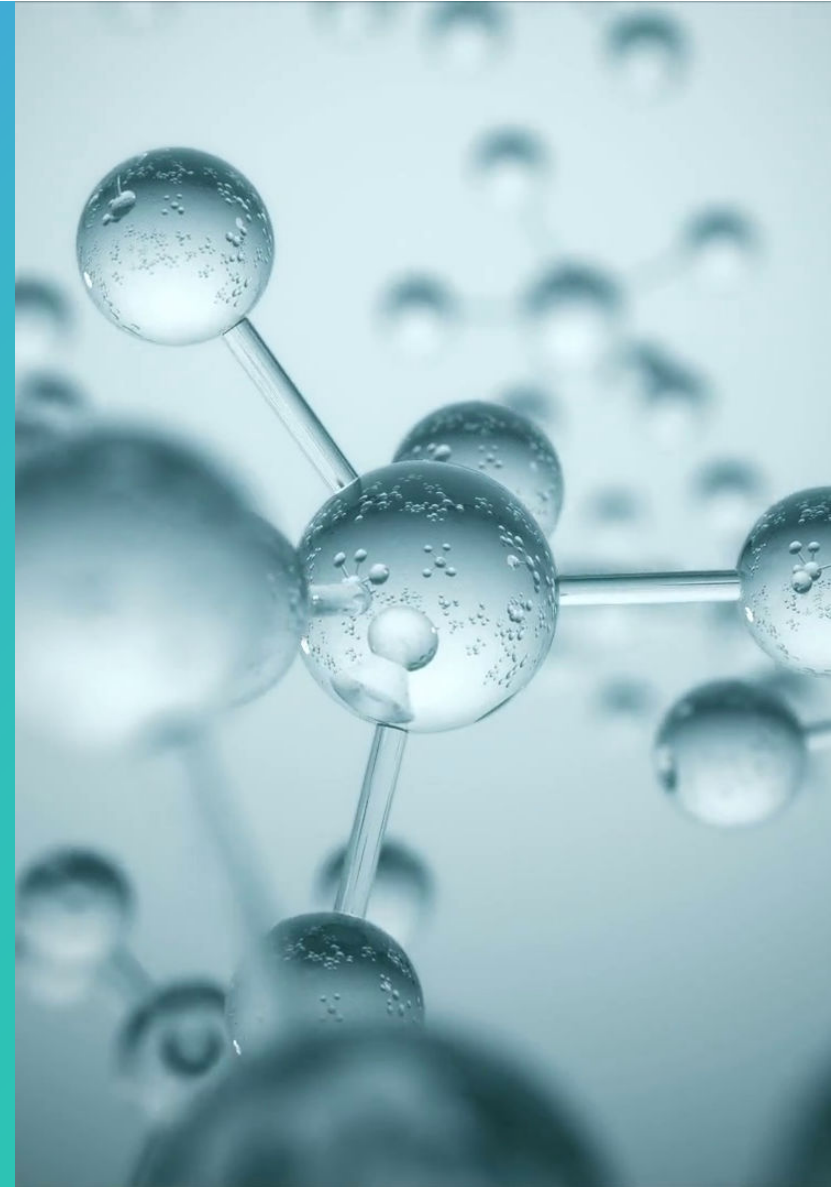


# ACT WASTEWATER TREATMENT SYSTEMS

Presents... Rescuing, Recovering and Reusing  
Our Water Resources



Rescuing, Recovering & Reusing Our Water Resources



## THE SOLUTION TO YOUR WASTEWATER NEEDS:



**RESCUE**



**RECYCLE**



**REUSE**





## WHO ARE WE?

The Bio-Pure treatment process was developed in 1969. Bio-Pure (ACT) has been manufacturing wastewater treatment systems ranging from 10,000 to 1,000,000s of gpd for small communities, golf courses, and industrial/commercial complexes.



## GLOBAL ISSUES – CONSIDER FOR A MOMENT



Eighty (80%) percent of the earth's surface is covered in water; of that amount 1% is potable in its natural state.



There is no such thing as new water; every drop on this planet has been recycled over and over for eons.



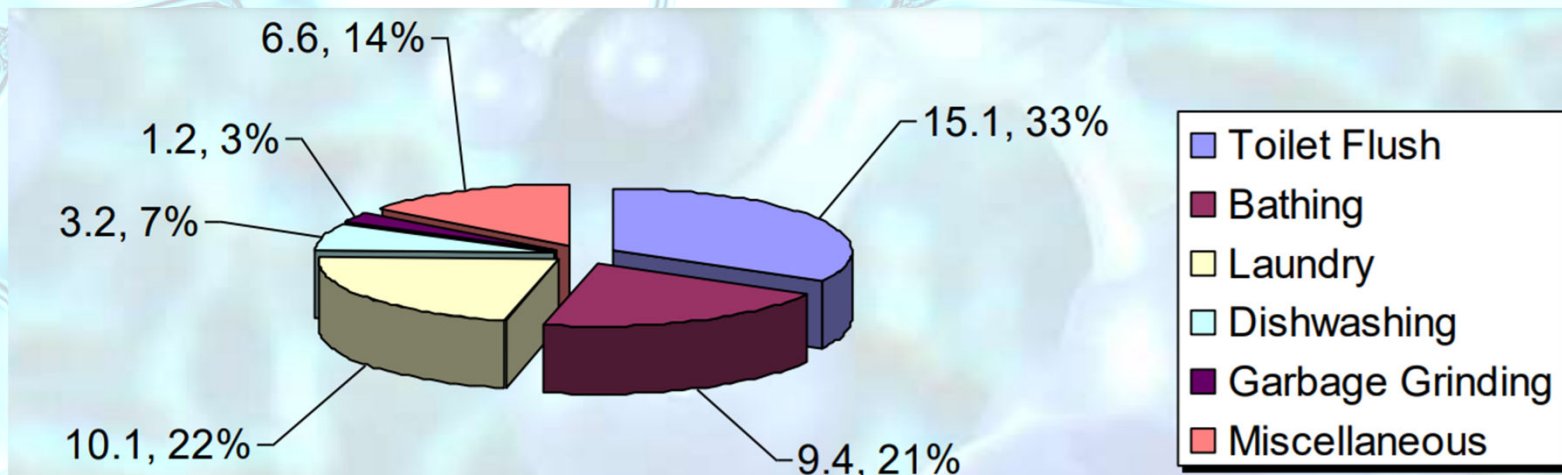
Water is one of the most important resources we have. People can survive without food for weeks,  
But will die in less than one week without water.





## WHY TREAT WASTEWATER

The average person uses 45.6 gpd. **How?**



It really isn't "Waste" after all...

- ✓ Residential sewage is 99% water.
- ✓ Our technology can remove the contaminants in sewage and effluent to a clean reusable product. It takes nature years... we can do it in minutes
- 💡 "No problem can be solved by the same consciousness that created it in the first place..."  
- Albert Einstein

## WHAT IS BIO-PURE (ACT)?

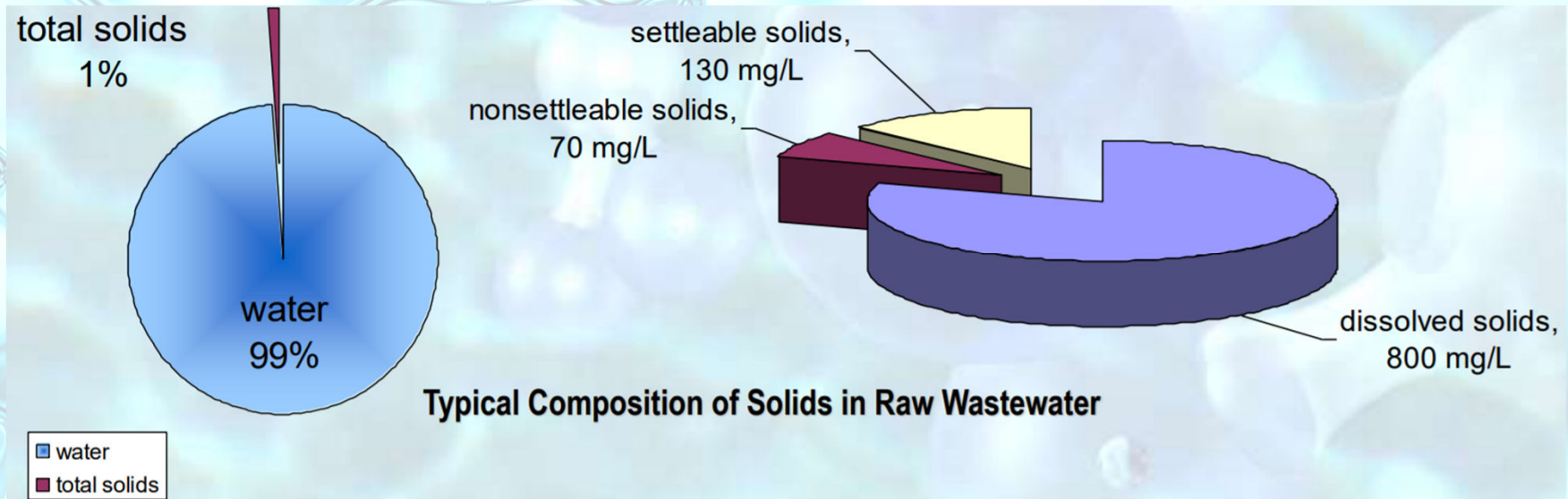
- ✓ The Bio-Pure system is a unique system for controlling biological treatment of organic waste.
- ✓ Bio-Pure continually produces quality effluent (meets California Title 22) which meets or exceeds some of the strictest requirements in North America.
- ✓ Bio-Pure's Intermittent-Cycle Extended-Aeration Systems have been used to treat domestic sewage for housing communities, golf courses, school districts, Pipeline operations, and agricultural processors.





## WHAT IS POLLUTION?

- ✓ **Organics** (BOD5)...carbohydrates, fats, oils and grease
- ✓ **Solids** (TSS)...soils, dead cells, suspended and floating solids
- ✓ **Nutrients** (N&P)...fertilizers create nuisance biological growths
- ✓ **Turbidity** (NTU)...presence of pollutants reduces the clarity of the water
- ✓ **Aesthetics**...pollution or nuisance, visual degradation of the environment



## HOW DOES BIO-PURE (ACT) IMPROVE IT?

- ✓ **Organics**...biological aerobic-treatment microorganisms break down the organic pollutants
- ✓ **Solids**...biologically stabilized and broken down along with organic pollutants
- ✓ **Nutrients**...reduced in the aerobic stabilization process
- ✓ **Turbidity**...clear effluent is the result of adequate treatment
- ✓ **Aesthetics**...no longer sewage, a clean healthy environment





# WHY WE RECOMMEND OZONE OVER OTHER DISINFECTANTS

*"OZONE VERSUS CHLORINE: When comparing disinfection efficiency, Ozone is 25 x more effective than Hypochlorous acid (HOCl), 2,500 x better than Hypochlorite (OCI) and 5,000 x more than Chloramine (NH<sub>2</sub>Cl). These results are measured from the comparison of CT constants - the Concentration x Time needed to kill 99.99% of all micro-organisms. Chlorine reacts with organic materials to form organics containing Chlorine such as Chloroform, Carbon Tetrachloride, Chloromethane and others, generally known as Trihalomethanes (THMs). Ozone reacts with Organics to break them down into simpler compounds. These organics (Oxalic Acid for example) do not readily break down all the way to Carbon Dioxide with just Ozone, but if subjected to bacterial degradation on activated charcoal they will be removed. This water can be later treated with a low level of Chlorine, say 0.2 - 0.3 ppm, to maintain sanitation in the distribution system. This way no THMs will be formed. THMs have been implicated as carcinogens in the development of kidney, bladder and colon cancer. The regulatory authorities are again decreasing the allowable levels of THMs in community water systems. At the present time the limit is 0.05 ppm. Based on the scientific research the level will be most likely soon be lowered to 0.01 ppm. Ozone does not react significantly with THMs as they are more resistant to oxidation - it takes a very long time to achieve full oxidation. Some THMs are removed as a result of physical sparging by the aeration action of the ozone/air mixture."*

Vladimir Stuchlik, M.Sc. P.Eng.  
Leonard Girard, B.Sc. Chemist

## COMMON ORGANISMS OXIDIZED BY OZONE

### BACTERIA

Achromobacter butri NCI-9404  
Aeromonas harveyi NC-2  
Aeromonas salmonicida NC-1102  
Bacillus anthracis  
Bacillus cereus  
B. coagulans  
Bacillus globiggi  
Bacillus licheniformis  
Bacillus megatherium sp  
Bacillus paratyphosus  
B. prodigiosus  
Bacillus subtilis  
B. stearotherophilus  
Campylobacter jejuni  
Clostridium Botulinum  
C. sporogenes  
Clostridium tetoni  
Cryptosporidium  
Coliphage  
Corynebacterium diphthrae  
Eberthelia typhosa  
Endamoeba histolica  
Escherichia coli  
E. coli 0517:H7  
Flavobacterium SP A-3  
Leptospira canicola  
Listeria monocytogenes  
Micrococcus candidus  
Micrococcus caseolyticus KM-15  
Micrococcus sphaeraeroides  
Mycobacterium leprae  
Mycobacterium tuberculosis  
Neisseria catarrhalis  
Phytomonas tumefaciens  
Proteus vulgaris  
Pseudomonas aeruginosa  
Pseudomonas Fluorescens (biofilms)  
Pseudomonas putida  
Salmonella Cholerasuis  
Salmonella enteritidis  
Salmonella typhimurium

### BACTERIA (cont.)

Salmonella typhosa  
Salmonella paratyphi  
Sarcina lutea  
Seratia marcescens  
Shigella dysenterige  
Shigella flexnaria  
Shigella paradysenteriae  
Spirillum rubrum  
Staphylococcus albus  
Staphylococcus aureus  
Streptococcus "C"  
Streptococcus faecalis  
Streptococcus hemolyticus  
Streptococcus lactis  
Streptococcus salivarius  
Streptococcus viridans  
Torula rubra  
Vigrio alginolyticus & angwillarum  
Vibrio cholerae  
Vibrio comma  
Virrio ichthyodermis NC-407  
V. parahaemolyticus

### VIRUS

AIDS  
Adenovirus (type7-a)  
Bacteriophage (E.coli)  
Coxsacke A9, B3 & B5  
Cryptosporidium  
Echovirus 1,5,12 & 29  
Encephalomyocarditis  
Hepatitis A  
GD V11 Virus  
Onfectious hepatitis  
Influenza  
Legionella pneumophila  
Polio Virus (Poliomyelitus 1,2 &3)  
Rotavirus  
Tobacco mosaic  
Vesicular Stomatitis

### PROTOZOA

Paramecium  
Nematode eggs  
Chlorella vulgaris (algae)  
All Pathogenic and non-pathogenic forms of Protozoa

### FUNGAL PATHOGENS

Alternaria solani  
Botrytis cinera  
Colletotrichum coccades  
Fusarium oxysporum  
Monilinia fruticola  
Monilinia laxa  
Pythium ultimum  
Phytophthora erythrosetpica  
Phytophthora parasitica  
Rhizoctonia solani  
Rhizopus stolonifera  
Sclerotium rolfsii  
Sclerotinia sclerotium

### YEAST

Baker's yeast  
Candia albicans-all forms  
Common yeast cake  
Saccharomyces cerevisiae  
Saccharomyces ellipsoideus  
Saccharomyces sp.

### CYSTS

Cryptosporidium Parvum  
Giardia lamblia  
Giardia muris

### ALGAE

Chlorella vulgaris

### FUNGUS MOLD & SPORES

Aspergillus candidus  
Aspergillus flavus (yellowish-green)  
Aspergillus glaucus (bluish-green)  
Aspergillus niger (black)  
Aspergillus terreus,saitoi & oryzae  
Botrytis allii  
Colletotrichum lagenarium  
Fusarium oxysporum  
Grotrichum  
Mucor recemosus A&B (white-gray)  
Mucor piriformis  
Oospora lactis (white)  
Penicillium cyclopium  
P. chrysogenum & citrinum  
Penicillium digitatum (olive)  
Penicillium glaucum  
Penicillium expansum (olive)  
Penicillium expansum (olive)  
Penicillium egyptiacum  
Penicillium roqueforti (green)  
Rhizopus nigricans (black)  
Rhizopus stolonifer  
Thamnidium  
Trichoderma viride  
Verticillium albo-atrum  
Verticillium dahliae



## OUR PERFORMANCE SPEAKS FOR ITSELF

### California Title 22 Requirements and Bio-Pure Test Data

Constituents	Monthly Average Maximum		Weekly Maximum		7-Day Median Maximum		Daily Maximum Any Event
	Title 22	Bio-Pure	Title 22	Bio-Pure	Title 22	Bio-Pure	Title 22
BOD5, mg/L	10	5.9	15	5.7			20
TSS, mg/L	10	6	15	6			20
Total Coliform, MPN/100ml		<2		<2	2.2	<2.0	23
Nitrate, mg/L	10						
Ammonia, mg/L		3	2.08	3			13.3

**Note:**

- 1) Two fish tests were completed in 2002; 100% of the fish survived.
- 2) Several tests from other systems are available which show the effluent is drinking water quality.





## HOW DOES BIO-PURE (ACT)'S SYSTEM OPERATE?



### FLOW DESCRIPTION

1. Influent
2. Lift pumps from equalization to anoxic chamber
3. Mixed liquor transfer aeration to clarifier chamber
4. Weir, overflow of floatables and foam
5. Supernatant transfer from clarification to disinfection chamber
6. Ozone (Chlorine) disinfection
7. Activated sludge (RAS) clarifier to anoxic/aeration chamber
- 8a. Polymer injection (optional)
8. Discharge to filters
9. Sludge return from disinfection to anoxic chamber
10. Filter backwash to anoxic chamber
11. Desludge max 10% of clarifier volume directly bed (class B sludge)
12. Decant from optional sludge digester to equalization chamber
13. Digested sludge from sludge digester to sludge drying bed (class A sludge)
14. Decant from sludge drying bed to equalization chamber



## **BENEFITS OF THIS TECHNOLOGY**



- Interdisciplinary project approach
- Better quality control
- Simplified team organization
- Better team work & communication
- Closer team interaction
- Complete-Turnkey service packages



## WHAT WE HAVE LEARNED

- Re-use of wastewater saves billions of gallons of fresh water (golf courses use 350,000-500,000 GPD)
- Tests prove effluent has met drinking water quality
- 100% of fish survive state tests in our effluent
- Sludge quantity reduced to a minimum, surpasses competition
- Limited use of digesters
- Perfect technology for multiple project types and with difficult sites
- Treatment process has small footprint
- Can be constructed inside a building (large or small)...a part of the architecture



320,000 – GPD Bio-Pure (ACT) System constructed in the basement of the Jin Jiang Hotel and Commercial Center in Shanghai, China

## THE BIO-PURE (ACT) TEAM HAS



Unique Knowledge and technology

Vast experience in innovative and alternative water and wastewater solutions

Awareness of the public needs in North America

Produced reliable systems internationally

A global environmental concern



## **SUMMARY OF SERVICES**

- Water and wastewater design engineering
- Turnkey design/build/operate
- Permitting and commissioning of systems
- Interface with local municipalities
- On-going consulting and training
- Advice on future planning



## INSTALLATION LOCATIONS (PARTIAL LIST)

Location	# of Installs	Location	# of Installs
Alaska	61	Kentucky	1
Antigua (Virgin Islands)	2	Louisiana	100
Arizona	2	Marshall Islands	2
Bora Bora	1	Michigan	1
British Columbia	23	Mississippi	5
California	6	Montana	14
Canary Islands	2	New Jersey	8
Carolina Islands	2	New Mexico	4
China	1	Ontario	2
Colorado	8	Oregon	20
England	2	Quebec	3
Hawaiian Islands	16	Puerto Rico	1
Idaho	18	Singapore	1
Illinois	3	Tahiti	4
Indonesia	1	Texas	25
Iowa	2	Washington	29
Japan	1	Wyoming	12



## EXAMPLES OF BIO-PURE (ACT) SYSTEMS

Service a range of applications  
in almost any environment

Marine Environments/Industrial



600 gpd Drilling Rig System



3,000 gpd Pacific Campground

10,000 gpd Idaho Subdivision





## EXAMPLES OF BIO-PURE (ACT) SYSTEMS

Residential and  
Apartments



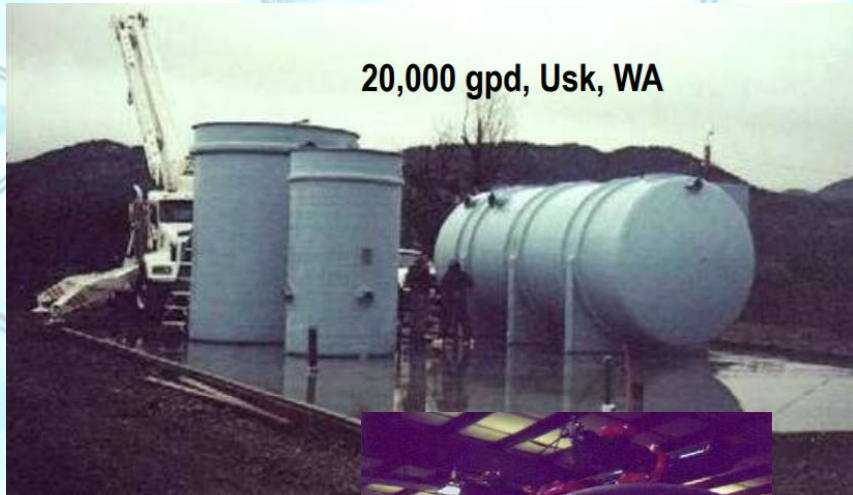
7,500 gpd-Kona Halli, HI



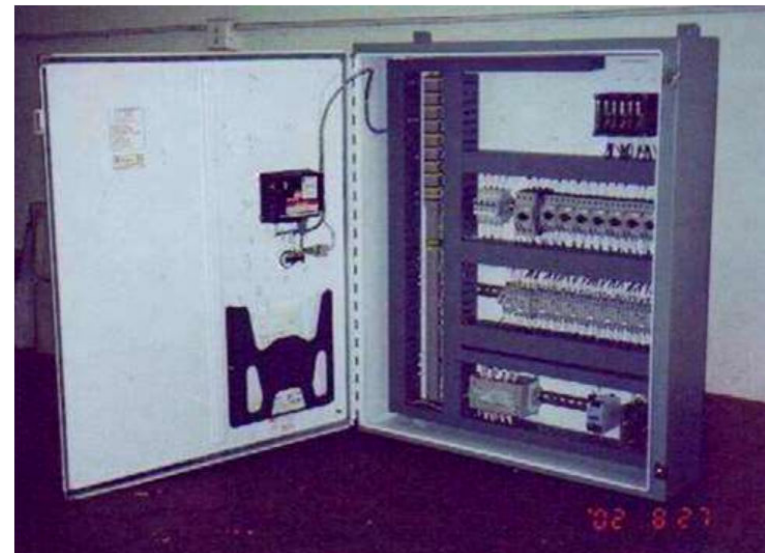
10,000 gpd-Captain Cook Apartments, HI



## EXAMPLES OF BIO-PURE (ACT) SYSTEMS



Commercial/Residential/RV Park



Multi-Media Filter



Control Panel (CPU to be installed)

## EXAMPLES OF BIO-PURE (ACT) SYSTEMS

Recreational



30,000 gpd,  
Paradise Point Marina, California





## EXAMPLES OF BIO-PURE (ACT) SYSTEMS

Requires 50% less land than traditional flow-through systems



Agriculture/Recreation

50,000 gpd,  
French Camp Golf & RV Park, California





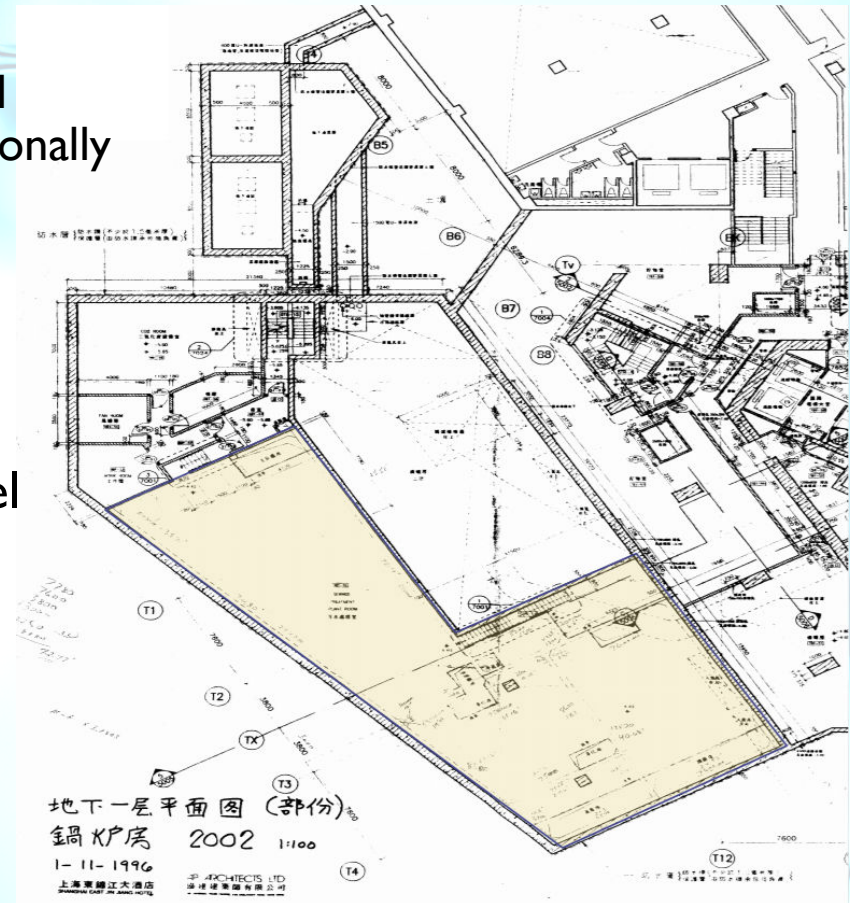
## EXAMPLES OF BIO-PURE (ACT) SYSTEMS



Bio-Pure 320,000-GPD  
System in basement

Systems designed and  
constructed internationally

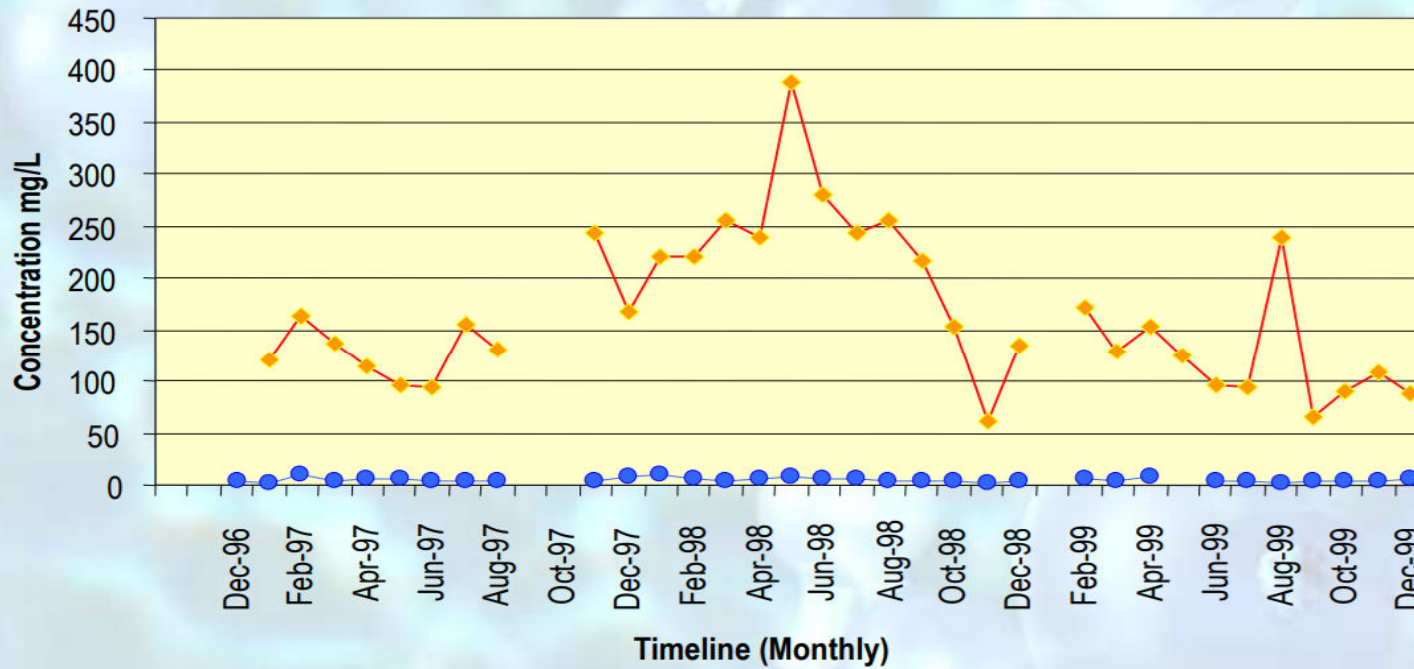
Commercial / Hotel





# BOD5 TEST DATA

**BOD<sub>5</sub> Influent and Effluent Concentrations - 3 Years**



◆ Influent BOD<sub>5</sub>    avg: 456 mg/L   
 ● Effluent BOD<sub>5</sub>    avg: 5.4 mg/L

**Biological Oxygen Demand (BOD5)**

Biological oxygen demand (BOD) is a measure of the quantity of oxygen used in the biochemical oxidation of organic matter in a specific time, at specific temperature, and under specific conditions (laboratory control). BOD5 refers to the results of a 5-day test period as prescribed by Federal E.P.A. regulations. There are three levels of treatment:

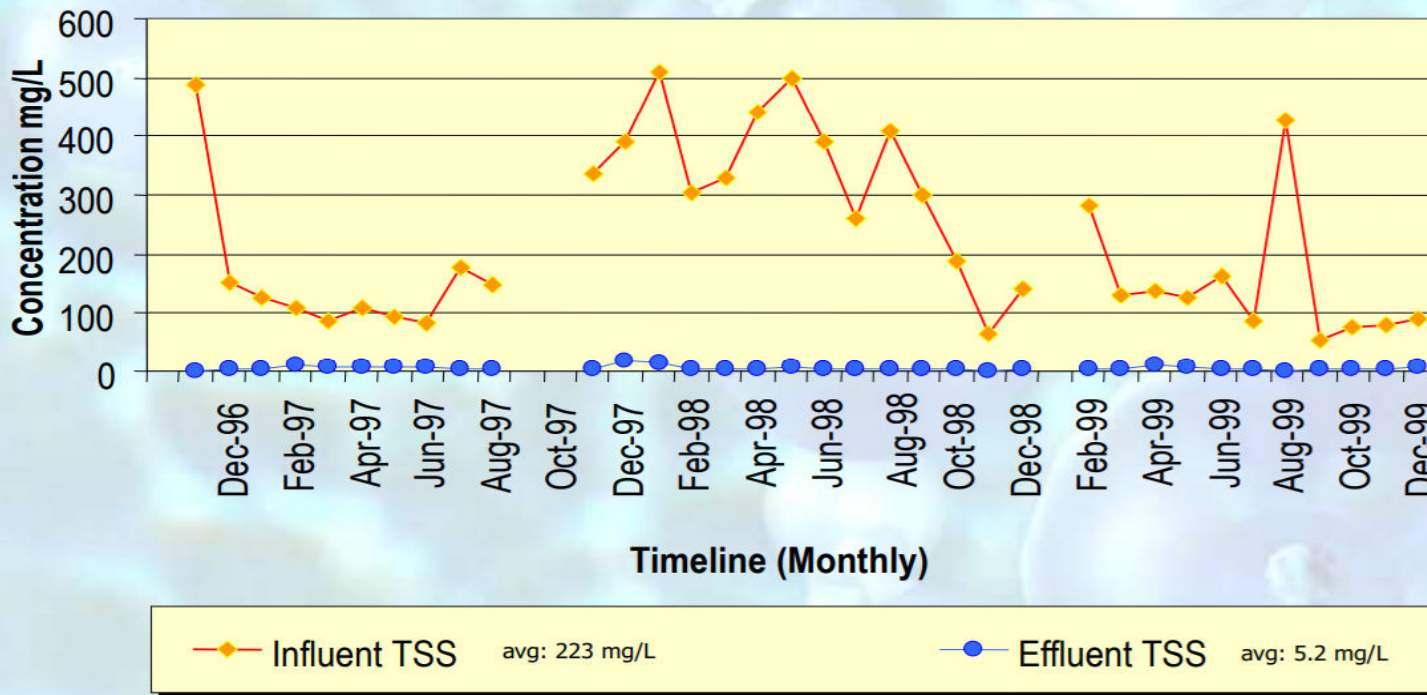
- 1) *Septic* - BOD5 of no more than 50 mg/L.;
- 2) *Secondary* - BOD5 of no more than 30 mg/L.;
- 3) *Tertiary* - BOD5 of no more than 10 mg/L.

- Test period 8/03 – 9/03 on a Bio-Pure 50,000-gpd system averaged 1.5 mg/L
- Test period 1/96 – 12/02 on a Bio-Pure 50,000-gpd system averaged 5.9 mg/L
- Test period 2/93 - 9/93 on a Bio-Pure 30,000-gpd system averaged 8.2 mg/L.
- Test period 3/01 - 4/01 on a Bio-Pure 10,000-gpd system averaged 4.9 mg/L.

*Tests are normally conducted on a weekly basis.*

# TSS TEST DATA

TSS Influent and Effluent Concentrations - 3 Years



**Total Suspended Solids (TSS)**

Total suspended solids (TSS) is a measure of the amount of insoluble solids (floatables and settleables) in the wastewater influent and the effluent. The TSS test is required under Federal EPA regulations. There are three levels of treatment:

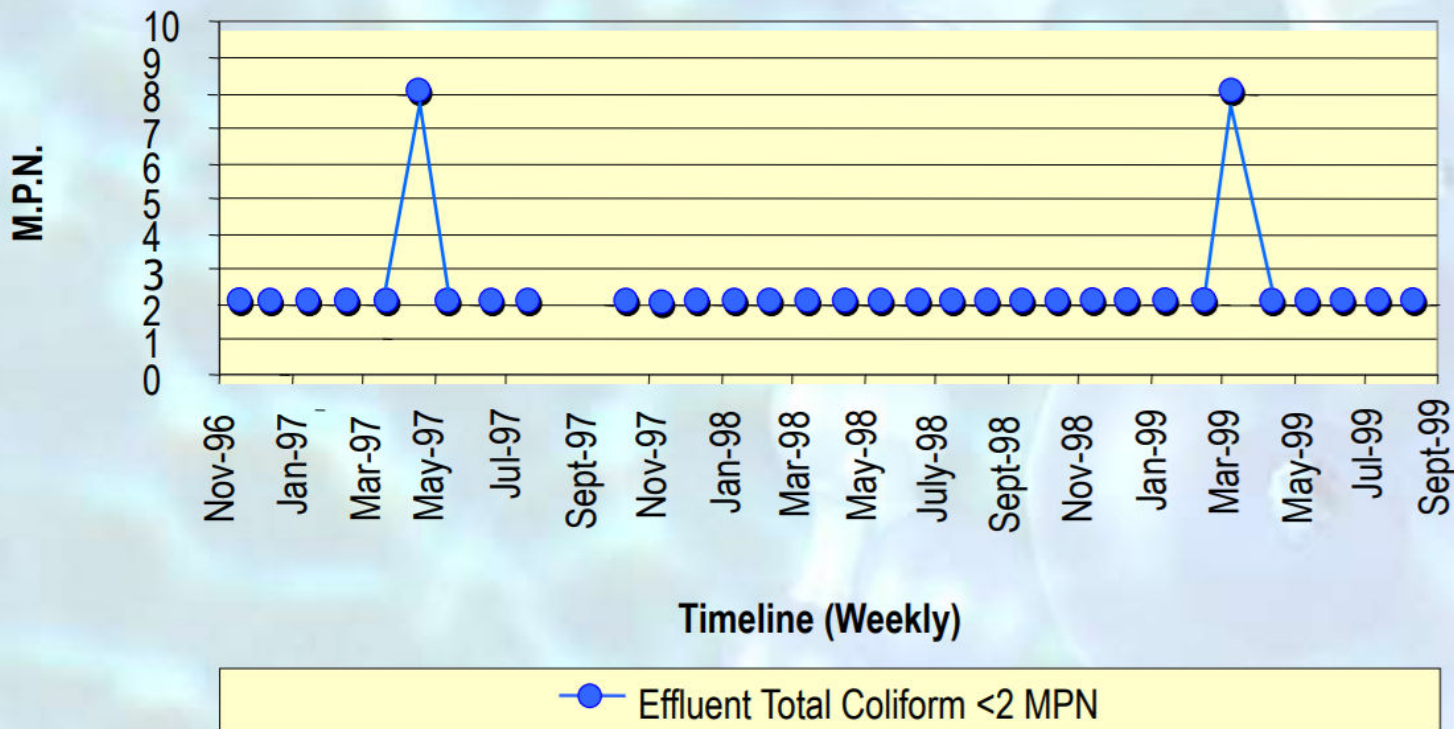
- 1) *Septic* - TSS of no more than 50 mg/L.;
- 2) *Secondary* - TSS of no more than 30 mg/L.;
- 3) *Tertiary* - TSS of no more than 10 mg/L.

- Test period 8/03 – 9/03 on a Bio-Pure 50,000-gpd system averaged 4.9 mg/L
- Test period 1/96 – 12/02 on a Bio-Pure 50,000-gpd system averaged 6.0 mg/L
- Test period 2/93 - 9/93 on a Bio-Pure 30,000-gpd system averaged 0.88 mg/L
- Test period 3/01 – 4/01 on a Bio-Pure 10,000-gpd system averaged 8.1 mg/L.

*Tests are normally conducted on a weekly basis.*



# TOTAL COLIFORM TEST DATA



## Total Coliform

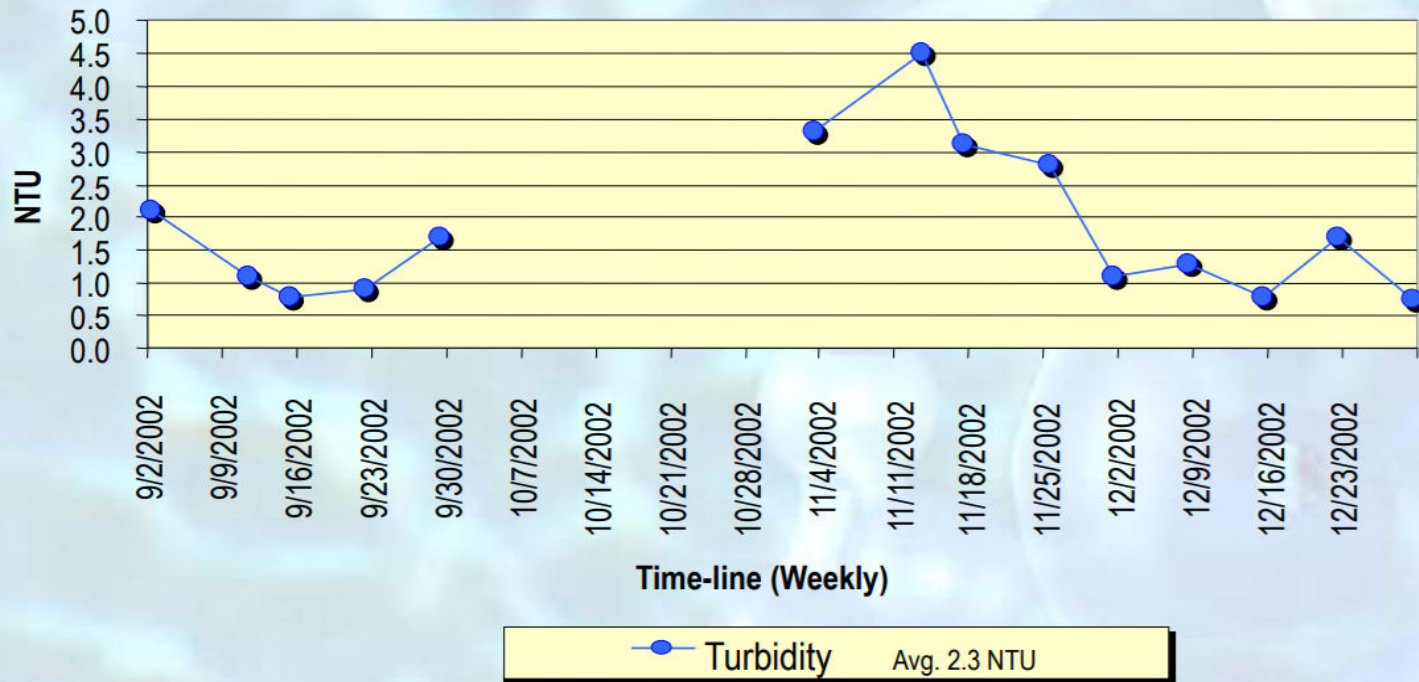
Total coliform indicates the level of intestinal bacteria in the effluent.

- Test period 8/03 – 10/03 on a Bio-Pure 50,000-gpd system averaged <2 MPN
- Test period 1/96 – 12/02 on a Bio-Pure 50,000-gpd system averaged <2 MPN
- Test period 8/03 – 10/03 on a Bio-Pure 30,000-gpd system averaged <2 MPN
- Test period 2/93 – 9/93 on a Bio-Pure 30,000-gpd system averaged <2 MPN
- Test period 3/01 – 4/01 on a Bio-Pure 10,000-gpd system averaged <2 MPN

Tests are normally conducted on a weekly basis.

# TOTAL (TURBIDITY) TEST DATA

Turbidity Concentration - 3 Months



## Total Turbidity

Turbidity occurs as the result of clay, silt, finely divided organic and inorganic matter, plankton, and other microorganisms in wastewater influent and effluent.

Under California Title 22, turbidity should not exceed a monthly average of 2 NTU and not exceed a maximum of 5 NTU more than 5% of the time during a 24 hour period.

Total turbidity indicates the level of intestinal bacteria in the effluent.

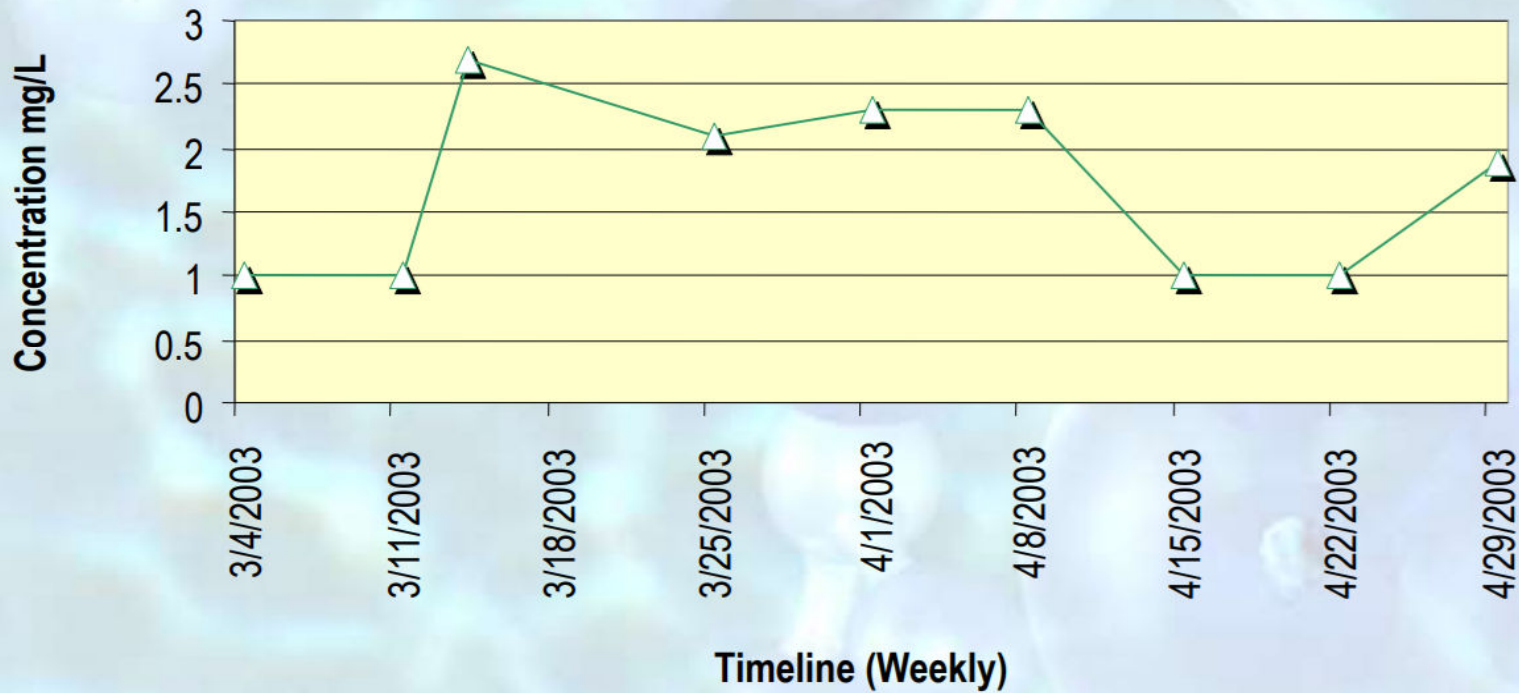
- Test period 8/03 – 9/03 on a Bio-Pure 50,000-gpd system averaged 0.8 NTU
- Test period (Graph) 9/02 – 12/02 on a Bio-Pure 50,000-gpd system averaged 2.3 NTU
- Test period 1/90 – 12/02 on a Bio-Pure 30,000-gpd system. Receiving body of water tested above and below effluent discharge and met DEQ requirements.
- Test period 4/01 on a Bio-Pure 10,000-gpd system averaged 1.4 NTU

Tests are normally conducted on a weekly basis.



# TOTAL KJELDAHL NITROGEN TEST DATA

## Total Kjeldahl Nitrogen Concentration - 2 Months



### Total Kjeldahl Nitrogen (TKN)

TKN is the combined amount of organic and ammonia nitrogen in mg/L.

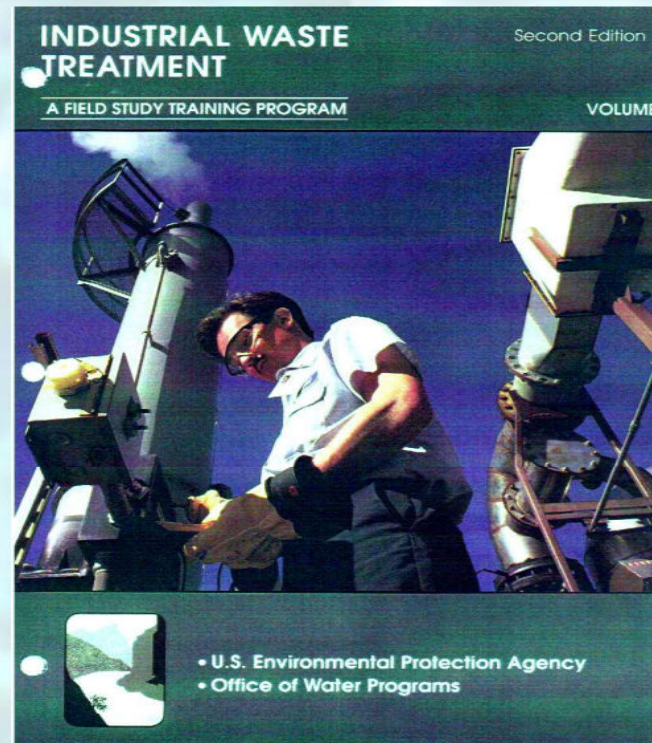
- Test period 3/03 – 4/03 on a Bio-Pure 10,000-gpd system averaged 1.7 mg/L

*Tests are normally conducted on a weekly basis.*

—△— Nitrogen

## PUBLIC PERCEPTION: BIO-PURE (ACT)WTS

- Support from environmental groups
- Good housekeeping is important
- Public likes to learn about the process
- The plant as an educational tool
- Strong interest by engineers, cities
- Strong interest by other countries



Batch Reactors 263

### 4.1 INTERMITTENT CYCLE EXTENDED AERATION SYSTEM

#### 4.10 Process Description

A modification of the sequential batch reactor (SBR) process is the intermittent cycle extended aeration system where the inflow is continuous. **Bio-Pure** systems are a modification of the activated sludge process. A typical process schematic is shown in Figure 4.11<sup>10</sup>. Most current applications of this technology treat wastewater flows ranging from 6,000 to 50,000 gpd, with multiples added to a practical limit of about 300,000 GPD. (We now have systems in the millions of gallons.)

Intermittent cycle extended aeration systems have been used by industry to treat agriculture waste streams. Examples include meat and poultry processors (lamb, pig, chicken) and breakage waste streams on egg farms. There are many potential industrial applications for this mode of the activated sludge SBRs and their modifications. This section provides information on how to operate and maintain one mode while the training manual could be adapted to many similar modes.

If there is a potential for grease problems, grease must be controlled at the source or there must be a grease trap at the plant headwork's.

#### PROCESS:

Raw wastewater flows continuously through a coarse screen and into a buffer or flow equalization tank. This tank may be aerated to keep the wastewater "fresh" (control development of odors) and to prevent solids from settling and accumulation in the tank. Aeration also assists in the floatation of grease. Wastewater is pumped from the buffer tank to the aeration chamber on an intermittent basis. The pump operation is controlled by wastewater level sensors in the buffer tank. Every 100 minutes the mixed liquor transfer pumps deliver a fixed volume (batch) from the aeration chamber to the clarifier. After approximately one hour settling the supernatant transfer pump transfers the clarifier supernatant to the ozone contact chamber. Ozone is injected directly into the chamber. A weir at the top of the clarifier allows the floatables to be returned to the aeration chamber. The top three inches of the supernatant are returned to the aeration chamber along with the remaining sludge by the return sludge pump. This procedure prevents floatables from reaching downstream processes and completely empties the clarifier. After disinfection the water receives tertiary treatment by passing through multimedia filters.



## BIO-PURE (ACT) TEAM CAN ASSIST WITH PLANNING

\$

Planning Consultants available since 1990, however the expertise represented by these firms extends over 30 years. Our knowledge and contacts with other architectural, engineering, planning, and design-build firms allows BIO-PURE to offer full service to our clients. BIO-PURE can help you accomplish your goals by fielding a team that will add to your efforts effectively.



ACT Can Help You With:

- Economic and Community Development
- Land Use Planning and Permitting
- Environmental Assessment
- Regulatory/Policy Analysis and Development
- Strategic Business Planning
- Program Development
- Project Management
- Market Research and Analysis
- Resource Analysis
- Grant and Proposal Writing



## BIO-PURE (ACT) TEAM CAN ASSIST WITH FUNDING



We have corporations with expertise represented by funding firms since 1991. Lenders are banks, life insurance companies, savings banks and private sources.



We Can Help You:

- Underwrite the funding request
- Package loan and place with lenders
- Follow the procedure from beginning to funding
- Assist when necessary





## BIO-PURE WTS (ACT) OFFERS SERVICES IN DESIGN & CONSTRUCTION



### Turnkey System

- Wastewater facility design/Geo-Flow or conventional disposal systems
- Infrastructure design (Enviro-One and conventional)
- Civil engineering
- Landscape architecture



### Adaptable

- Systems installed nationally in Alaska, Hawaii and Western U.S.
- Design sizes range from 600 gallons to millions of gallons per day



### Cost Effective

- Eliminating settling basins, contaminant rooms, scrubbers and sludge equipment results in reduced construction/maintenance cost
- Requires 50% less land than traditional flow through systems



### Environmental Benefits

- Eliminating chlorine and introducing ozone reduces impact on our atmosphere
- Sludge to influent ratio is 1gal:2,390 gal; compared to 1:8 for typical flow through systems



Rescuing, Recovering & Reusing Our Water Resources



## **PROVIDING FULL DESIGN SERVICES UNDER ONE ROOF**

Providing full design services at one location helps Bio-Pure to complete your project on, or ahead of, pre-determined schedules.

Our diversified and talented staff produce results in...



***Wastewater Treatment***



***Civil Engineering***



***Infrastructure Design***



## ENVIRONMENTAL ONE – GRINDER PUMPS

**OVER 65,000 INSTALLATIONS  
SINCE 1969**

**Enviro-One grinder pumps can  
be installed to service 1 to 4  
homes per unit.**

**Enviro-One systems can be used  
in virtually all site conditions.**

**Enviro-One is a solution to gravity  
mains at substantial savings.**

***Enviro-One is another product  
Bio-Pure (ACT) can recommend  
and include in our turnkey proposals.***

**T**here is a better alternative to conventional gravity sewers for communities not built over the ideal sloping, tractable soil. These communities should consider a gravity-independent, low-pressure sewer (LPS) system, powered by Environment One Grinder Pumps.

Gravity systems are an expensive proposition, requiring intensive labor and costly materials, such as large-diameter pipe, deep trenches, safety shoring, bracing, de-watering, and restoration of property.

By pumping through small-diameter pipes buried in shallow trenches, low-pressure systems designed around E/ONE Grinder Pumps avoid these expensive problems, while transporting solid and liquid sewage safely and efficiently. Material and labor costs are greatly reduced.

The E/ONE Grinder Pump is a compact, factory-assembled and tested unit that provides wastewater storage and conditioning, while efficiently pumping through the LPS system. A single residential Grinder Pump can transport sewage through miles of pipe with elevation changes of greater than 100 feet, effectively sewer areas with high groundwater, bedrock and flat or hilly terrain.

**Flat. Wet. Rocky. Hilly.** An Environment One LPS system can be specified for virtually all site conditions. In over 65,000 installations since 1969, we've saved communities millions of dollars in construction costs compared to conventional gravity systems.



### **PUBLIC HEALTH AND ENVIRONMENTAL CONCERNS.**

With groundwater contamination endangering public health, most communities are now being forced to convert from continued septic tank use. E/ONE Grinder Pump systems are the sensible alternative, providing gravity-independent wastewater transport to a host of effective treatment options.

Installation of an E/ONE Grinder Pump system imparts minimal environmental stress on the surroundings many communities wish to preserve. Small-diameter mains can be laid alongside roadways or installed using trenchless technologies, with little damage to streets, sidewalks, lawns, driveways and underground utilities, reducing cost and right-of-way issues. Pressure-tight mains eliminate groundwater infiltration and reduce treatment plant expenditures.

### **ANYTHING'S POSSIBLE.**

For builders, developers, architects and engineers, the advantages of a low-pressure sewer system provide a new degree of freedom in land planning and an opportunity to sharply reduce front-end costs. LPS systems offer a low-cost means of solving the problem of failed septic systems.

Low-pressure systems range in size from a single Grinder Pump discharging wastewater from one problem lot to hybrid pressure/





# ENVIRONMENTAL ONE – GRINDER PUMPS

## Smaller diameter piping:

- Enviro-One low pressure sewer systems require vastly smaller-diameter piping: 4 inches instead of gravity's typical 24 inches.
- Enviro-One systems only require shallow trenches. Small diameter piping follows the contour of the land, just under the frost line with less disruption and lower costs.

gravity systems—where lots not economically sewerable are handled with Grinder Pumps—to complete multi-branch, low-pressure systems designed to serve entire communities.

### WE'RE WITH YOU ALL THE WAY.

The Environment One team won't vanish after the installation of your system. Beginning with facilities planning and progressing through design and construction, E/ONE provides a variety of helpful inputs. Throughout the multi-year warranty period and during the years after installation, Environment One staff remains at your side to help make operation and maintenance go smoothly. We encourage you to "check us out" by talking with any of the over 60,000 E/ONE customers worldwide.

### DEPENDABILITY: THE INSIDE STORY.

Only E/ONE Grinder Pumps automatically overcome the wide variety of operating conditions that are randomly presented in low-pressure systems. Whether it's functioning at no head or abnormally high heads, the E/ONE Grinder Pump dependably performs day in and day out. Plus, E/ONE LPS systems are self-cleaning—a feature which is clearly beneficial.

The most important component of our system? Our people—dedi-

cated to delivering the best possible products and service through our commitment to our customers.

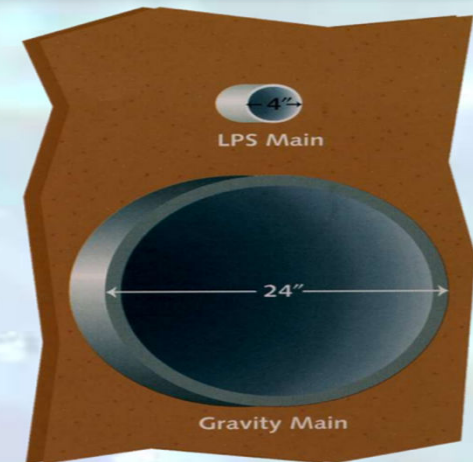
From engineering, marketing and manufacturing, to sales, accounting and customer service, everyone at Environment One works as a team. A team with one goal in mind—satisfying our customers with high value and quality products. On Time. Worldwide.

### INSTALLATION: WE GO TO EXTREMES.

E/ONE Grinder Pumps are delivering safe, reliable performance in every environment under the sun—from semi-tropical ocean-front cottages to arctic mining camps on permafrost. A choice of models is available to meet the requirements imposed by local conditions.

Our product line allows flexibility in addressing job-specific issues such as indoor installation, easy all-weather outdoor access, low cost, protection from weather and vandalism, safety approvals, public versus private property considerations, bury depth, and many others. May we address your issues?

**Trenchless installation technology—means even less surface disruption. Rights-of-way, paving, utilities and established landscaping are no longer cost-prohibitive obstructions. The result: dramatically lower restoration and installation costs.**



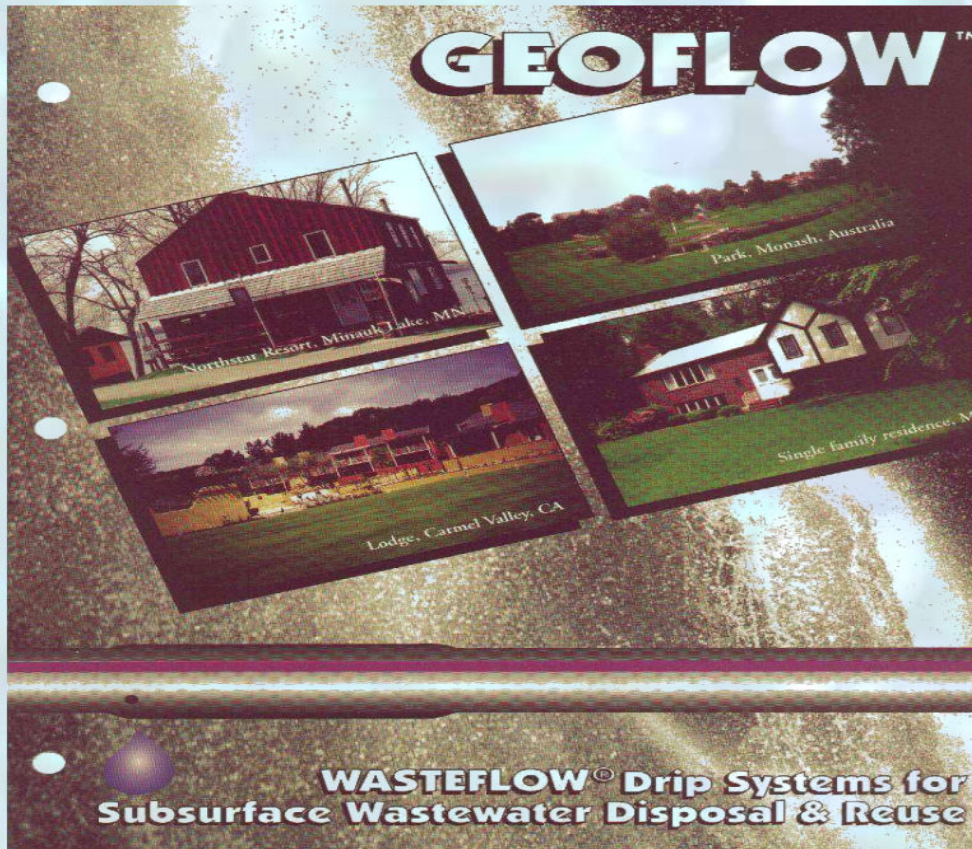
**Smaller diameter piping.** E/ONE low pressure sewer systems require vastly smaller-diameter piping: 4 inches instead of gravity's typical 24 inches.

**Environment One systems only require shallow trenches. Small diameter piping follows the contour of the land, just under the frost line. Less disruption. Lower costs.**





## GEOFLOW – PROVEN EFFLUENT DISPOSAL



**GEOFLOW™**

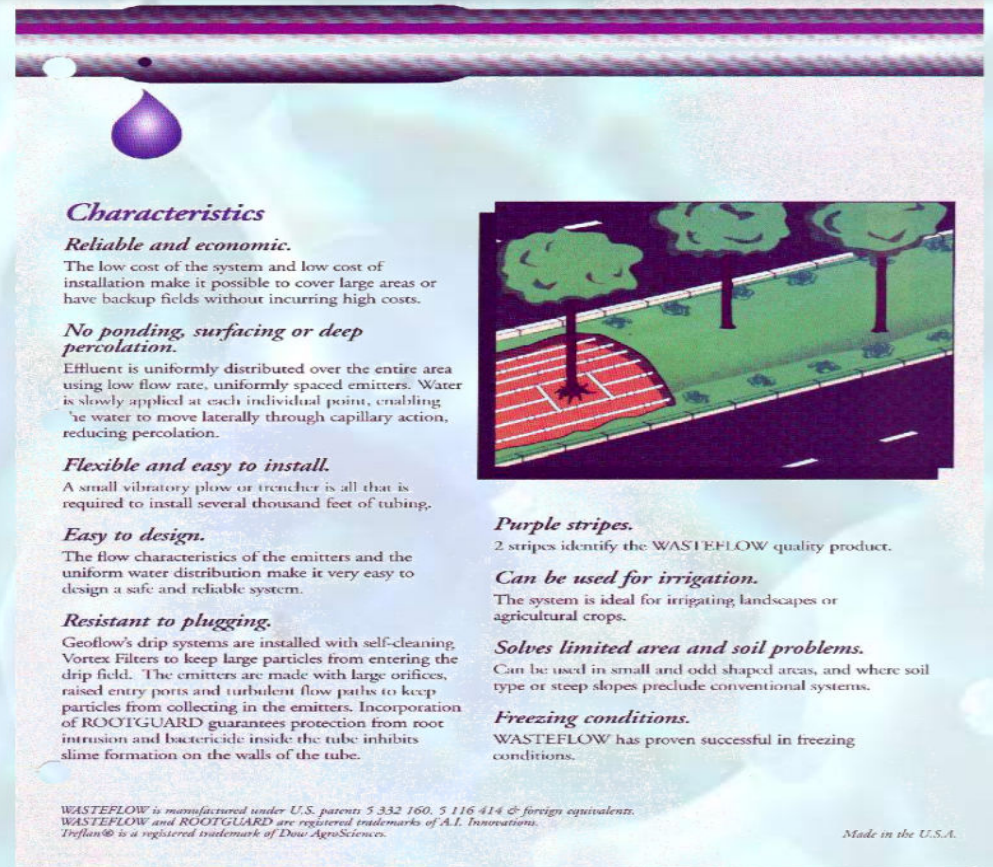
Northstar Resort, Minnetonka, MN

Park, Monash, Australia

Lodge, Carmel Valley, CA

Single family residence, MN

**WASTEFLOW® Drip Systems for Subsurface Wastewater Disposal & Reuse**



**Characteristics**

**Reliable and economic.**  
The low cost of the system and low cost of installation make it possible to cover large areas or have backup fields without incurring high costs.

**No ponding, surfacing or deep percolation.**  
Effluent is uniformly distributed over the entire area using low flow rate, uniformly spaced emitters. Water is slowly applied at each individual point, enabling the water to move laterally through capillary action, reducing percolation.

**Flexible and easy to install.**  
A small vibratory plow or trencher is all that is required to install several thousand feet of tubing.

**Easy to design.**  
The flow characteristics of the emitters and the uniform water distribution make it very easy to design a safe and reliable system.

**Resistant to plugging.**  
Geoflow's drip systems are installed with self-cleaning, Vortex Filters to keep large particles from entering the drip field. The emitters are made with large orifices, raised entry ports and turbulent flow paths to keep particles from collecting in the emitters. Incorporation of ROOTGUARD guarantees protection from root intrusion and bactericide inside the tube inhibits slime formation on the walls of the tube.

**Purple stripes.**  
2 stripes identify the WASTEFLOW quality product.

**Can be used for irrigation.**  
The system is ideal for irrigating landscapes or agricultural crops.

**Solves limited area and soil problems.**  
Can be used in small and odd shaped areas, and where soil type or steep slopes preclude conventional systems.

**Freezing conditions.**  
WASTEFLOW has proven successful in freezing conditions.

WASTEFLOW is manufactured under U.S. patents 5 332 160, 5 116 414 & foreign equivalents.  
WASTEFLOW and ROOTGUARD are registered trademarks of A.I. Innovations.  
Treflow® is a registered trademark of Dour AgroSciences.

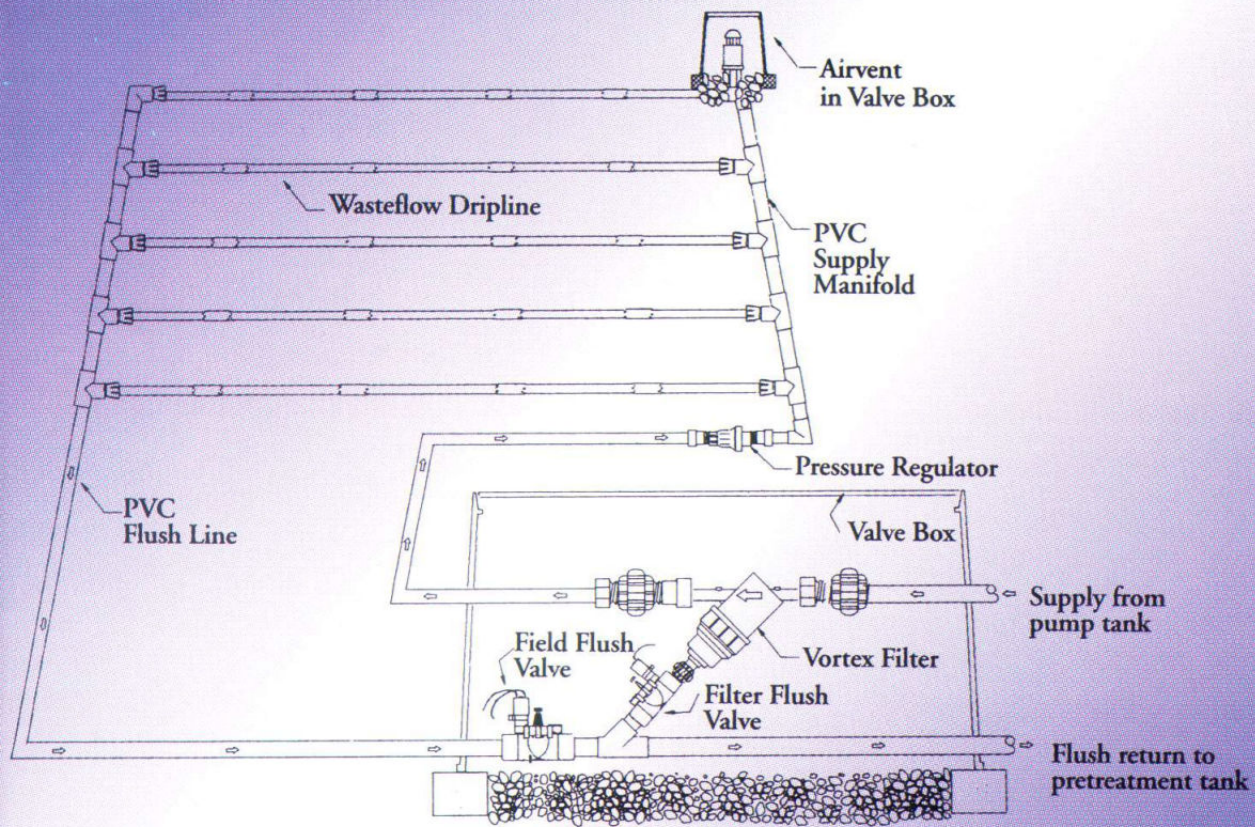
Made in the U.S.A.

Geo-Flow is a product Bio-Pure recommends and can be part of turnkey proposals.



# GEO-FLOW DISPOSAL DIAGRAM

## Typical Dripfield Layout





Rescuing, Recovering & Reusing Our Water Resources



## CONTACT INFORMATION

### BIO-PURE (ACT) Wastewater Treatment Systems



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Suite 100



Bellevue, WA 98004, USA

206-415-7002




[info@jmcsservices.com](mailto:info@jmcsservices.com)

To receive an analysis/estimate of your project needs you will be asked to fill out a questionnaire of existing Wastewater treatment requirements for your projects. Then simply e-mail your specifications to: [info@jmcsservices.com](mailto:info@jmcsservices.com)







**ON BEHALF OF  
BIO-PURE (ACT)  
WASTEWATER  
TREATMENT SYSTEMS**

Thank you - Contact Us Today:

Call: (206) 415-7002

Email: [info@jmcsservices.com](mailto:info@jmcsservices.com)

"It's an invisible resource. But it's most probably the resource our children will depend on."

-ALICE AURELI