and coated to prevent additional corrosion.
- ❖ Lagoon Decant line was modified to prevent plant influent samples to be misrepresented by excess ammonia and organic load from lagoons.
- ❖ "Pancake" pump was reallocated from unused SAF unit and installed as scum pit pump for #3 & #4 Final Clarifiers.
- ❖ Obsolete boilers from Operations Building and Digester #1 were disconnected, removed and sold for scrap value.
- ❖ Splash guard was installed on VLR pass #5 to prevent untreated waste from spilling onto the ground.
- ❖ Bulk chemical storage tanks in the Administration Building were removed. The man door was replaced with an overhead rolling door to allow removal of tanks and other unused equipment. Eventually, this area will be converted into a training room.
- ❖ The flood damaged motor control centers in the Operations Building were replaced and moved out the basement to avoid future water damage.
- ❖ The influent screen control panels were relocated outside to avert water intrusion.
- ❖ New wiring was installed in the galley of the sequencing batch reactors.



Pictured at left; damaged influent impeller from excessive cavitation.

Below; rusted steel structure of gravity thickener before coating and welded reinforcement project.



**WATER POLLUTION CONTROL PLANT
EMPLOYEE ROSTER as of 1/1/13
(Certification level)**

MANAGEMENT:

Utilities Manager

Kevin Givins (WW III)

Plant Supervisor

Steve Carathers (WW III)

LABORATORY TECHNICIANS:

Michael Shultz (WW III)

Rod Musser (WWIII)

PRETREATMENT/BIOSOLIDS COORD.:

Lee Troyer (WW III)

OPERATORS:

Chad Frank (WW I)

Rick Shilling (WW I)

Adam Wilford (WW II)

Charlie Scott (WWI)

ASSISTANT OPERATOR

Benjamin Martin

PLANT MECHANICS (shared with WTP):

Ray Windsor (WWII)

ACCOUNT CLERK (shared with PPMD):

Janell Cooper

Water Pollution Control Plant Goals and Objectives for 2013

- Maintain Compliance with NPDES Permit
 - Rebuild Massei Injector Pumps to increase flow and oxygen transfer in the post aeration system to reduce Dissolved Oxygen Violations
 - Add additional post aeration utilizing unused Tsunami pumps and venturi equipment.
 - Improve solids handling capability via third party contract for sludge processing to eliminate suspended solids permit violations.
 - Begin wet stream improvements to the vertical loop reactors, dissolved air floatation and sidestream pumping to comply with OEPA's Findings and Orders.
 - Modify process flows to improve ammonia/nitrogen treatment
 - Contract with SCADA Technician to improve network reliability and assist with emergency technical support
 - Negotiate new NPDES permit limits and conditions with OEPA

- Continue Staff Training and Professional Development
 - Host OTCO Basic Wastewater Training Course
 - Update Lock Out/Tag Out, Blood Bourne Pathogen, and Personnel Protective Equipment Training
 - Send Staff to exam preparatory class for OEPA Wastewater Certification Exam
 - Continue cross training with WTP to allow Wilford and Frank to gain enough experience time to meet the water certification requirements
 - Finish remodel of former chemical room into new staff training room
 - Begin succession plan for future staff openings in laboratory and pretreatment
 - Fill vacant Assistant Operator position

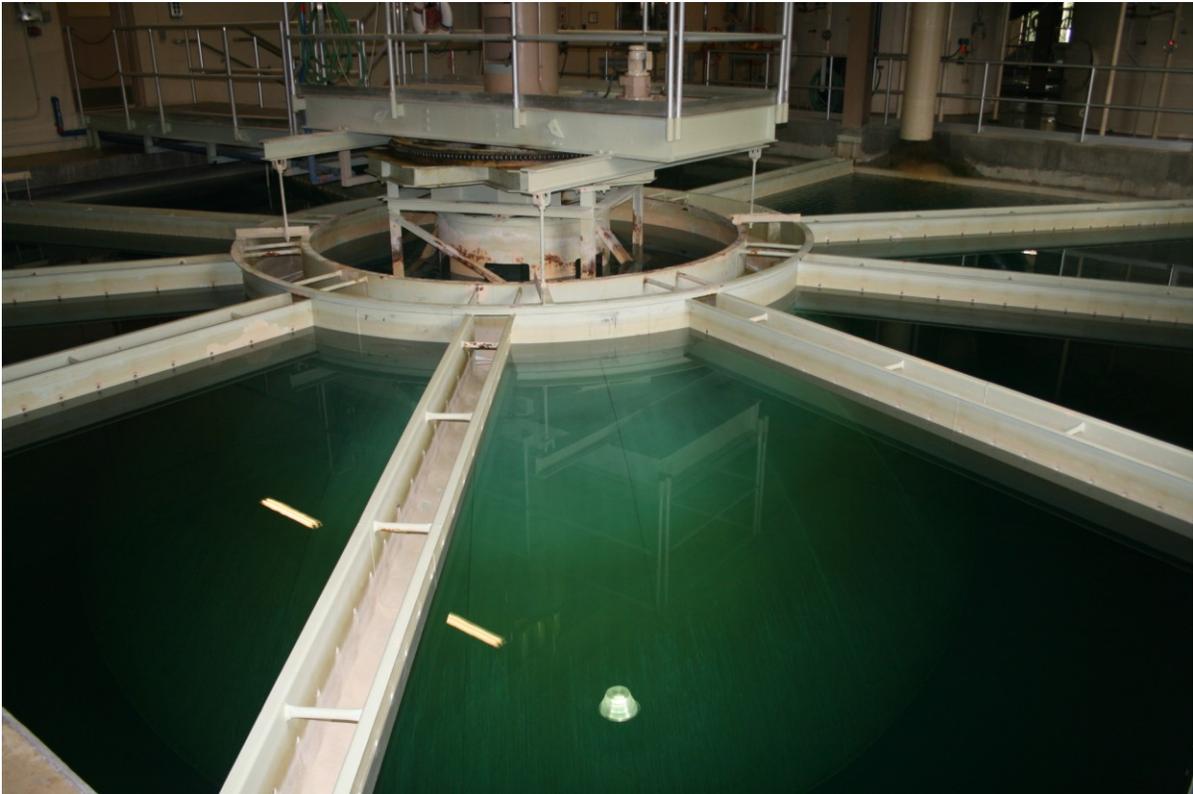
- Replacement of Obsolete and Worn Equipment (not replaced in last upgrade)
 - Replace 1965 RAS Pump
 - Rebuild Moyno sludge pumps (6)
 - Restore 1988 RAS Pumps (3)
 - Refinish/replace worn impellers on influent pumps (7)

WATER TREATMENT PLANT *TREATMENT OPERATIONS*

The City of Wooster's Water Treatment Plant (WTP), now in its 14th 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 2012 increased by 22 million gallons from the previous year for a total of 1.197 billion gallons. The high duty pumps sent an average of 3.27 million gallons per day of finished water into the distribution system. The peak-pumping day occurred on June 15th when 4.20 million gallons of finished water was pumped into the city. The average per capita usage of water in 2012 was 123 gallons per day (based on population data of 26,619).

The chemical cost per million gallons of treated water in 2012 was \$240.44 while the total cost of WTP operations and personnel was \$1,662/MG. The increase of chemical costs from the previous year (\$218.45) 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	CO2
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
2012	\$148.08	\$42.93	\$34.42	\$15.01

Annual chemical usage (in pounds)

YEAR	LIME	SODA ASH	CHLORINE (in gallons)	CO2
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
2012	2,411,607	306,815	43,374	285,115

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
2012	1209	1197	\$240.43	367	107

Sludge, a byproduct of the lime and soda ash softening process, is pumped to the sludge lagoon at the Water Pollution Control Plant. There were 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 31.8 feet. Its lowest level was in August at 21.7 feet, and the high was at 41.4 feet in February. The S-1 Well in the South Well Field averaged 39.0 feet of water peaking at 44.8 feet in January and a low of 33.6 feet in October. The S-2 Well in the South well field averaged 42.9 feet, peaking at 50.6 feet in April, and a low of 34.2 feet in May. The S-3 Well averaged 54 feet, peaking at 60.2 feet in January to a low of 47.5 in October.

Average water well levels (in feet)

WELLS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
North Well Field	23.2	28.6	30.3	29.9	31.0	33.2	31.4	30.1	34.4	31.8
South Well Field S-1	54.4	64.5	60.4	58.8	58.8	40.2	38.3	37.9	41.6	39.0
South Well Field S-2	28.5	54.8	46.1	43.2	43.2	45.1	42.8	42.8	47.2	42.9
South Well Field S-3					54.1	54.1	59.3	54.3	57.1	54.0

The OARDC reports of 2012 show 29.52 inches of precipitation in the Wooster area compared to 44.9 inches in 2011. The average rainfall is 38.9 inches for the Wooster community. For the year 2012, the area was 9.4 inches below the normal precipitation. The lower precipitation contributed to the 3.2 inch overall decrease 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%
2012	29.5	-24.2%

Production of safe and satisfactory drinking water throughout 2012 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 1047 bacteria tests completed including Wooster Distribution, new water lines, water line breaks, depressurization events, boil advisories, outside water systems, and private wells.

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 2012, the packed media stripping towers treated 455.2 million gallons of contaminated water then discharged into the Little Apple Creek.

SPECIAL PROJECTS COMPLETED IN 2012

- ❖ Replaced the well casing and repaired pump of the #6 North Wellfield Production Well
- ❖ Performed Tank (internal & external) coating inspections of Winter, Madison, Milltown and OARDC tanks.
- ❖ Removed fouled air screen on #7 interceptor well stripping tower to improve performance and eliminate NPDES permit violations.
- ❖ Utilized existing antenna at Fire Station #1 to redirect communication signal from Buckeye Booster to Water Treatment Plant via fiber network. The change improved response time and reduced communication losses.
- ❖ Rehabilitated #2 South Production Well by acidizing screens and rebuild pump assembly. Flow increased to 2800 gpm from 1800 gpm, a 55% improvement.



Pictured above is the corroded well casing from North Wellfield #6 Production Well and the pump housing. The collapsed casing allowed gravel to be drawn into the pump and damaged the shaft and impellers. The new casing is made of stainless steel and should have an extended service life over a typical steel casing.

**WATER TREATMENT PLANT
EMPLOYEE ROSTER (as of 1/1/2013)
(Certification level)**

MANAGEMENT:

Utilities Manager	Kevin Givins (WS III)
Plant Supervisor	Robert King (WS III)

LABORATORY TECHNICIAN:

Michael Shultz (WS III)

OPERATORS:

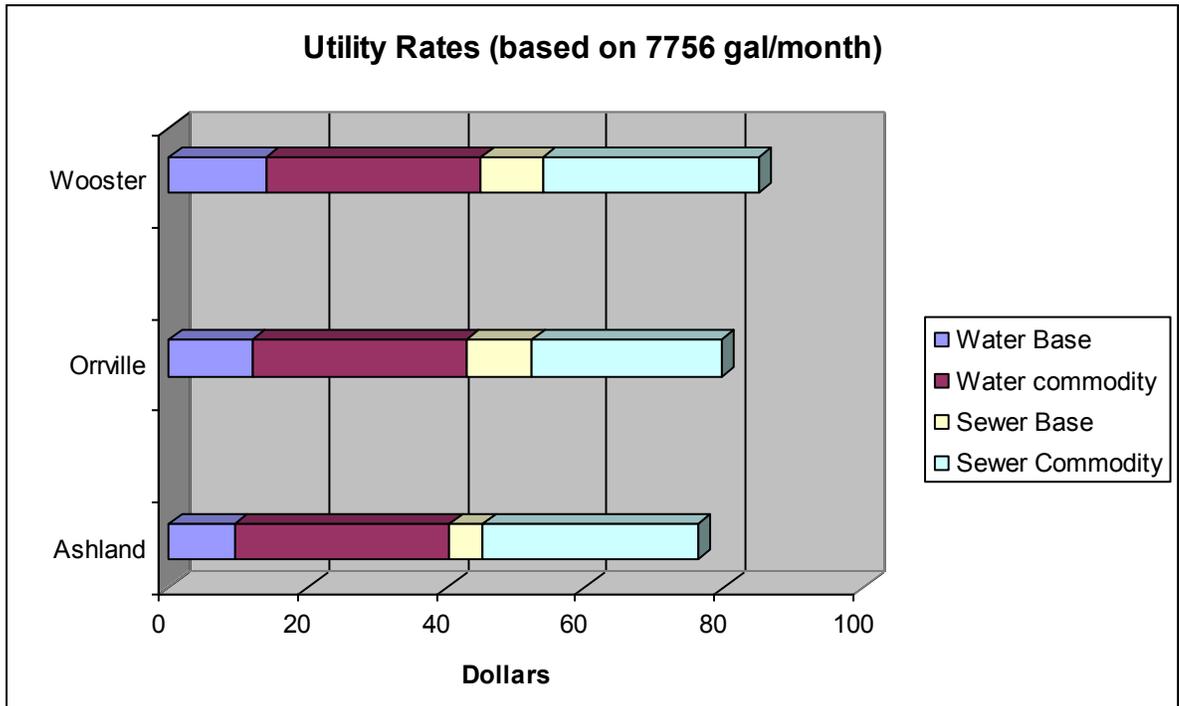
Michael Stebelton (WS II)
James Phillips (WS I)
Dave Mosher (WS II)
DJ Reichert (WS I)
Tim Breneman (WS I)

PLANT MECHANICS (shared with WPCP):

Ray Windsor (WDII)

ACCOUNT CLERK (shared with PPMD):

Janell Cooper



Water Treatment Plant Goals and Objectives for 2013

- Improve unaccounted water by 20%
 - Leak detection survey of entire system
 - Audit of data (production, pumping, metering and unmetered accounts)
 - Meter calibration of plant and pump stations
 - Account verification
 - Replacement of failing AMR system

- Increase distribution turnover and improve water quality
 - Contract for painting and mixing equipment improvements at the Madison Hill Storage Tank
 - Replacement of Spring Street Water Line
 - Modify System Pumping procedure to prevent water stagnation in system

- Maintain Wellfield Reliability
 - Overhaul and rebuild #3 South Production Well (has not been touched since installation in 2005)
 - Capacity test and acidize as needed production wells at the North Wellfield

- Increase Building Maintenance of 15 year old water plant
 - Refresh paint in hallways, doors and offices
 - Refinish floor in chemical room
 - Touch up metal corrosion spots on softening clarifiers
 - Minor roof restoration project