

# Massachusetts Health Officers Association

Annual Meeting  
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# **I/A Technology Approved and Under Review in 2004 and Operating Issues**

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Title 5 I/A Program

# I/A Technology

Over the last several years I have talked about how I/A technology works and what to expect in the field. This year I want to talk about:

- Technology recently approved or under review – some new treatment ideas
- Proposed Certification for Tire Chips – substitute for stone aggregate
- Installation and O&M Issues- problems encountered in the field

# I/A Technology

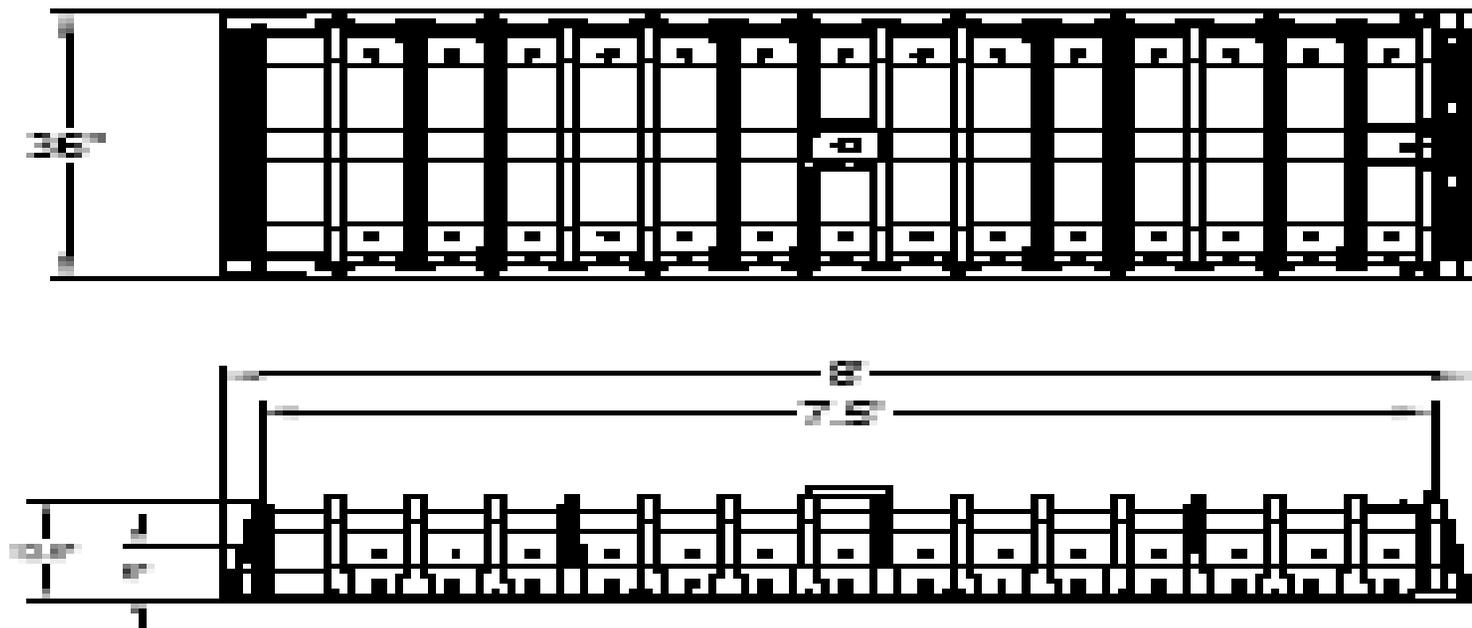
## Certified for General Use

- EZ Flow- Polystyrene aggregate as a substitute for stone aggregate.
- Cultec- Chamber technology with 40% reduction in SAS.
- Cromaglass- SB Reactor, biological treatment.
- Sinulair- technology transfer from Siegmund to NORWECO under negotiation.
- Advantex AX-20- Trickling filter, textile media, biological treatment.
- SeptiTech – Trickling Filter, polystyrene media, biological treatment



# CULTEC

Contactors® 100 Section View  
Scale: N.T.S.



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# I/A Technology

## Provisional Use Approved for Nitrogen Reduction

- Amphidrome
- Waterloo Biofilter
- Bioclere
- Single Home FAST and Modular FAST- S&L
- MicroFAST, HighstrengthFAST & NitriFAST-  
BioMicrobics

# I/A Technology

## Provisional Use Approved for Nitrogen Reduction

- No DEP review of plans, annual review of operating results.
- Technology proponent Certification of Design and Installation.
  - <http://www.mass.gov/dep/brp/wwm/files/it/provis.htm#forms>
- 50 unit limit for new technology approvals, Amphidrome and Waterloo.
- FAST and Bioclere are **not allowed** new approvals.

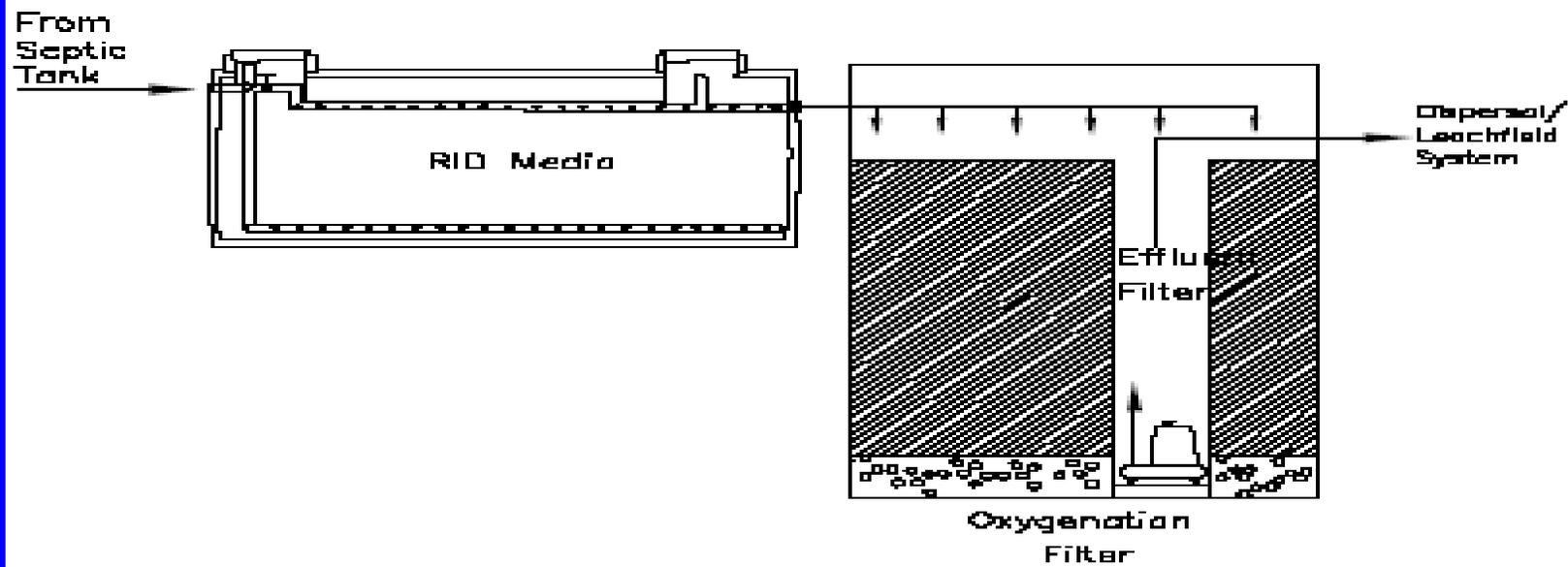
# I/A Technology

## Piloting Approved

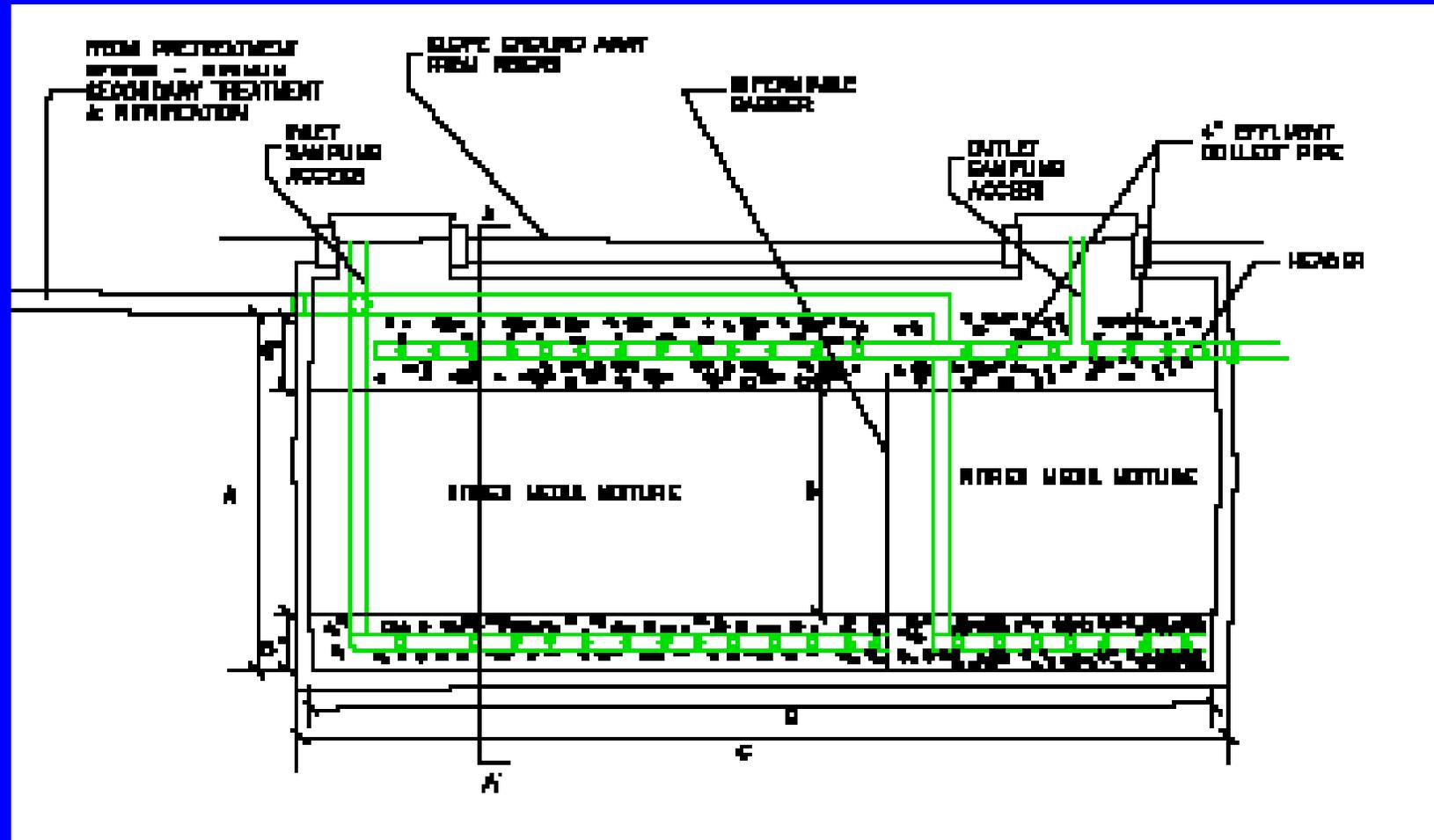
- RID Phosphorous Removal System- two stage treatment using reactive media and aeration
- Nitrex- Technology transferred to Lombardo Associates
- NORWECO Singulair 960DN- Maximum number of systems are installed.

# RID System

## PhosRID System Schematic



# Nitrex System



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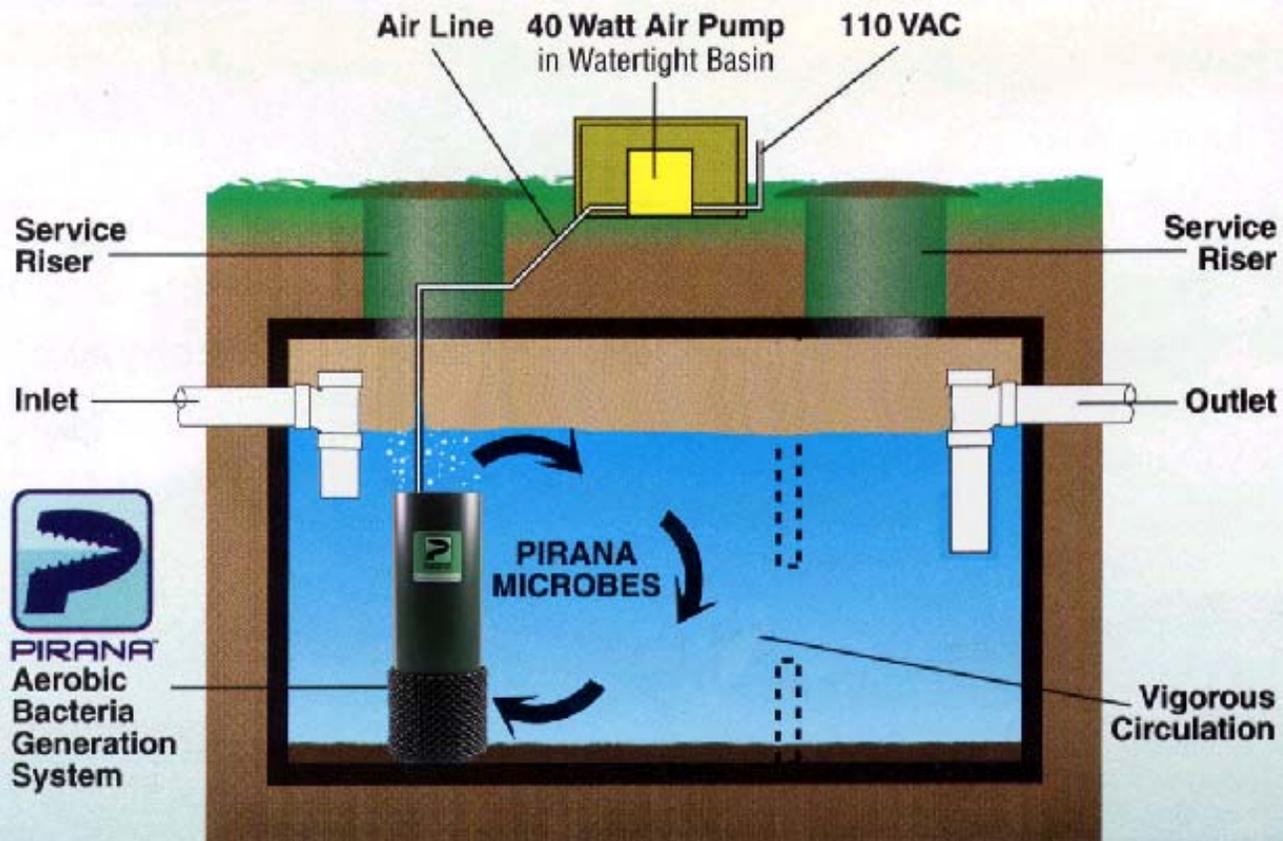
# I/A Technology

## Remedial Use Approved

- Several technologies received renewals
  - Modular FAST, Bioclere and Waterloo Biofilter
- Two technologies awaiting renewals
  - Saneco's Orenco ISF and Singular (Transferred to NORWECO)
- New Remedial Approval
  - Piranaco – Aerated bacterial augmentation system to renovate failed SAS due to solids buildup
  - White Knight – Aerated bacterial augmentation system to renovate failed SAS due to solids buildup

# Piranaco System

## Pirana Keeps All Systems Clean Naturally



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# I/A Technology

## Technology Under Review

- **General Use**
  - Fiberglass and Polyethylene Septic Tanks – Innovative Septic Tank Design
  - **Tire Chips – Substitute for Stone Aggregate**
- **Remedial Use**
  - Presby Enviro-Septic – Buried biological filter system

# I/A Technology

## Technology Under Review

- **Piloting Approval**
  - Omni Environmental RSF – Recirculating Sand Filter to reduce nitrogen to less than 19 mg/L
  - BAM – Aerated bacterial augmentation system for renovating failed SAS

# Tire Chip Certification for General Use

- Several states have found tire chips to be viable substitute for stone aggregate.
- The Department has initiated a detailed review.
- A draft Certification for General Use has been prepared and is under review.

# Tire Chips

- 250 million tires are discarded annually
- Mass has 6 million discarded annually
- 17 states approved the use of tires
  - 5 southeastern states have very detailed specifications
- 13 states interested in tires

# Tire Chips

*Chelsea-UMass, Oct 1999 Report*

- Scrap tire chips will leach metals and non-metallic ions in low quantities
  - Iron, manganese, chloride & sulfate may exceed Secondary Drinking Water Standards
- Scrap tire chips will not affect Primary Drinking Water Standards when substituted for aggregate

# Tire Chips

*Grimes, Steinbeck, Amoozegar, Fall 2003*

## Composition of Tire Chips

- By Weight
  - 30 synthetic rubbers 5 lbs.
  - 8 types of natural rubber 4 lbs.
  - 8 types of carbon black 4 lbs.
  - Steel cords for belts 1 lb.
  - Polyester and nylon 1 lb.
  - Steel bead wire <1 lb.
  - Chemicals, waxes, & oils, etc. 3 lbs.

# Tire Chips

- Percentage Rubbers
  - Natural 55%
  - Synthetic 45%
- By Percentages
  - Carbon 85%
  - Ferric Material 10-15%
  - Sulfur 0.9 – 1.25%



# Tire Chips



- Per Tire Weight
  - Passenger 18.8 – 21 lbs
  - Truck ~ 100 lbs.
- Cubic Yard Weight
  - Stone 2800 lbs
  - Tire chips 2” 800 lbs
- 40 Passenger Tires/CY

# Tire Chips

*Chelsea-UMass, October 2000*

- Test Center trench used for evaluation
- Tire shreds (chips) compact
- Tire shred leaching trenches perform like aggregate trenches
- Tire shred trenches do not leach any toxic inorganic metals or anions at concentrations greater than aggregate trenches
- Tire shred trenches will leach manganese at concentrations greater than Secondary Drinking Water MCL

# Tire Chips

## Tire Chip Construction

- Only for systems under 2000 gpd
- Not for pits, galleries or chambers
- Lighter than aggregate but easily compacted
- Protective clothing required including:
  - Heavy gloves and Work boots
- Tire chips must be covered with geotextile

# Tire Chips

## Design standards for Tire Chips

- Tire chip volume shall be equal to the stone aggregate volume
- Nominally 2" and may range from 1/2" to 4" - 95%
- Free of wire protruding more than 1/2" - 95%
- Free of balls of wire or fine rubber - 98%
- Free of any soil particles - 98%
- Free of fines < 2mm in size
- Covered with nonwoven geosynthetic

# Tire Chips

## Geosynthetic filter fabric

- Cover tire chips to prevent soil intrusion
- 3 ounce per sq. yd. – ASTM D-5261
- Permittivity of at least  $1 \text{ sec}^{-1}$ - ASTM D-4491
- Apparent Opening Size of 70 – ASTM D-4751

# Tire Chips



- Supplier shall obtain DEP approval
- Suppliers must demonstrate they can continuously meet specifications
- Suppliers must reapply annually
- Suppliers must provide bill of lading certifying tire chips meet specifications

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# Tire Chips



- Installers must provide bill of lading to owner and BOH from approved supplier.
- All chips must be stored on asphalt or protective barrier.
- Installers must be trained.
- Installers must remove all chips from site.

# I/A Technology In The Field

## Installation Issues

- Poor pipe installation – broken pipes, broken tubing.
- Poor electrical work – electrical problems with pumps, timers, controls, etc.
- Buried access ports or manholes that cause testing and servicing problems.
- Inaccurate or missing as built plans.
- Control panels inaccessible – locked in facility.

# I/A Technology In The Field

## O & M issues

- Odor problems that go unsolved.
- Poor sample collection techniques – not reviewing and correcting results that are obviously wrong.
- Inadequate observation of site and equipment, i.e.- depression near unit caused by broken pipe not investigated.
- Inadequate operator oversight – do not observe and solve on site problems.
- Incomplete inspection and checklist forms.
- Inadequate completion of MASS inspection requirements.
- Missing signatures on inspection forms.

# I/A Technology In The Field

## Equipment issues

- Pump failures – too many.
- Pump problems, i.e- continuous recycle when intermittent required.
- Timer and relay failures – too many.
- Inadequate information on all systems, especially poor O&M information on large commercial and multifamily systems.
- Lack of education of System owner – they do not understand system limits especially at large facilities.

# I/A Technology In The Field

## Some Possible Solutions

- More oversight of installation with certification by designer
- Management districts to oversee installation and O&M
- More professional outlook by O&M personnel, additional equipment training
- More BOH training and education

# I/A Technology

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