City of Waupaca Regional Wastewater Treatment Facility

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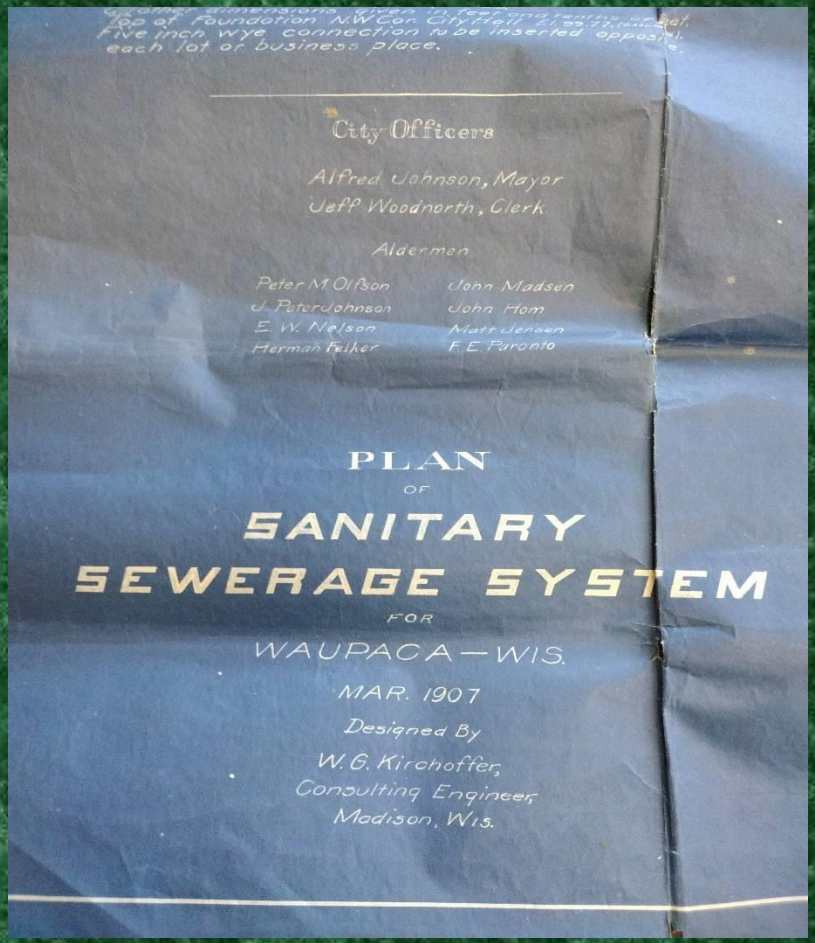
Wastewater Superintendent

City of Waupaca Regional Wastewater Treatment Facility

- Early sewage treatment history for the City of Waupaca
- Past WWTF expansions and upgrades
- Most recent WWTF expansion in 1996
- Design loadings of current wastewater facility
- Sludge land application information
- Recent equipment upgrades at the WWTF

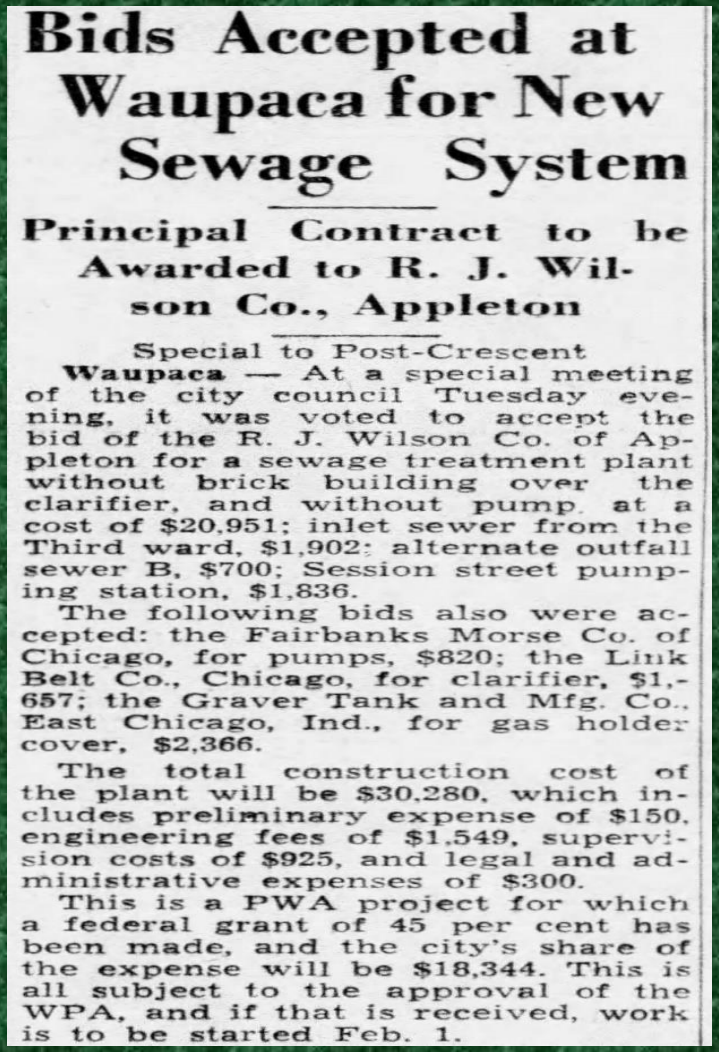
Beginning of Sewer System in Waupaca

- First sewer system in the City consisted of 4.2 miles of sanitary sewers ranging in size from 8-18 inches connected to 300 services
- Sewage collection system was designed by William G. Kirchoffer sanitary & hydraulic engineer Madison, WI 1907
- Construction of sewers was completed in 1910
- Sewage collection system flowed into two septic tanks that discharged to the Waupaca River
- Population of City of Waupaca in 1910 was 2,789



First Sewage Treatment Facility

- City starts planning for new sewage treatment facility and sewer additions in 1933
- William G. Kirchoffer, sanitary engineer, submits plans to City for first sewage treatment facility in 1934
- City requests bids for sewage treatment facility in Fall 1936
- Bids accepted in January 1937 for new sewage treatment facility
- Sewage treatment facility consisted of a rectangular chain and flight clarifier and rectangular anaerobic digester with floating gas holding cover
- Digested solids were discharged to sludge drying beds
- Construction was completed in September 1937
- Total cost of new sewage plant was $30,280



Bids Accepted at Waupaca for New Sewage System

Principal Contract to be Awarded to R. J. Wilson Co., Appleton

Special to Post-Crescent

Waupaca — At a special meeting of the city council Tuesday evening, it was voted to accept the bid of the R. J. Wilson Co. of Appleton for a sewage treatment plant without brick building over the clarifier, and without pump at a cost of $20,951; inlet sewer from the Third ward, $1,902; alternate outfall sewer B, $700; Session street pumping station, $1,836.

The following bids also were accepted: the Fairbanks Morse Co. of Chicago, for pumps, $820; the Link Belt Co., Chicago, for clarifier, $1,657; the Graver Tank and Mfg. Co., East Chicago, Ind., for gas holder cover, $2,366.

The total construction cost of the plant will be $30,280, which includes preliminary expense of $150, engineering fees of $1,549, supervision costs of $925, and legal and administrative expenses of $300.

This is a PWA project for which a federal grant of 45 per cent has been made, and the city's share of the expense will be $18,344. This is all subject to the approval of the WPA, and if that is received, work is to be started Feb. 1.

First WWTP Expansion 1955

LAUNCH REMODELING PROJECT

Work has been started on the $100,000 remodeling project at the Waupaca sewage disposal plant, located on the Waupaca River at the end of Oborn Street. A new clarifier will occupy the large hole, and other changes are planned in the original structure, located at the left. The Bahr Construction Company of Wausau has the general contract. (Jim Anderson photo)

Oshkosh Northwestern 21
Thurs., July 21, 1955

Big Field Is Expected For OutboardMeet

WINNECONNE — According to advance information, available here, it is expected that some 150 outboard racing drivers will take part in the Region 7 Outboard championship races to be run on the Wolf River Saturday and Sunday.

Drivers in the region are expected to arrive from Indiana, Illinois and Wisconsin, states that make up Region 7, Friday afternoon.

Races will be run in all classes in which drivers register and it is expected that a full program will be run during the two days in the following classes: Utility boats in the JU, AU, BU, CU and DU events; hydroplane events to include the ASH, BSH, and DSH classes. Local waters are popular with Midwest racing drivers and the Chamber of Commerce, which sponsors the event locally, expects a thrill - packed program. The event is sanctioned by the American Power - Boat Association and will be conducted by the Wisconsin Stock Utility Outboard Racing Association.

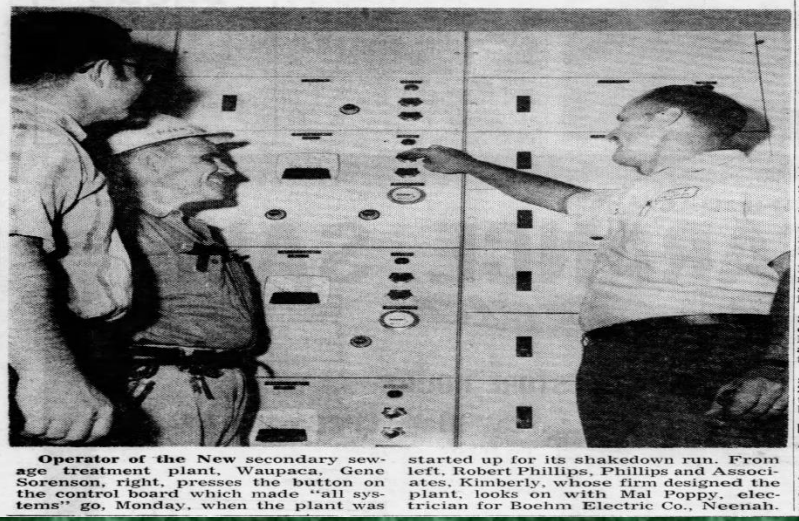
New London Girl, Neenah Man Wed

NEW LONDON — The marriage

- WWTF deemed inadequate by State Board of Health and Committee on Water Pollution Officials in 1951
- BOD removal was 17.2% and Suspended solids 34%
- Baxter & Woodman Sanitary Engineers, Crystal Lake, Illinois designed new treatment facility expansion 1955
- Extra clarifier settling tanks, new larger anaerobic digester, extra sludge drying bed, chlorination equipment added
- Design capacity to be 527,000 GPD
- Total upgrade cost $107,000

1971 Wastewater Facility Expansion

Before the City of Waupaca's new 580,000 secondary sewage treatment plant, was started up Monday for its adjustments and test run Mark Kerhkoff, left, project superintendent of Oudenhoven Co., Inc. Kaukauna, checked one of the big headers on a primary clarifier. Iver Oerter, consulting engineer with Phillips and Associates, Kimberly, former city engineer and director of public works for the city, makes a check sheet. (Post-Crescent Photo)

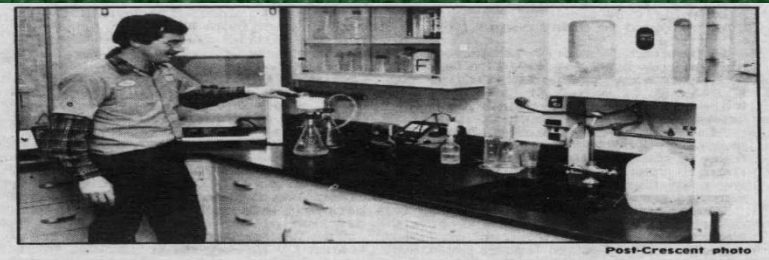


Operator of the New secondary sewage treatment plant, Waupaca, Gene Sorenson, right, presses the button on the control board which made "all systems" go, Monday, when the plant was started up for its shakedown run. From left, Robert Phillips, Phillips and Associates, Kimberly, whose firm designed the plant, looks on with Mal Poppy, electrician for Boehm Electric Co., Neenah.

- In 1967 State issues order that City of Waupaca must submit plans for secondary treatment facilities by 12/31/1969 and construction be completed by 1971 due to undersized treatment facilities
- Phillips & Associates Little Chute, WI was the consulting engineer
- Secondary treatment equipment additions consisted of 2 new secondary clarifiers, 1 chlorine contact tank, 2 aeration tanks, 1 aerobic digester, and a service/office building
- Upgraded wastewater treatment facility now has design capacity of 1.25 MGD, previous treatment capacity was 527,000 GPD
- Total cost for upgrade was $567,500
- Construction completed and upgraded treatment facility went online in August 1971
- Temporary phosphorus removal facilities added in 1973

1985 WWTP Expansion

- Upgrade was needed to handle excessive sludge production at plant from phosphorus removal process
- Inadequate anaerobic digestion volume and equipment to handle sludge were contributing factors
- Process was generating 2.97 million gallons sludge annually
- Phillips & Associates consulting engineer
- New additions consisted of 40ft anaerobic digester, sludge handling building, sludge press, phosphorus chemical storage
- Project cost was $1.5 million



Post-Crescent photo

Paul Springsteen, plant superintendent, tests water in the remodeled laboratory of the Waupaca wastewater treatment plant.

Plant project ends sewage problem

BY ED CULHANE
Post-Crescent staff writer

WAUPACA — A $1.5 million renovation project at the city's wastewater treatment plant has ended a 14-year problem with sludge handling, provided a means to extract energy from refuse and guaranteed a greater measure of year-round protection for the Waupaca River.

The project solves a problem which has existed since 1970 when the city installed equipment which effectively removed more than 95% of the waste from wastewater.

The process created great amounts of liquid sludge (the byproduct of water purification), and in 1971, when the state required the removal of phosphorus from wastewater, even greater amounts of sludge resulted — more than the plant could handle.

"We just couldn't get it out timely enough," said Gene Sorensen, director of public works.

The system would occasionally back up, and in some cases, allow sewage that had not been fully treated to overflow into the river in violation of the city's permit.

Sorensen said city officials never waivered in assuming responsibility for the problem and, although the city was repeatedly cited for its difficulty with sludge handling, the Department of Natural Resources never asked that fines be imposed.

Before 1970, wastewater was treated by letting it sit in large tanks where suspended solids would slowly sink to the bottom. This removed only 25% to 30% of the objectionable pollutants, Sorensen said. The plant was built in 1937.

A second process was added in 1970. The product of the first process is cleaned further in an aerobic (adds air) digestion process in which microorganisms attack the suspended solids. In a final clarifier, these solids then separate from the water leaving it 95% to 98% clear.

The Common Council authorized the latest improvements in the spring of 1982. State grant money paid for 60% of the work and the city issued $700,000 in general obligation bonds to finance the remaining cost.

Most of the work was finished last summer with only minor engineering adjustments left to be completed.

The plant has a new sludge-handling building which is used to remove some of the water from liquid sludge and compact the remaining substance into more easily handled, semi-watery cakes.

In the treatment process, sludge is cooked in digesters where bacteria break down its harmful, volatile elements and create a useful fertilizer. Liquid sludge, though, is less useful to the farmer because it is so highly diluted (97% water). And it can't be spread on frozen ground.

Paul Springsteen, plant superintendent, said that before the latest modifications, up to 10 tanker trucks a day hauled liquid sludge to open fields and farmland, an unreliable and expensive system.

Sludge in caked form takes up less space. It can be stored easily and transported in the back of a city dump truck. The sludge is now hauled away in two or three loads a day, Springsteen said.

And because it is more concentrated (88% water), it is a better fertilizer than liquid sludge. The process also insures that the plant will not become backed up.

Another improvement is the addi-

Continued on page 29

Most Recent Wastewater Facility Expansion 1996

- Future treatment facility planning started in 1992
- Chain O Lakes Sanitary District sewage will be pumped to Waupaca WWTF for treatment
- Expanded WWTF will treat both City of Waupaca and Chain Sanitary District sewage
- Construction started May 1995
- Construction completed August 1997
- Kaempfer & Associates, Oconto Falls, WI consulting engineers
- Project cost $8,460,000

1996 Upgrade Design Data Limits

- City Maintains 14 sewage pumping stations
- Woolsey Plumbing maintains Chain Sanitary sewage collection system with 23 lift stations
- Design average annual flow-1.5 MGD
- Peak hydraulic flow-4.5 MGD
- BOD-4,860 pounds per day
- Suspended solids-4,180 pounds per day
- Ammonia-311 pounds per day
- Phosphorus-97 pounds per day
- TKN-514 pounds per day

Waupaca WWTF Treatment Efficiency Averages 2022

- Average influent flow- 1.0 MGD
- Influent CBOD- 200 mg/L
- Influent suspended solids- 300 mg/L
- Influent phosphorus- 6 mg/L
- Effluent phosphorus- .33 mg/L
- Effluent ammonia- .2 mg/L
- Effluent CBOD- 1.92 mg/L
- Effluent suspended solids- 1.7 mg/L

Sludge Storage Tank

- Largest tank at WWTF
- Round concrete tank 90 feet diameter x 30 feet tall
- Stores 1.6 million gallons of digested sludge
- Emptied, cleaned, inspected each Spring & Fall after land application of sludge is completed

Sludge Hauling

- WWTF produces 1.8-2.0 million gallons of anaerobic digested sludge annually
- Sludge storage tank is emptied twice annually in Spring & Fall
- Sludge is land applied on DNR approved sites (farm fields) for local farmers as fertilizer
- Cost to WWTF is 3.8 cents/gallon to have land applied
- $68,000-$80,000 cost annually
- Badger State Waste LLC hauls & land applies WWTF sludge
- WWTF staff tries to minimize sludge hauled by decanting up to 500,000 gallons of supernatant from sludge storage tank back to the treatment process annually

Recent Equipment Upgrades

Digester Cover Rehab 2022

- Removed 67 year old 25-foot diameter digester cover to repair, inspect, and recoat exterior
- Digester utilized a floating cover from 1955-1996, then was converted from a floating to fixed roof cover from 1996-2022
- Converted back into a floating digester cover in 2022
- Installed stainless steel piping in digester
- New concrete wall cap and coating system on interior walls of tank
- McMahon & Associates, consulting engineer

Primary and Secondary Clarifier Upgrades 2021

- All steel submerged in water was replaced with stainless steel
- Stainless steel eliminated the need to paint any submerged steel
- Typically need to recoat non-stainless steel every 10-15 years
- Clarifier drives rebuilt
- All wear parts replaced
- Waupaca Machine & Repair fabricated and installed new stainless steel components

Aeration Tank Upgrades 2020

- WWTF staff handled demo and removal of old air diffuser system
- New air diffuser system was installed by WWTF staff in all three aeration tanks
- 420 diffusers per tank
- Each aeration tank is 84 feet long x 24 feet wide x 12.5 feet deep
- Capacity of each aeration tank is 188,496 gallons

Old diffuser system

City of Waupaca WWTF Staff

- Jesse Landre- Plant Superintendent
- Cody Bank- Lead Operator
- Eric Johnson- Operator
- Sam Ziebell- Operator