March 8, 2017 Meeting

The March 8, 2017 Waterloo Technical Society (WTS) meeting was called to order by President Gary Dorhout at 7:15 pm. President Dorhout noted that this was the sixth meeting of the 103rd year of the Society. Gary then noted David Greene, previous WTS President, was absent, celebrating his 92nd birthday.

A total of 29 members and guests attended.

Treasurer's Report. Gary Dorhout reported on behalf of Ken Friend a balance of $970.10. Secretary Stevenson identified a $0.07 arithmetic error from a beginning balance of $986.17 with income of $20 from dues and expenses of $36 for the February Coach and Mentor of FIRST Robotics Team dinners and an outstanding obligation of $250 to UNI Solar Boat team leaving a balance of $970.17, with a donation to UNI Solar Boat Team of $250 still outstanding. Treasurer Friend stated a total of 8 honorary and 55 paid members gave a membership roster of 63 members.

Old Business. The speakers for the remainder of the fiscal year have all been identified. Suggestions are still being accepted from the membership. President Dorhout presented this lineup:

Speakers for the 2016-2017 Meeting Year (Year 103)

- 14 Sep 2016 - Dr. Donald Gurnett from U of I. Voyager Spacecraft
- 12 Oct 2016 – Dr. Tim Nagel – Sign Technology
- 9 Nov 2016 – Mr. Steve Crouse – Facilities Changes at PEC
- 14 Dec 2016 – No Meeting
- 11 Jan 2017 - Brian Keierleber – County Engineer, Independence – Ultra High Performance Concrete used in Bridge Building
- 08 Feb 2017 – FIRST (For Inspiration and Recognition of Science and Technology) Robotics – Team Presentation
- 08 Mar 2017 -- Mr. Erick Mandt– Vice-President of Sales and Marketing at Fluidyne Corporation in Cedar Falls -- “ISAM” (Integrated Surge Anoxic Mix), an innovative wastewater treatment process for municipalities and industries.
- 12 Apr 2017 – UNI Solar Boat Team
- 10 May 2017 – Jeremiah Treloar -- Virtual Painter Training System

Speakers for the 2017-2018 Meeting Year (Year 104)

- 13 Sep 2017 – Cody Wilkinson – John Deere Small Grains, Air Seeding Equipment
- 11 Oct 2017 – Mr. Gomes – Using Ultra-lights for Crop Inspections
- 8 Nov 2017 – Robert Levis -- WCF&N Railroad by Gene Van Gorder, 319-233-4235
- 13 Dec 2017 – No meeting

Officers for 2016-2017

President:	Gary Dorhout
Co-Vice Presidents:	Jerry Mohling & James Stevenson
Treasurer:	Kenneth Friend & Paul Anderson
Dinner Reservations:	Derek Eagles & Steve Lang
Secretary:	James Stevenson
Publicity/Recognition:	Todd Whiting

Auditing:	Bill Mitchell & Jim Garrett
Nominating Committee:	Open
Web Site:	Tim Schoenfelder

New Business. No new business was discussed.

Guest Speakers: Erick Mandt, Vice-President of Sales and Marketing at Fluidyne Corporation in Cedar Falls, spoke on the technology of Fluidyne's Integrated Surge Anoxic Mix (ISAM) sewage treatment process. Fluidyne designs and manufactures biological wastewater treatment systems. Erick has over twenty-four years' experience with Fluidyne in application engineering, project management and product development. Erick graduated from Arizona State University. He is married to Anne and they have three children, Rachel, James and Marcus.

Fluidyne's ISAM™ incorporates Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS) and ammonia (NH_3) and nitrogen (N) removal along with sludge reduction in an integrated system. Raw (crude) sewage enters a covered anaerobic reactor for pretreatment, sludge thickening and sludge destruction. Complex organic solids undergo hydrolysis to simpler soluble organics which pass to the surge anoxic mix (SAM™) tank.

In operation, all influent flow enters the anaerobic basin where influent solids are allowed to settle much like a primary clarifier. Elimination of primary solids in the anaerobic basin allows for much smaller Sequence Batch Reactor (SBR) basins at equivalent Solid Retention Time (SRT) than conventional SBRs. The anaerobic selector also creates soluble carbon as a food source for biological nutrient removal through anaerobic conversion of settleable BOD to soluble BOD. The influent then flows to the SAM™ surge basin, or influent equalization basin. The surge basin provides flow and nutrient equalization to optimize treatment at the full range of flows and loadings.

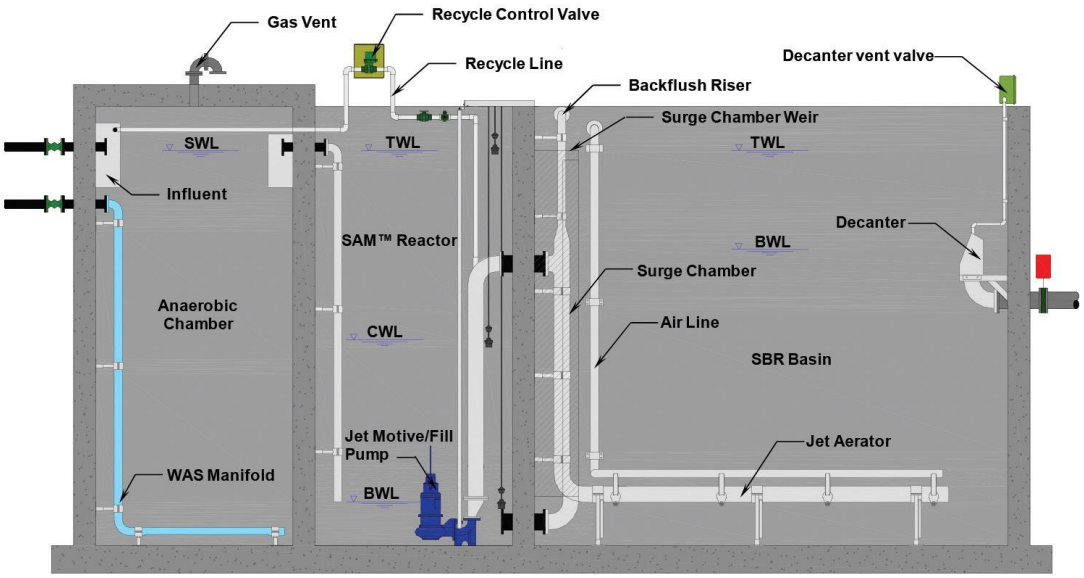


Figure 1. ISAM™ components.

Influent continuously enters the anaerobic chamber where solids settle. Settleable BOD is converted to soluble BOD. BOD is reduced by 30% and solids are reduced by 60%. The influent then flows to the SAM™ reactor. Mixed liquor is maintained in the SAM™ reactor to suppress orders and initiate and accelerate carbon and nitrogen reduction.

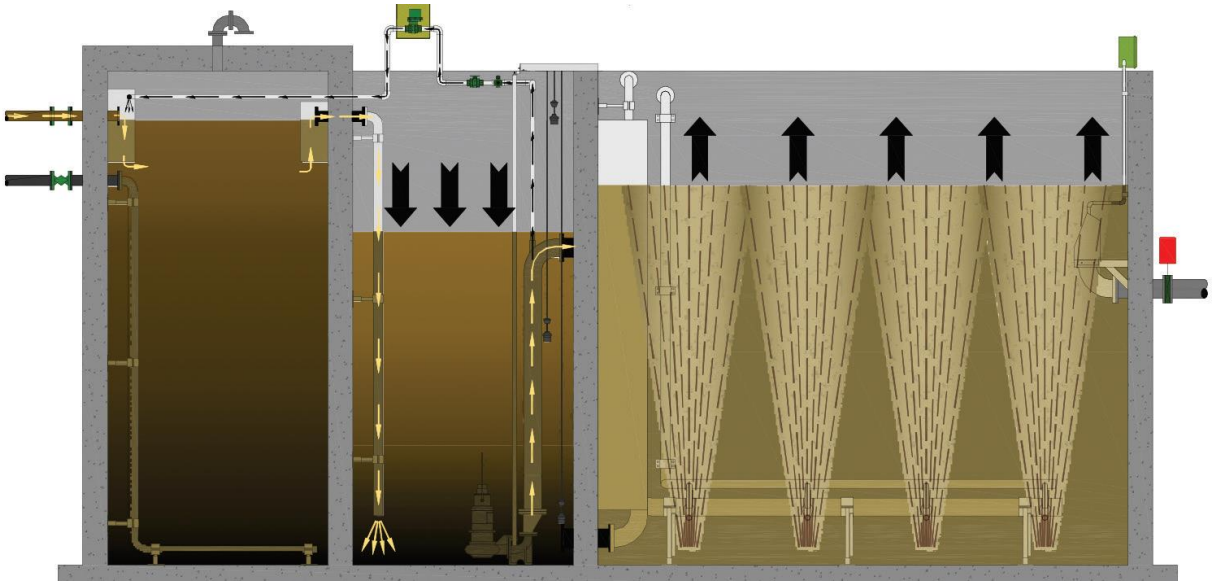


Figure 2. Fill phase.

Fill Phase. When the level in the SAM™ reactor reaches a predetermined "control level" the motive liquid pump is started. The SBR basin is filled and mixed. A percentage of the pumped flow is returned to the anaerobic chamber where biological solid settle. Settled solids in the anaerobic chamber are digested.

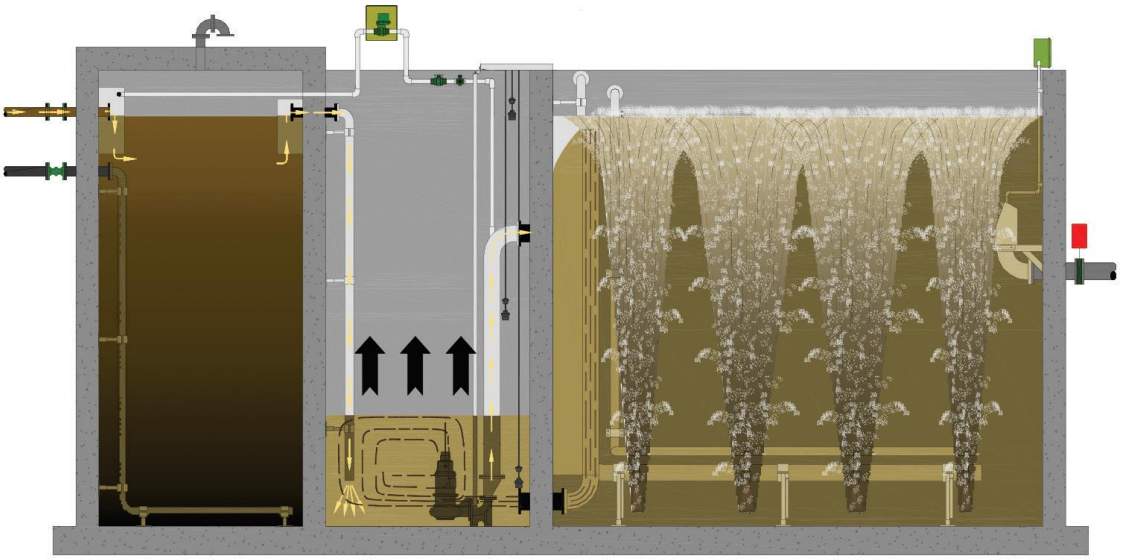


Figure 3. Interact Phase.

Interact Phase. When the level in the SBR reaches Top Water Level (TWL), nitrified mixed liquor overflows the surge chamber weir and is returned to the SAM™ chamber to mix and react with the raw influent. Aeration is cycled on and off to provide the required oxygen. Denitrification is reliable and complete. Scum is also removed from the SBR basin.

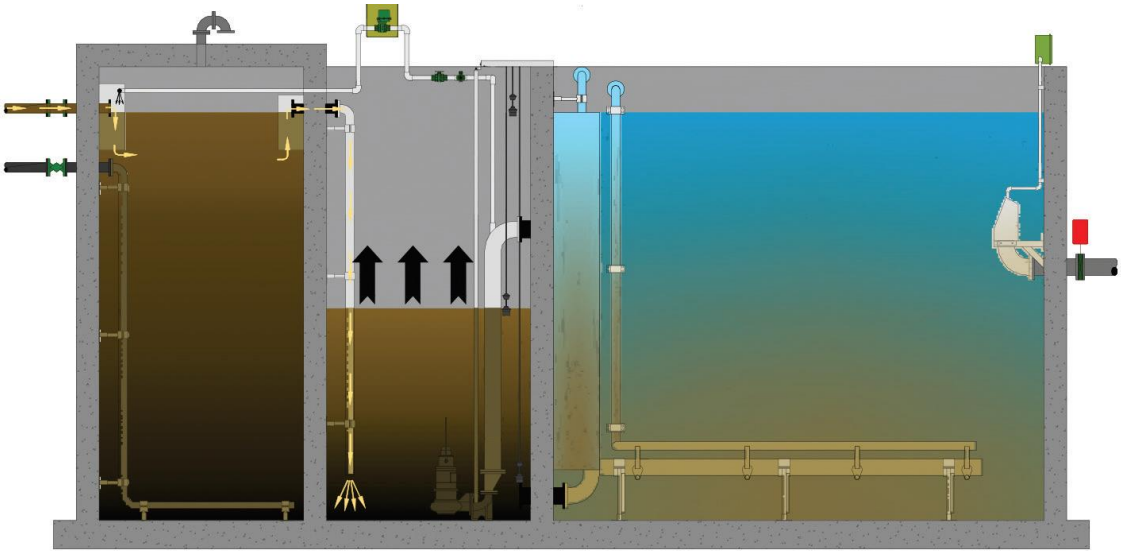


Figure 4. Settle Phase.

Settle Phase. When the level in the SAM™ reactor again reaches "control level" aeration is discontinued and the SBR basin settles under perfect quiescent conditions.

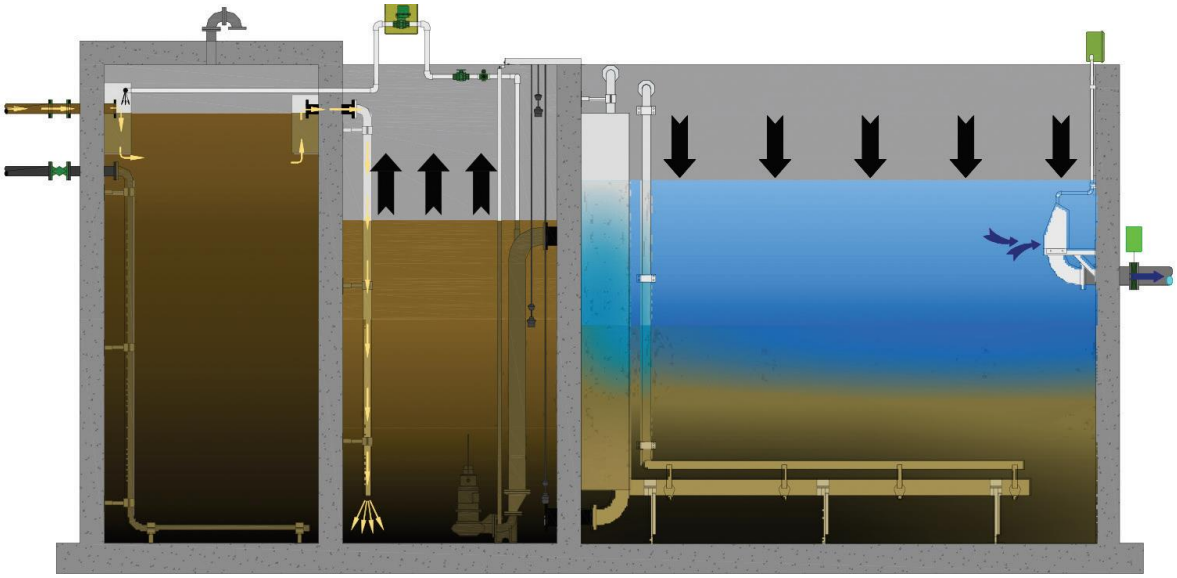


Figure 5. Decant Phase.

Decant Phase. When the settle timer expires, the decant valve is open and treated effluent is withdrawn from the upper portion of the SBR basin by means of a fixed solids excluding decanter.

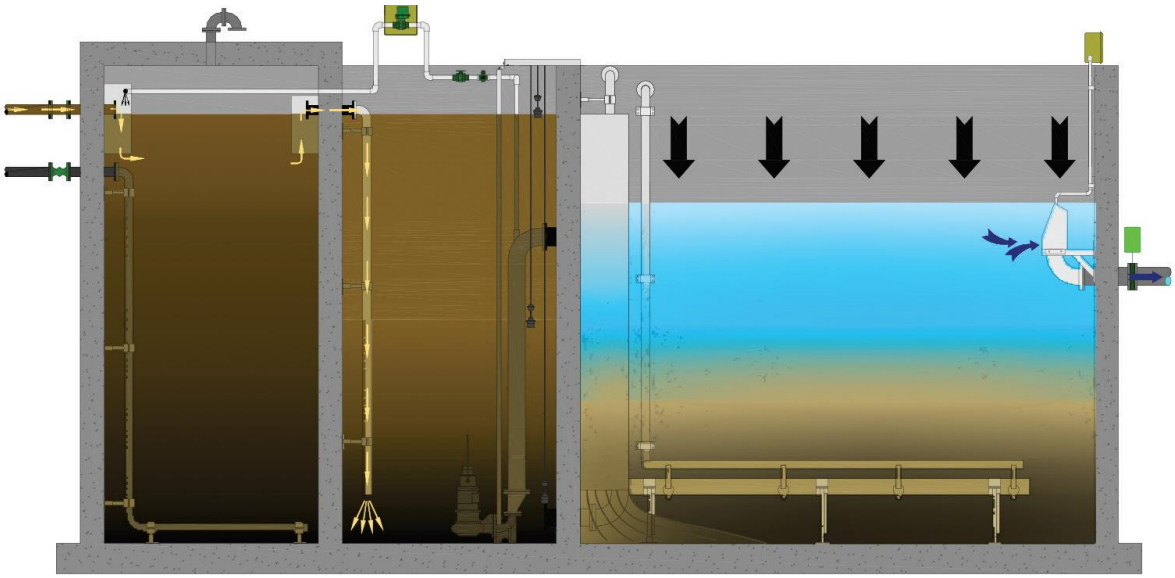


Figure 6. Filled Decant Phase.

Filled Decant Phase. If, during peak flow events, the SAM™ reactor reaches TWL before the decant phase ends, influent flows in a reverse direction through the surge return line and overflows the surge chamber secondary weir and is diffused into the settled sludge at very low velocity as the decant phase continues.



Figure 7. Installed ISAM™.

Advantages:

- Easy to operate and maintain
- Reduced operation and maintenance cost
- SBR basin has no moving parts that require maintenance.
- Power usage is controlled through the Fluidyne control panel
- Covered anaerobic selector chamber for odor control
- More flexible than continuous flow plants
- ISAM performs consistently regardless of influent flow changes
- Ability to handle highly variable flows and loading. Built in flow equalization is provided in the SAM™ reactor to handle peak hourly flows
- Built in sludge reduction system
- Aeration and mixing can automatically be adjusted to optimize power and prohibit filamentous growth
- Process utilizes quiescent settle and decant periods
- Small footprint with no digesters, secondary clarifiers,RAS piping and pumping
- Produces the highest quality effluent (Typical Fluidyne ISAM™ facilities are achieving less than 10 mg/L BOD5 and TSS, less than 1 mg/L NH3-N, less than 7 mg/L total N, and less than 2 mg/L phosphorus)
- Automatic scum skimming prior to effluent discharge provides highest quality effluent
- Easily expandable by adding additional flow trains

The system is sized for a small to medium population size of 5,000-6,000 people (4 to 6 mega-gallons per day).

Next Meeting. Our April 12, 2017 meeting features UNI's Solar Boat Club.

Meeting adjourned at 8:25 pm.

Respectfully submitted,

James R. Stevenson, Vice President and Secretary