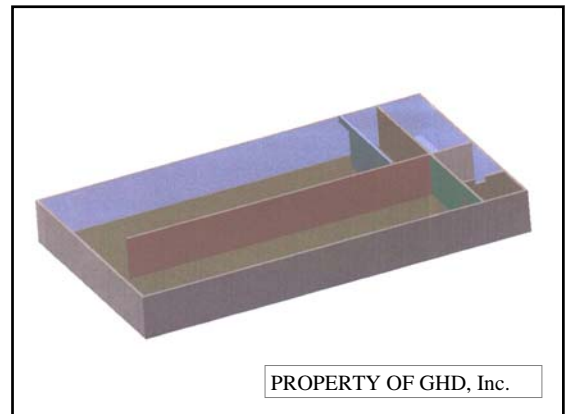
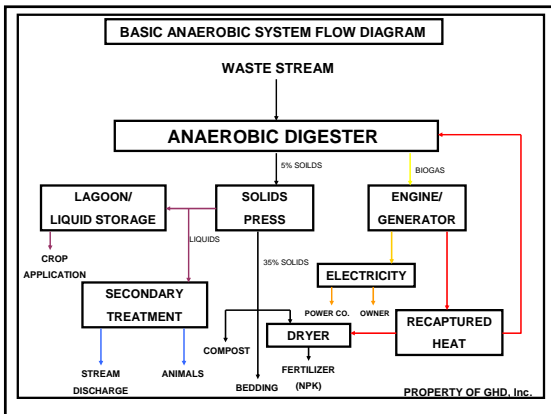


Two-Stage Mixed Plug Flow Anaerobic Digesters

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BIOLOGICAL SYSTEM

- MANURE COLLECTION SYSTEM
- DIGESTER VESSEL
 - Acid chamber vs. Methane Chamber
 - First in First Out
- DIGESTER MIXING
 - Biogas Recirculation
- DIGESTER TEMPERATURE
 - 101°F



BIOGAS CONSUMPTION

- 55 to 60% Methane (CO₂ ~ 45%)
- 5 to 5.5 Cows to Produce 1 kWh
- Gen-Set Provides Electricity and Heat
- Small Amount of H₂S
- Excess Biogas is Flared
- Considerations when Burning Biogas
 - Engine Temperatures (oil and coolant)
 - Moisture Content of Biogas
 - Pressure Requirements to Engine

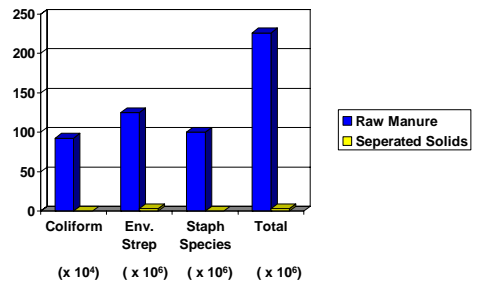


DIGESTER EFFLUENT

- SEPARATION w/ SCREW PRESS
- SOLIDS USED FOR BEDDING
 - 65 to 70% Moisture
 - Pathogen Reduction
 - Clean Cows
 - Somatic Cell Count
- LIQUID FOR FERTILIZER
 - 1.5 to 2% Solids
 - Irrigation vs. Trucking
 - Reduction in NPK



PATHOGEN REDUCTION Gordondale Farms



NOTE: SAMPLES COLLECTED 2/7/03

