APPENDIX B
ZENON DESIGN AND PILOT REPORT

AntiFoam Chemicals

Chemical compounds found within antifoam agents that are not permissible include;
a) presence of organic silicone agents
b) presence of petroleum hydrocarbon (oil)
c) presence of synthetic hydrocarbon
d) presence of petroleum solvent (light paraffins)
e) molecular weight of polymer additive < 50,000
f) molecular weight of polymer additives between 100,000 and 200,000
g) polymers dissolved in or part of a white oil base product

Chemical compounds found within antifoam agents that are desirable include;
a) active ingredient is glycerin with a molecular weight < 5,000
b) active ingredient is polyether polyol with a molecular weight < 5,000

Approved For Use With ZeeWeed® & PermaFlow® Membranes
Nalco, IL08
Nalco, 7465
Air Products, Surfynol DF-110L
Air Products, DF-110D
Pelron Corporation, P-463
Nalco, 76028
Dow, Polyglycol 45-200
Dow, Polyglycol FR-530
Dow, Polyglycol P-1200
Dow, Polyglycol 112-2
Dow, Polyglycol P-1000TB
Dow, Polyglycol P-2000
Dow, Polyglycol P-4000
PPG, MAZU-DF-204

NOT Approved For Use With ZeeWeed® Membranes
O'Brien Products / Zinkan Enterprises, O'B No Foam 24
Surpass Chemical Co., NOFOME AK
Ultra Additives Inc., FOAMTROL WT-2
Ultra Additives Inc., FOAMTROL WT-73
Ultra Additives Inc., FOAMBAN MS-5
Brose Chemical Co., BCC-336
Drew Chemical, DREWPLUS L-674
Betz, Foamtrol AF1660
Betz, Foamtrol AF3550
Betz, Foamtrol AF3551

MAPLE LEAF BRANDON - PILOT REPORT

JANUARY 6th 2003

THE GOAL: To validate the kinetic design as presented in Zenon Proposal 02109A-IND by installing a Membrane Bioreactor (MBR) pilot at the Maple Leaf facility in Brandon, Manitoba (MLB).

THE DESIGN: In order to model the proposed design a pilot plant is a scaled down version of what is to be provided. Two separate scalings are used, one for the biological process and one for the physical process. These two processes are kept separate by controlling the discharge of clean water. At MLB the scale for the biological process is 0.0014 (the tanks used are 0.14% smaller than the tankage proposed.) The physical performance is based on a 3 module membrane and the flow is calculated on the basis of GFD (Gallons of permeate per square foot of membrane area per day.)

THE SCHEDULE: The pilot plant was seeded on the 23rd of October, 2002 and by the time it was shut down for the Christmas holiday had been running for 8 weeks. For the first 5-6 weeks the pilot was building biomass while still treating the full flow and achieving design nitrogen removal. For the next 2 weeks the pilot ran at steady state and design phosphorus removal was achieved.

THE RESULTS:

COD/BOD Removal: During the 8 week pilot study the system ran at or above design loading and throughout this time the permeate COD was consistently <40 mg/L and the permeate BOD was below the detectable limit of 4 mg/L. There was one occurrence of a COD spike and this was on 11/30/02 when the feed COD was greater than 6,000 mg/L for 4 straight days. This created a high COD on only the fourth day and then the system was back to normal on 12/01/02.

Figure 1.0 represents the BOD and COD values received from the lab between the period of October 25th and December 16th.

Nitrogen Removal: The goal of the pilot was to remove nitrogen to a level of <10 mg/L total nitrogen in the permeate. Once system acclimatisation was reached the system regularly produced total nitrogen in the permeate less than 10 mg/L. There was one spike in permeate nitrogen due to an increased load on 11/30/02. On this day the feed TKN was 619 mg/L (almost double design load) and for two days the permeate nitrogen was high.

Figure 2.0 represents the total nitrogen in and out of the Zenon system.

Figure 1.0 - BOD and COD Removal

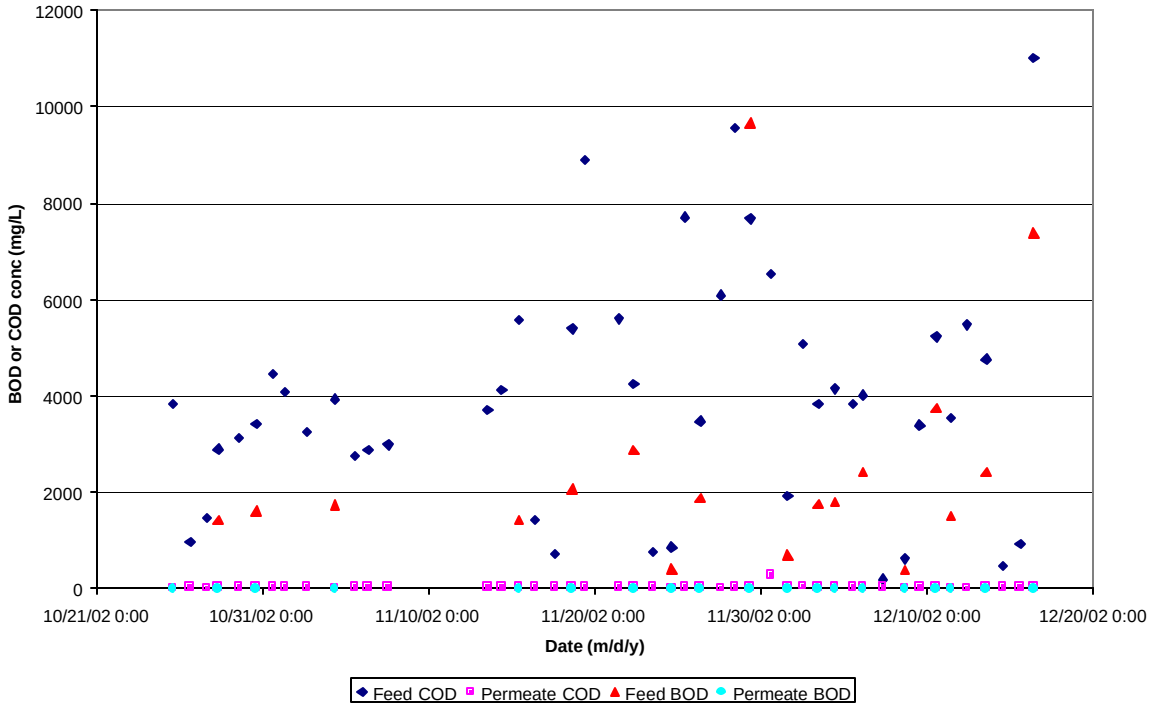
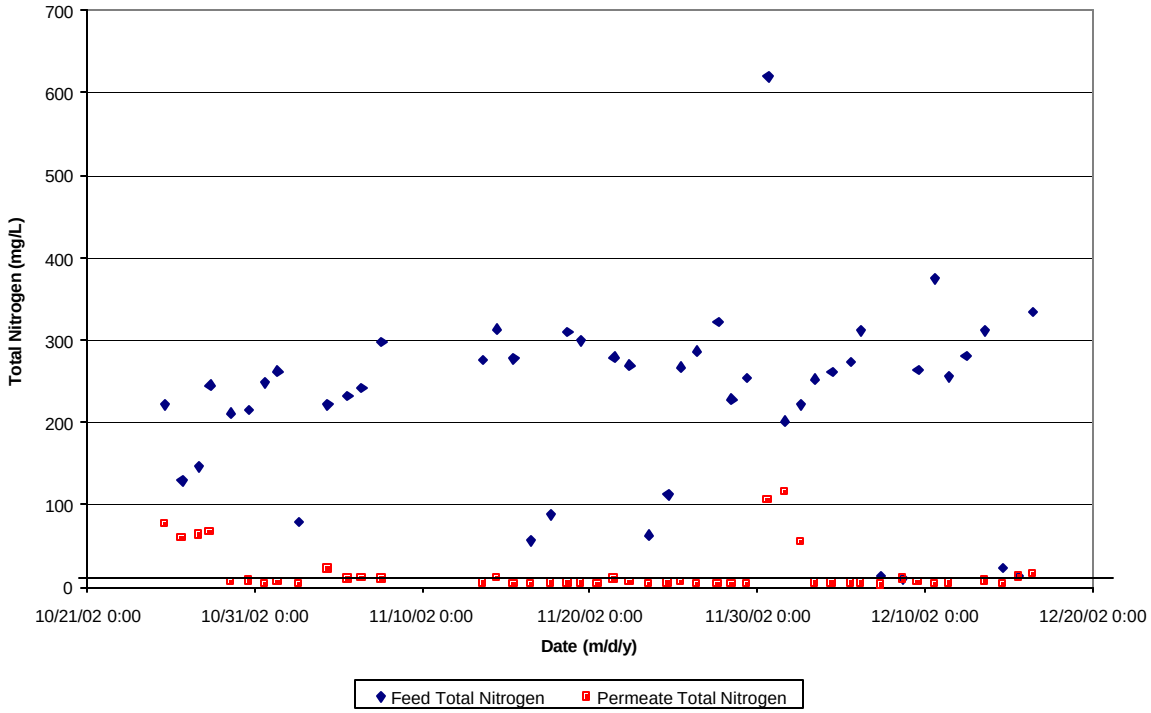
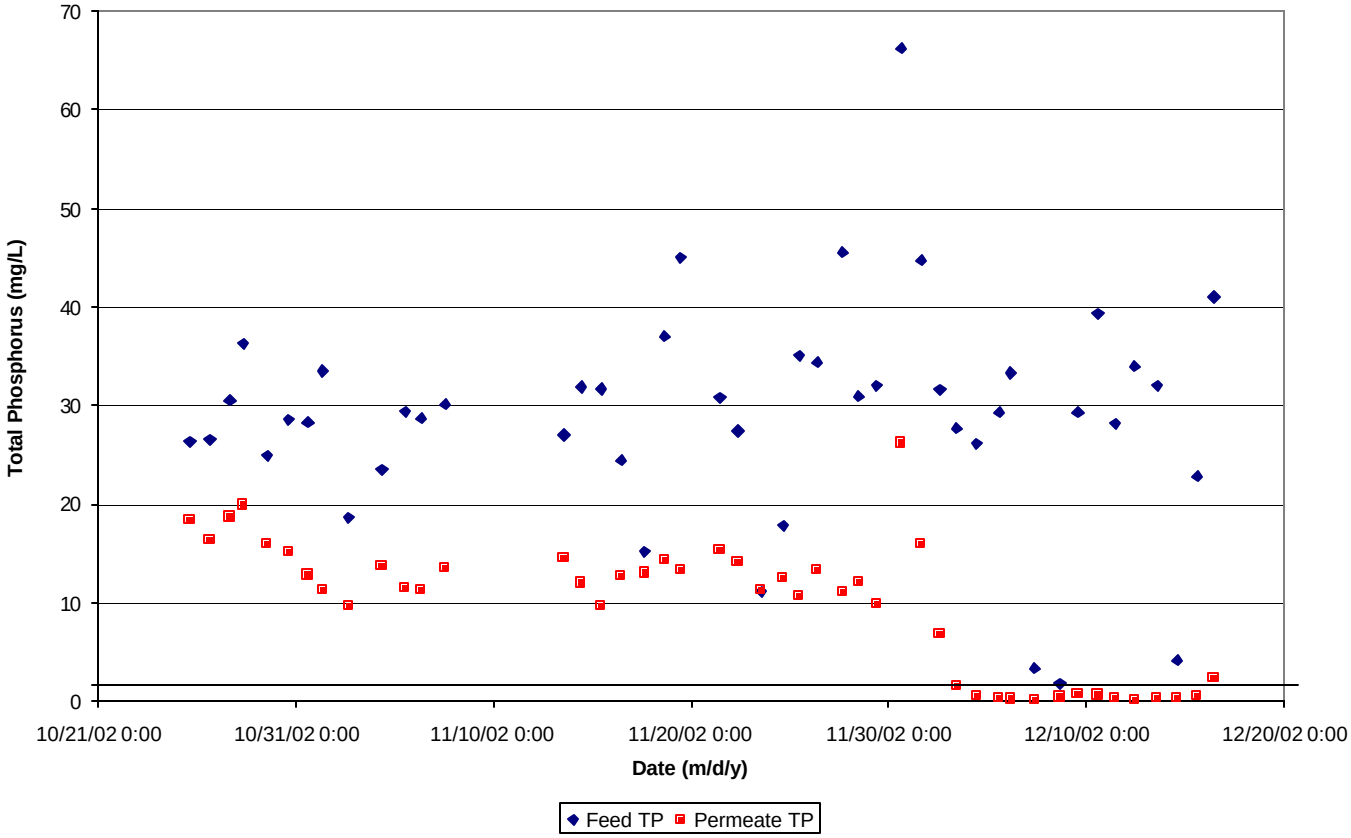


Figure 2.0 - Nitrogen Summary



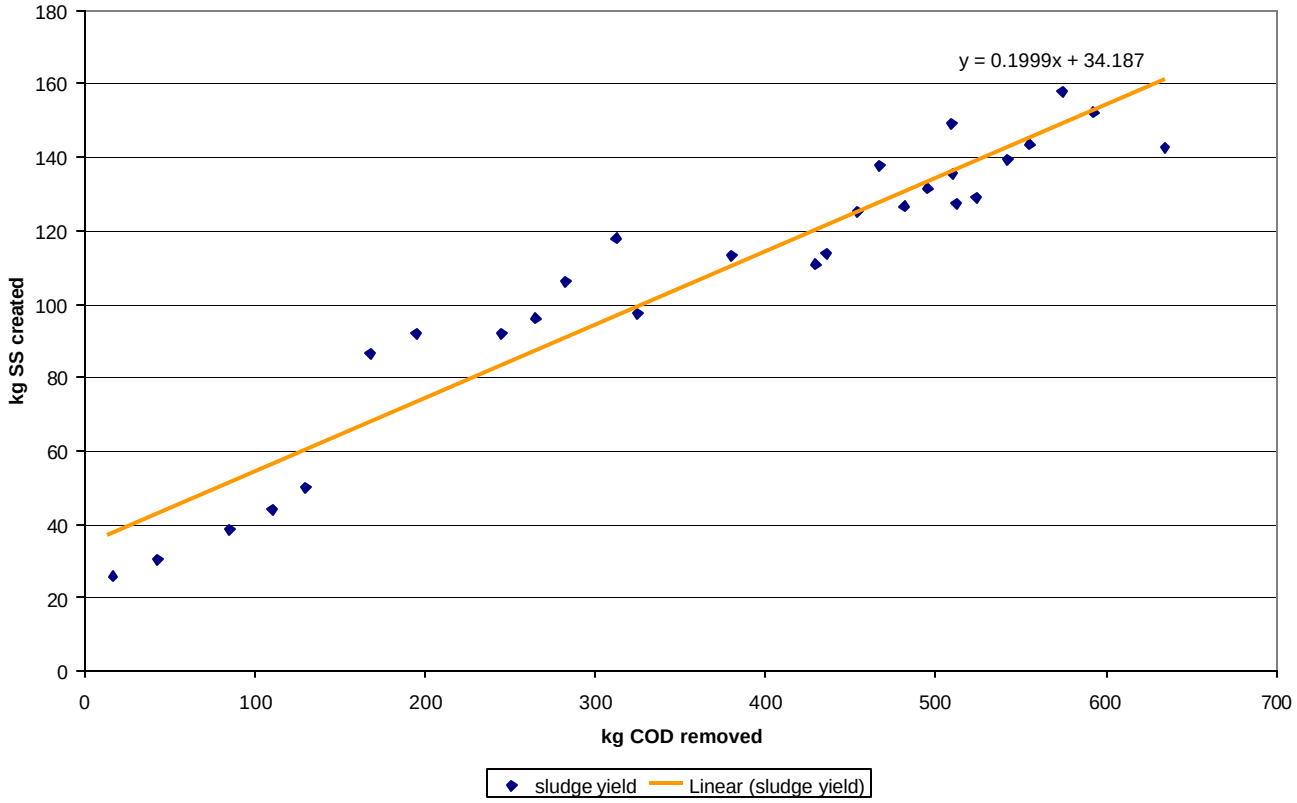
Phosphorus Removal: Once reaching steady state on 12/01/02 Ferric Chloride ($FeCl_3$) addition was initiated for the purpose of removing phosphorus (TP). After slowly increasing the dosing rate the established dosage rate to achieve permeate TP <1 was 100 mg/L (as $FeCl_3$). With the addition of $FeCl_3$ the permeate phosphorus was consistently less than the 1 mg/L as specified in the pilot objectives. Figure 3.0 (below) presents the data as collected.

Figure 3.0 - Phosphorus Summary



Sludge Yield: Over the eight week study the pilot system reached steady state and as a result the sludge yield was predicted. By plotting the Kilograms (kg) of solids generated per kg of COD removed the sludge yield is first determined. In Figure 4.0 (below) this relationship is displayed. The slope of the trendline (0.1999 kg SS/kg COD) is equal to the sludge yield of the system.

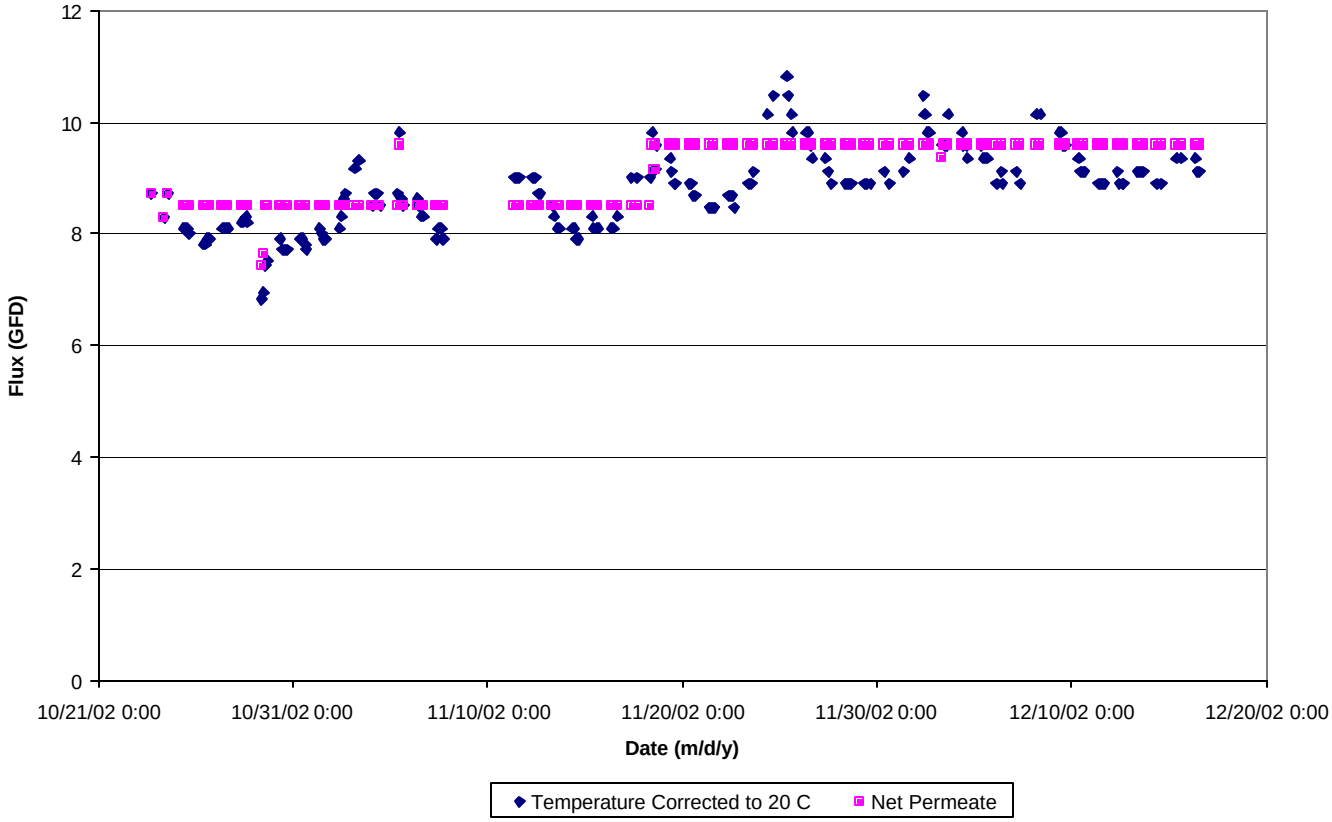
Figure 4.0 - Sludge Yield



To determine the Solid Retention Time (SRT) and thus the sludge wasting rate for the full scale system the sludge yield (determined above) is multiplied by a K value (0.13 kg COD/kg TSS) taken from the design COD removal and MLSS. After these calculations it has been determined that the SRT of the system is 40 days.

Membrane Performance: Having recently established that the design basis for the full scale system would be around 2,900 m^3/day the design flux that was to be verified is 8.7 Gallons per square ft per day (GFD). Not knowing the design basis throughout the pilot study meant that we ran the membrane at two different fluxes to verify the operation. As can be seen in Figure 5.0 (below) the initial flux was set at 8.5 GFD and this was later increased to 9.6 GFD. Despite the flux achieved being higher than the design flux, at no point in the pilot study did the membrane pressure increase above 1.3 psi.

Figure 5.0 - Membrane Flux



1. PROCESS DESIGN

1.1 Design Criteria

This waste water treatment plant is designed in accordance with information made available to date. The influent and effluent targets of this plant are listed below and have been used in the preparation of the design encompassed in this document.

Characterization Data

Parameter	Unit	Influent		Effluent	
		Average	Peak	Average	Peak
Flow	m^3/day	5,300	5,300	5,008[a]	5,008[a]
COD	mg/L	2,735	2,735	<50	<50
CBOD	mg/L	1,417	1,417	<10	<10
TSS	mg/L	873	873	<3	<3
Total Nitrogen	mg/L	310	310	<10	<10
TP	mg/L	41	41	<1	<1

a = balance of flow is in sludge wasted

The accuracy of ZENON's offer is based strictly on the available information as listed above. It is the responsibility of the client to ensure the accuracy of the information listed above, and have the assurance that these parameter values truly represent the design requirements of this project.

The proposed water treatment plant has been designed in accordance with information made available to date.

1.2 Process Design Considerations

The ZeeWeed® Process Description:

The ZeeWeed® membrane is a patented immersed membrane technology. The membrane process operates under a partial vacuum rather than pressure. These are two of its primary distinctions between the ZeeWeed® membrane and alternative membrane configurations.

The ZeeWeed® membrane is manufactured by ZENON with an OCP chemistry. This chemistry produces a membrane with a pore size of 0.036 µm. ZeeWeed® is a unique outside-in hollow-fibre module that operates under low vacuum as opposed to high pressure. This means that the overall energy costs are lower then traditional pressure-driven systems. In addition, the low trans-membrane pressure (TMP) means that the rate of fouling is lower than pressure driven processes. Since it is an outside-in hollow fibre, there is no risk of plugging of the flow channels with suspended solids.

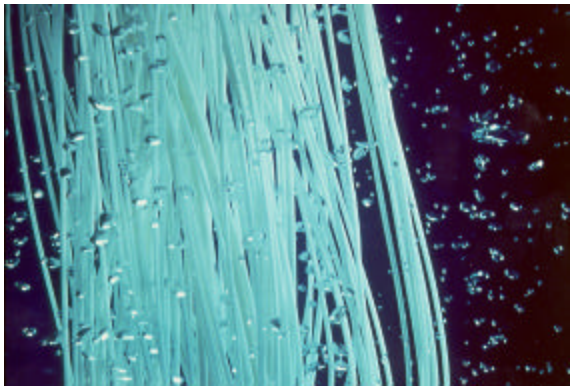


Figure 1 Photo of ZeeWeed Hollow Fibre Membrane Bundle

The distinctive feature of the ZeeWeed® membrane is the fact that it is immersed within the fluid that it is treating. This translates into very small footprints for the systems as well as important opportunities to allow retrofits of existing plants by installing the membranes in existing clarifiers, bioreactors and other tanks. The membrane is designed for chlorine oxidant tolerance up to 2000 ppm, which means that it can be utilized in disinfection systems, or easily cleaned with powerful oxidants.

The ZeeWeed® membrane utilizes a reinforced fibre backing upon which the membrane is cast. With an outer and inner diameter of 1.9 and 0.9 mm respectively, the fibre is extremely strong and very resistant to breakage.

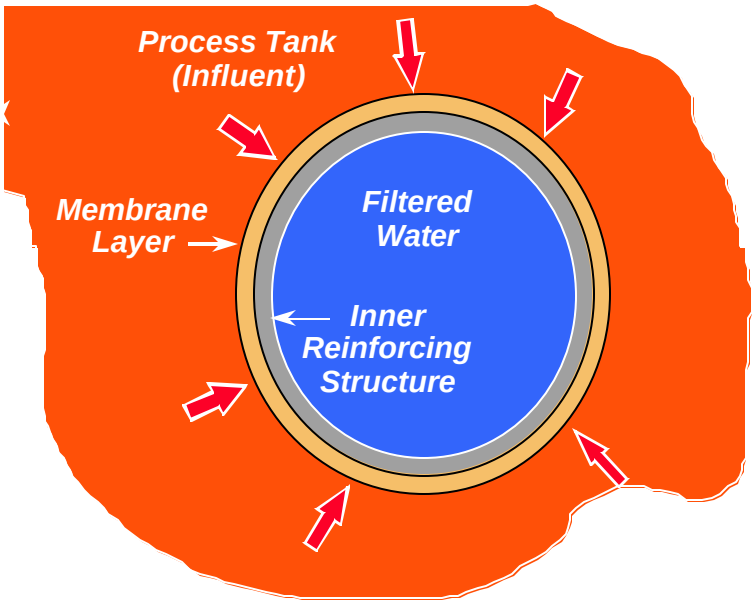


Figure 2 Cross Section of ZeeWeed® Fibre

The ZeeWeed® membrane and chemistry is packaged in a ZENON engineered module. The module provides the advantage of spiral membranes by packing a large surface area in a relatively small volume. Each ZeeWeed® membrane module has either 220 ft^2 (~20 m^2) or 650 ft^2 (~ 60 m^2) of surface area available. Each module is integrated into a cassette that encompasses either twenty-two (22) or eight (8) ZeeWeed® membrane modules respectively which are in-turn connected to a main permeate header pipe in trains of up to fifteen (15) ZeeWeed® cassettes in series. This highly efficient and well-designed system means the maximum surface area is installed in the minimum volume thereby reducing process tank sizes and overall plant footprint. In addition, this modular configuration provides unlimited versatility in sizing plants, and expanding existing plants now or in the future.

Figure 3 ZeeWeed® Membrane Module

Figure 4 ZeeWeed® Membrane Module Cassette

The ZeeWeed® membrane utilizes continual computer-controlled in-situ cleaning that ensures the highest possible flux and the greatest time between cleanings.

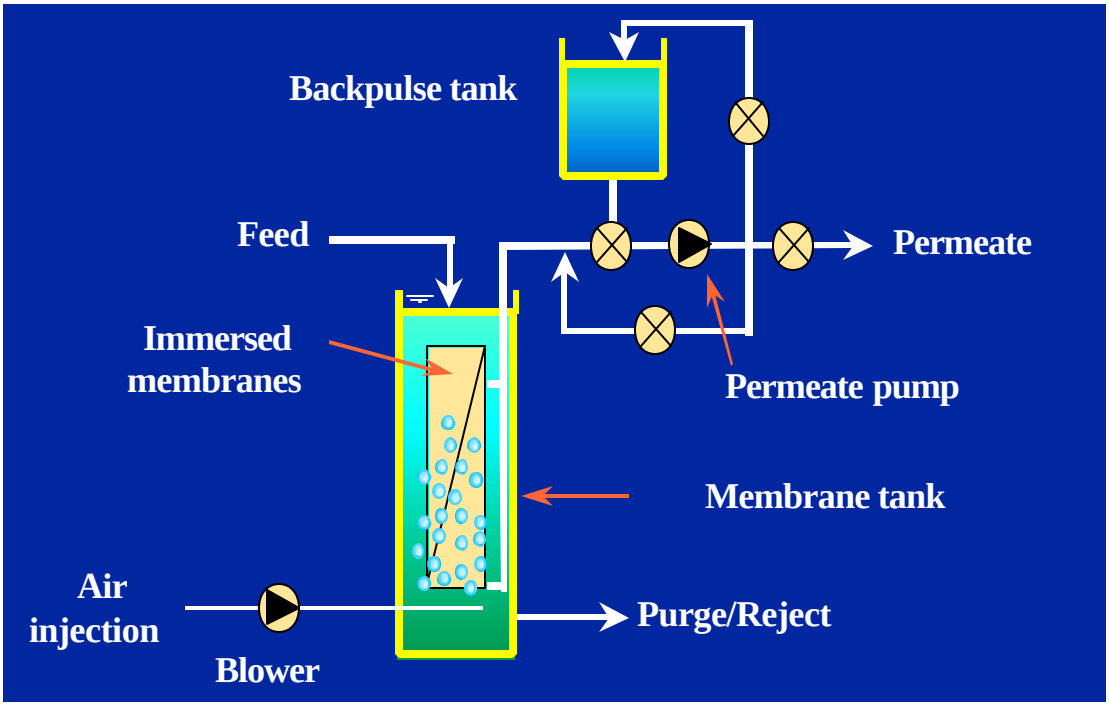


Figure 5 ZeeWeed® Process Flow Diagram

The ZeeWeed® membrane is continuously air scoured thereby providing a continuous mechanical cleaning action. This air scour has the effect of removing foulants and particles that deposit on the outside of the fibre thereby allowing operation at an overall high flux rate and/or a lower TMP. In addition, the membrane air scour greatly assists with minimization of any concentration polarization effects which are well recognized as a significant mechanism of fouling of membranes and contributes to poor membrane permeate quality.

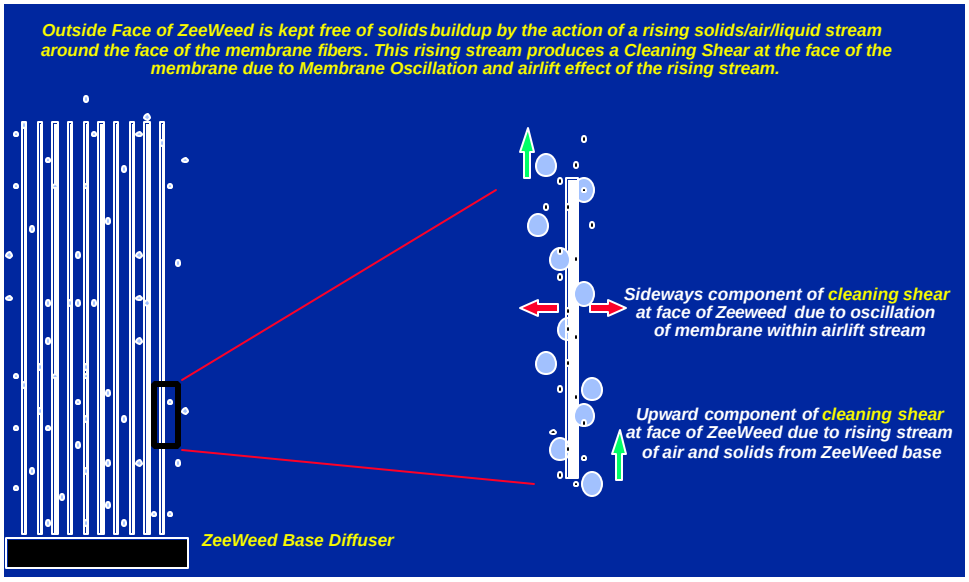


Figure 6 ZeeWeed® Air Scour

The ZeeWeed® membrane system includes an automatic backpulsing system that takes treated effluent (permeate), and reverses the flow from outside-in to inside-out. This periodic and brief flow reversal ensures that the surface and pores of the membrane are kept clean. This in-turn greatly reduces fouling and acts to minimize concentration polarization effects. The backpulse frequency and duration is factory set, but field adjustable to match specific site conditions.

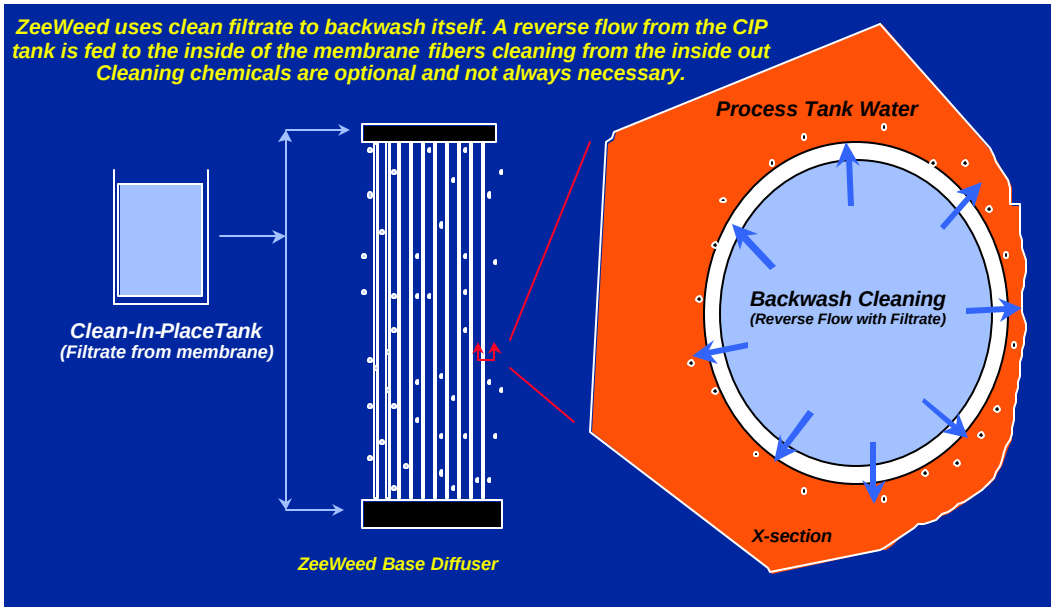


Figure 7 ZeeWeed® Backpulse

Summary of Benefits from ZeeWeed® Membranes

The ZeeWeed® membrane provides many benefits as described above. These benefits are summarized below.

- Outside-in hollow fibre of very durable construction provides reliability and long membrane life with reduced replacement frequency and cost.
- Operates at very low Trans Membrane Pressure (TMP) saving horsepower and operating cost.
- Immersed directly in process fluid, reducing plant floorspace requirements and utilizing existing tankage.
- Small footprint required for ancillary operations
- Easily expandable since the ZeeWeed® membranes are modular
- Allows easy retrofits of existing facilities
- Tolerates up to 2000 ppm of hypochlorite
- Air scour ensures reliable operation
- Automated Backpulsing ensure higher overall permeation rates at lower pressures

2. THE ZENOGEM® KINETIC DESIGN

ZENON's design criteria and process have been identified above. The kinetic design of the ZenoGem® process is as listed below. The following parameters should be used as a basis of comparison between ZENON's ZenoGem® process and any other proposed biological process.

Feed Flow	m^3/day	5,300	(1,400,000 US gpd)
COD	mg/L	2,735	
CBOD	mg/L	1,417	
TSS	mg/L	873	
Volatile Suspended Solids	%	75	
Non-degradable VSS	%	5	
Feed Phosphorus (as P)	mg/L	41	
Feed TKN (as N)	mg/L	310	
Total Alkalinity (as CaCO3)	mg/L	500	
Feed pH	S.U.	7.1	
Feed Temperature	°C	<30	
Max Ambient Temperature	°C	40	
Min Ambient Temperature	°C	-50	
Operating Cycle	days/yr	365	
Elevation above sea level	ft	1,340	
Aerobic Reactor HRT	hrs	65	
COD loading	kg/m3-reactor/day	1.0	

TKN (as N) loading	kg/m3-reactor/day	0.115
MLSS	mg/L	13,000
MLVSS	mg/L	9,000
F:M	g-COD/g-VSS/d	0.1128
Sludge Retention (SRT)	days	47
Net Sludge Yield	g-SS/g-COD	0.3
Sludge Waste Rate	m^3/d at 1.5% SS	292

3. ZENON SCOPE OF SUPPLY

ZENON's proposed system design is based on the influent design criteria and effluent design requirements as listed in the chart presented earlier in this document.

Wherever possible, ZENON supplies equipment on Engineered and preassembled carbon steel skids and frames to simplify the placement of these components and the final installation requirements.

If the following information and delineation of ZENON's scope of supply is not clear, please do not hesitate to contact ZENON for clarification.

3.1 General

In accordance with the design criteria of this project and ZENON's required scope of supply, the following list is brief summary of the major component scope of supply by ZENON. Additional details and specifications can be found in the following subsection or within ZENON's standard "Electrical Specifications" and "Mechanical Specification" documents that are available upon request.

ZeeWeed® Equipment Scope

Two (2)	ZenoGem® bioreactor tanks,
Two (2)	Bioreactor foam control systems,
One (1)	Bioreactor aeration system,
Two (2)	Pre-Denitrification tanks (w/ mixer),
One (1)	Pre-Denitrification recirculation system,
One (1)	Post-Denitrification tank (w/ mixer),
Four (4)	ZeeWeed® membrane and tank systems,
Two (2)	ZeeWeed® ZenoBox® aeration systems,
Four (4)	ZeeWeed® recirculation pump systems,
Four (4)	ZeeWeed® permeate/backpulse pump systems,
One (1)	Membrane backpulse tank,
One (1)	Vacuum Pump system,
One (1)	Low capacity hypochlorite addition system,
One (1)	High capacity hypochlorite addition system,
One (1)	High capacity organic acid addition system,
One (1)	Bioreactor pH control system,
One (1)	Ferric Chloride addition system,
One (1)	Provisional Carbon Source addition system,
One (1)	Lot Instrumentation/Controls (including VFD's and MCC),
One (1)	Central AB PLC and operator interface panel

3.2 ZeeWeed® Equipment Specifications

Following are detailed specifications for those components as listed in the sub-section above. Additional specification details are found within ZENON's standard "Electrical Specifications" and "Mechanical Specifications" and are available upon request.

a) ZenoGem® Bioreactor Tanks

Quantity	Two (2)
Volume	1,600,000 US Gallons
Diameter	92 Feet
Height	32 Feet
Construction	Epoxy Coated Carbon Steel, Bolted Design, Closed Top
Manufacturer	Peabody, TekTank, Columbia Steel Tank or ZENON approved equal
Notes:	Unit is complete with overflow, level transmitter, drain valve, inlet and outlet flange connectors. Concrete foundation included. Erection and installation services are included.

b) Bioreactor Foam Control Systems

Quantity	2
Type	Pigtail, 90° cone spray pattern
Construction	PVC
Piping	PVC, SCH80
Configuration	Each sprayer is complete with one 1" manual isolating ball valve. Main supply pipe is complete with manual isolating butterfly valve and one flow divert butterfly valve
Notes:	Independent spray nozzles, isolating valves and main spray line isolating valve are supplied loose for field installation

c) Bioreactor Aeration Systems

Quantity	Five (5)	(1 standby)
Capacity	2,700	scfm each @ 26 feet
Type	Positive Displacement	
Manufacturer	Aerzen, Roots, or Zenon approved equal	

Aeration Diffuser System

Quantity	Two (2)
Type	Fine Bubble Diffuser
Construction	Stainless Steel / PVC
Manufacturer	Wilfley Weber, Sanitaire or ZENON approved equal

d) Pre-Denitrification Tanks

Quantity	Two (2)
Volume	282,000 US Gallons
Diameter	39 Feet
Height	32 Feet
Construction	Epoxy Coated Carbon Steel, Bolted Design, Closed Top
Manufacturer	Peabody, TekTank, Columbia Steel Tank or ZENON approved equal
Notes:	Unit is complete with overflow, mixer, level transmitter, drain valve, inlet and outlet flange connectors. Concrete foundation included. Erection and installation services are included.

e) Pre-Denitrification Recirculation System

Quantity	Three (3)	(One Standby)
Flow Rate	4,875 USgpm	@ 20 feet
Type	ANSI Centrifugal	
Construction	316 SS wetted parts	
Manufacturer	Goulds, Durco or ZENON approved equal	
Equipment Skid	Epoxy coated carbon steel construction	
Notes:	Unit is skid mounted and preassembled, with local junction box. Terminal pipe is 150# flanged. Pumps are complete with check valves, manual isolating valves, inlet strainer, flow meter and pressure indicator.	

f) Post-Denitrification Tank

Quantity	One (1)
Volume	754,000 US Gallons
Diameter	73 Feet
Height	24 Feet
Construction	Epoxy Coated Carbon Steel, Bolted Design, Closed Top
Manufacturer	Peabody, TekTank, Columbia Steel Tank or ZENON approved equal
Notes:	Unit is complete with overflow, mixer, level transmitter, drain valve, inlet and outlet flange connectors. Concrete foundation included. Erection and installation services are included.

g) ZeeWeed® Membrane and Tank Systems

# Membrane Tanks	Four (4)
Membrane Type	ZW-500c, hollow fiber
Model	ZeeWeed®
# of Membranes	616 (total)
# of Cassettes	28 (total, 7 per tank)
# membranes/cass.	22
Tank Length	30 Feet
Tank Height	10 Feet
Tank Width	9 Feet
Tank Construction	epoxy coated carbon steel
Notes:	ZenoBox® is a completely preassembled system, with local junction box. Permeate and air manifolds are SCH10 304SS, subheaders are SCH80 PVC and mounted directly on the tank. Terminal pipe are 150# flanged. Membranes are installed within the tank at site. All cassettes are complete with manual isolating valves on permeate and air lines. Instruments include pressure/vacuum transmitter, and effluent flow transmitter.

h) ZeeWeed® ZenoBox® Aeration Systems

Quantity	Three (3) (1 standby)
Capacity	1400 scfm each @ 4.5 psig
Type	Rotary Lobe
Manufacturer	Aerzen, Roots or ZENON approved equal

i) ZeeWeed® Recirculation Pump Systems

Quantity	Four (4)
Pump Size	1,220 USgpm each @ 30 ft
Pump Type	ANSI Centrifugal, Goulds, Durco or Equal
Pump Construction	316 SS Wetted Parts
Process Piping	SCH 80 PVC
Equipment Skid	Epoxy coated carbon steel construction
Notes:	Unit is skid mounted and preassembled, with local junction box. Terminal pipe is 150# flanged. Pumps are complete with check valves, strainers, pressure indicators and flow transmitters.

j) ZeeWeed® Permeate/Backpulse Pump Systems

Quantity	Four (4)
Pump Size	244 USgpm each @ 35 ft Sized for max backpulse flow @ 366 US gpm
Pump Type	ANSI Centrifugal, Goulds, Durco or Equal
Pump Speed	1800 rpm
Pump Construction	316 SS Wetted Parts
Process Piping	SCH 80 PVC / 306 SS Main Headers
Equipment Skid	Epoxy coated carbon steel construction
Notes:	Unit is skid mounted and preassembled, with local junction box. Terminal pipe is 150# flanged. Pumps are complete with check valves, automatic isolating valves, strainer, with flow transmitters and one turbidity transmitter.

k) Membrane Backpulse Tank

Quantity	One (1)
Volume	7.6 m^3
Diameter	1.6 m
Height	4.0 m
Construction	High density Polyethylene, flat bottom, closed top
Manufacturer	Acco-Assmann or ZENON approved equal

l) Vacuum Pump System

Quantity	Two (2) (1 standby)
Pump Size	9.5 acfm each @ 10 in Hg
Type	Single stage liquid ring
Material	Stainless Steel casing, Stainless Steel impeller
Process Piping	316 SS
Equipment Skid	Epoxy coated carbon steel construction
Notes:	Unit is mounted and preassembled on the permeate pump skid, with local junction box. Terminal pipe is 150# flanged. Pumps are complete with check valves, manual isolating valves, and pressure indicators.

m) Low Capacity Hypochlorite Addition System

Quantity	One (1)
Capacity	0.01 m^3/d
Manufacturer	Prominent, LMI or ZENON approved equal
Type	Gala Series
Pumping	Positive Displacement
Power Supply	110/1/60
Wetted Ends	Polypropylene (PVC pipe connections)
Diaphragm	PTFE
Balls	Ceramic
Chemical Storage Tank	
Volume	0.4 m^3 or Totes
Controller	Integral with metering pump
Construction	High density Polyethylene, flat bottom, closed top
Manufacturer	Aco-Assmann or ZENON approved equal
Notes:	The chemical tank is completed with suction line check/foot valve assembly, and low-level switch.

n) High Capacity Hypochlorite Addition System

Quantity	One (1)
Capacity	0.05 m^3/d
Manufacturer	Prominent, LMI or ZENON approved equal
Pumping	Positive Displacement or Air Diaphragm
Power Supply	110/1/60
Wetted Ends	Polypropylene (PVC pipe connections)
Diaphragm	PTFE
Balls	Ceramic
Chemical Storage Tank	
Volume	0.4 m^3 or Totes
Controller	Integral with metering pump
Construction	High density Polyethylene, flat bottom, closed top
Manufacturer	Aco-Assmann or ZENON approved equal
Notes:	The chemical tank is completed with suction line check/foot valve assembly, and low-level switch.

o) High Capacity Organic Acid Addition System

Quantity	One (1)
Capacity	0.05 m^3/d
Manufacturer	Prominent, LMI or ZENON approved equal
Pumping	Positive Displacement or Air Diaphragm
Power Supply	110/1/60
Wetted Ends	Polypropylene (PVC pipe connections)
Diaphragm	PTFE
Balls	Ceramic
Chemical Storage Tank	
Volume	0.4 m^3 or Totes
Controller	Integral with metering pump
Construction	High density Polyethylene, flat bottom, closed top
Manufacturer	Aco-Assmann or ZENON approved equal
Notes:	The chemical tank is completed with suction line check/foot valve assembly, and low-level switch.

p) Bioreactor pH Control System

Quantity	Two (2) (both caustic or lime, one standby)
Capacity	tbd
Manufacturer	Prominent, LMI or ZENON approved equal
Type	Gala Series
Pumping	Positive Displacement
Power Supply	110/1/60
Wetted Ends	Polypropylene (PVC pipe connections)
Diaphragm	PTFE
Balls	Ceramic
Chemical Storage Tank	
Volume	0.4 m^3 or Totes
Controller	Integral with metering pump
Construction	High density Polyethylene, flat bottom, closed top
Manufacturer	Aco-Assmann or ZENON approved equal
Notes:	The chemical tank is completed with suction line check/foot valve assembly, and low-level switch.

q) Ferric Chloride Addition System

Quantity	Two (2) (one standby)
Capacity	1.6 m^3/d
Manufacturer	Prominent, LMI or ZENON approved equal
Type	Gala Series
Pumping	Positive Displacement
Power Supply	110/1/60
Wetted Ends	Polypropylene (PVC pipe connections)
Diaphragm	PTFE
Balls	Ceramic
Chemical Storage Tank	
Volume	7.6 m^3
Controller	Integral with metering pump
Construction	High density Polyethylene, flat bottom, closed top
Manufacturer	Aco-Assmann or ZENON approved equal
Notes:	The chemical tank is completed with suction line check/foot valve assembly, and low-level switch.

r) Provisional Carbon Source Addition System

Quantity	Two (2) (one standby)
Capacity	tbd
Manufacturer	Prominent, LMI or ZENON approved equal
Type	Gala Series
Pumping	Positive Displacement
Power Supply	110/1/60
Diaphragm	PTFE

s) Instrumentation

Level Transmitters	E&H, ABB, or ZENON approved equal
Flow Transmitters	E&H, ABB, or ZENON approved equal
Pressure Transmitters	E&H, ABB, or ZENON approved equal
DO Transmitters	GLI or ZENON approved equal
pH Transmitters	GLI or ZENON approved equal
Pressure Gauges	Ashcroft, WIKA or ZENON approved equal
Pressure Switches	United Electric or ZENON approved equal
Level Switches	Flygt, or ZENON approved equal
Turbidimeters	Hach, or ZENON approved equal

t) Controls

The control system can be designed to interface with the Central Control Center. The ZENON System will be provided with a stand alone PLC-Based Control Panel.

Enclosure	Nema 12, Painted Carbon Steel
PLC Type	Allen Bradley SLC 505 with ethernet
Operator Interface	Allen Bradley PV1000
Approvals	CSA Electrical Control Panels
Designation	Equipment is designed for non-classified areas
Notes:	1. A motor control center is included. VFDs, for the process pumps and two bioreactor blowers are also included. All programming and electrical design and configuration are in accordance with ZENON's electrical and programming specifications. Copies of these documents are available at your request. 2. Client to provide a dedicated analog phone line for modem use. 3. Client to provide 120V control voltage to ZENON control panel.