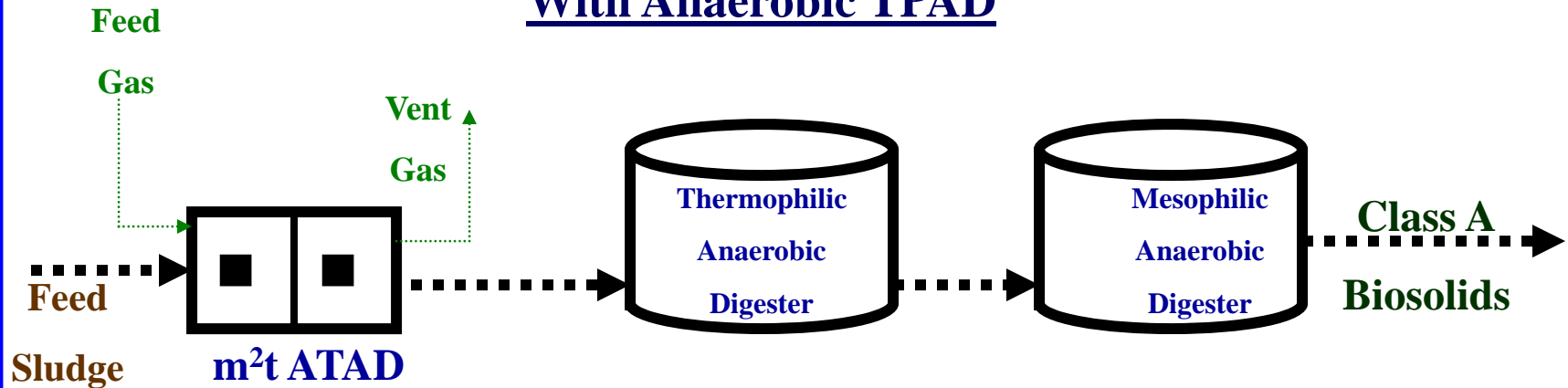


m²t technologies

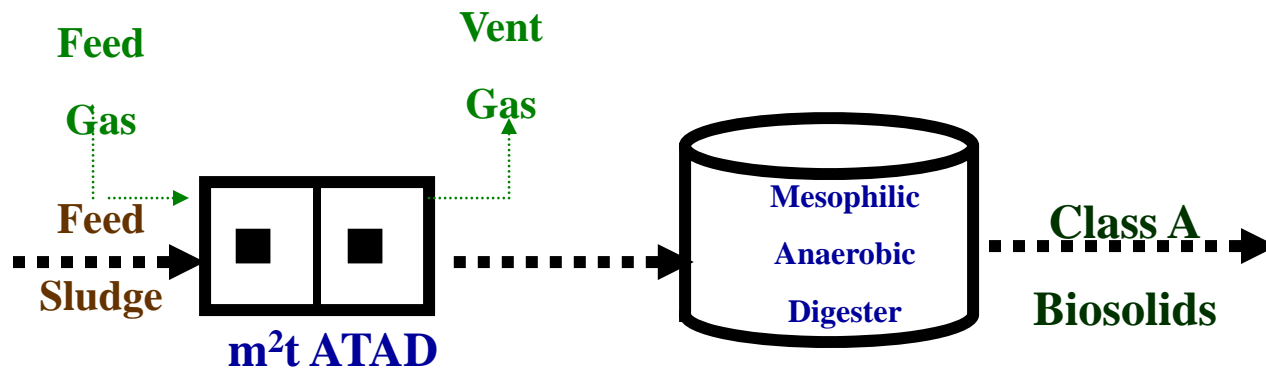
*Dual Digestion*TM Systems

Dual Digestion™ Layouts

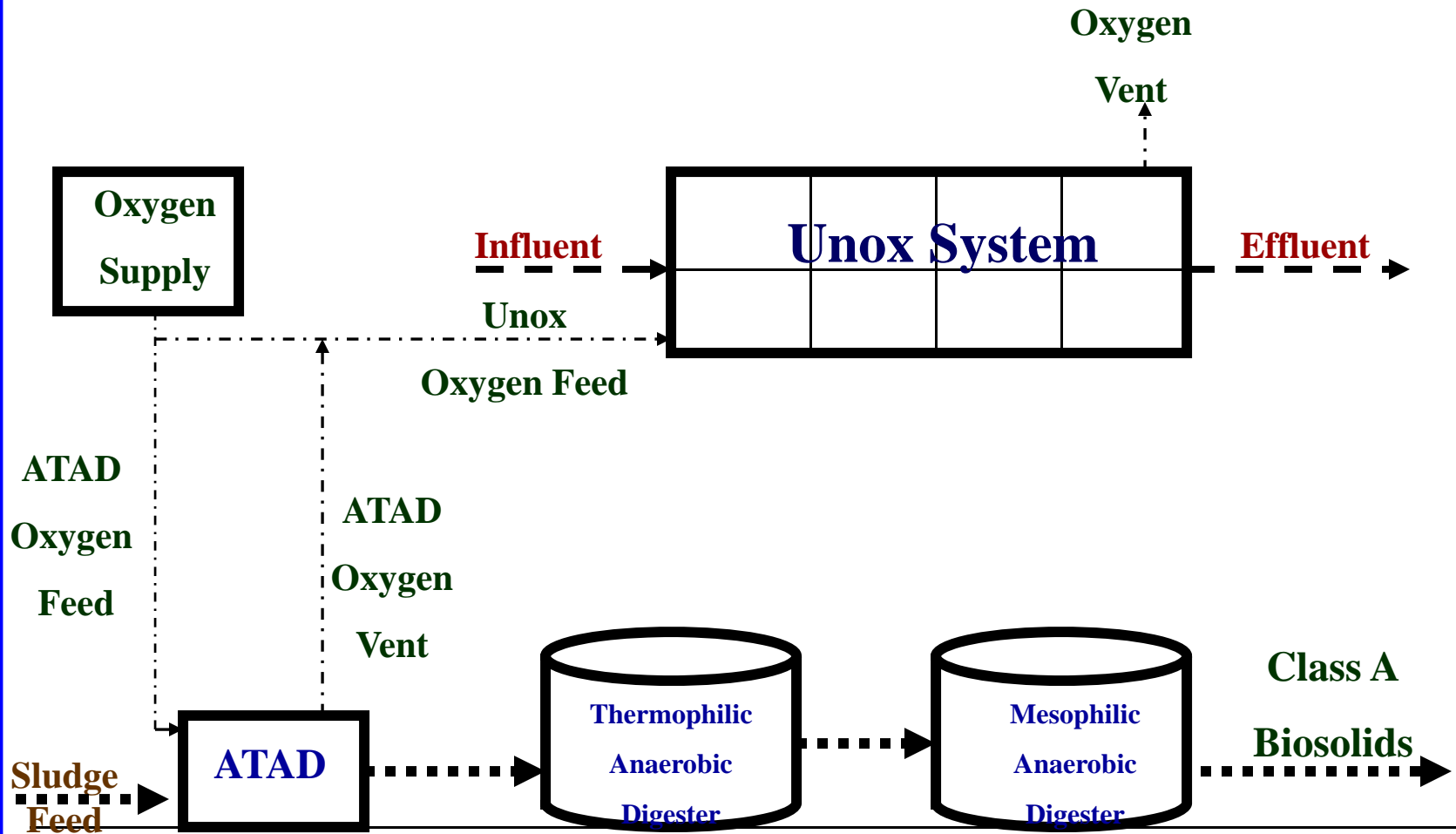
With Anaerobic TPAD



With Conventional Anaerobic Digestion



Integrated *m*²*t* technologies' *Dual Digestion*TM Schematic



Comments on *Dual Digestion**

- **Thermophilic aerobic digestion accelerates acidification and ultimately reduces required anaerobic digester detention time.**
- **There is also some evidence of improved mesophilic anaerobic digestion performance following thermophilic aerobic treatment**
- **Ability of the *Dual Digestion*TM process to reduce pathogens is documented**

**The Straight Scoop on Biosolids,*

CH₂MHill, Vol. 4, number 1

Union Carbide *Dual Digestion* Installations

(Oxygen ATAD one stage process followed by Anaerobic Digestion)

<u>Location</u>	<u>Startup</u>	<u>Status</u>
Barrie, Ontario	1997	On Line
Charleston, WV	1987	Off Line
Coral Springs, FL	1985	On Line
Hagerstown, MD	1983	Off Line
Henderson, NC - Nut Bush plant	1982	On Line
Lackawanna, NY	1982	On Line
Tacoma, WA, Central, USA	1990	On Line

Tacoma, Washington *Dual Digestion* System



TAGRO™



Dual Digestion System

Henderson, N.C. Nut Bush Plant



Dual Digestion System Barrie, Ontario



Full Scale Demonstration of Dual Digestion: Thermodynamic and Kinetic Analysis
Gemmell, Deshevy, Elliot, Crawford, Murthy
WEFTEC 1999

- @ low TSS and VSS which hindered results development
- $K_d = 0.087/d$ @ $37^\circ C$, $0.034/d$ @ $45^\circ C$, and $0.055/d$ @ $47^\circ C$
- Heat Reaction = 16.6, 28.8, 30.4 MJ/kgVSS_D



Design Considerations and Operating Experience for a Full Scale Dual Digestion system with Separate Sludge Thickening;
Gemmell, Deshevy, Elliot, Crawford, Murthy
WEFTEC 2000

- @ 5-6 TSS
- $K_d = 0.17/d$ @ $55^\circ C$
- Heat Reaction = 17 MJ/kgVSS_D



Dual Digestion System Lackawanna, NY



1. City of Lackawanna, NY STP Application of UCC DDS
 V. Caruso and S. Barbasch; Nussbaumer & Clark
 NY WPCA 22nd, January, 1980

	<u>Feed</u>	<u>Aerobic Step</u>	<u>Anaerobic Step</u>
Temperature, °C	11.3-19.5	53.8-50.6	49.1-50.6
RT _Q		0.78-1.0 days	8.0-8.8 days
VSS _{load} , pounds VSS / ft ² -day		1.53-2.2	0.14-0.23
CH ₃ , ft ³ /pound VSS _R			12.2-15.7
CH ₃ , %			60.2-63.8



2. Full Scale Operating Results for an Energy Efficient Method of Digestion
 P. Pieczonka and K. Wicks; City Lackawanna and Lotepro Division
 Linde AG WPCA 56th Annual Conference 3rd, October, 1983

	<u>Feed</u>	<u>Aerobic Step</u>	<u>Anaerobic Step</u>
Temperature, °C	20	50	44
VSS and VSS _R , %	3.2	22	51
Oxygen _{CR} , lb O ₂ /lb VSS _R		1.36	
CH ₃ , ft ³ /pound VSS _R			16.4
CH ₃ , %			60

