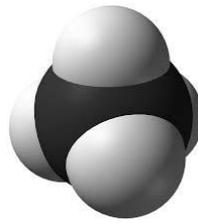


Nutro™ - Bio-Solids Recycling Technology

February 19, 1993, the National Sewage Sludge Use and Disposal Regulations (Chapter 40 Code of Federal Regulations Part 503 and commonly referred to as the 503 Regulations) were published in the Federal Register. The 503 regulations define treatment methods that transform bio-solids to Class “A” status; Class “A” bio-solids are free of pathogens and vector attractions. In essence, the Regulation establishes several categories in terms of stabilization, pathogenic content, beneficial reuse and disposal practices for land-application of bio-solids.



Since 1993, experience has taught that the most reliable methods are temperature methods and/or chemical. The heating, composting and thermophilic operating costs, direct heating and Due to release of methane, the most composting is not environmentally require a minimum pH of 12 utilizing an very alkaline product, which is not good



methods require heating to a minimum of 50 °C for a specified period of time, which is dependent on the amount of temperature above 50 °C, and are expensive. Composting, in addition to release of methane, is labor intensive and therefore costly.

temperature methods include direct digestion. However, due to chemical methods are expensive. dangerous greenhouse gas (GHG), conscious. Chemical methods oxidizer, such as lime; this creates a for land application. Temperature

The most economical method involves Thermophilic Digestion (TD). Energy cost is minimal due to the thermophilic process itself. In the case of Aerobic TD (AeTD), digestion occurs exothermically, maintaining temperature once initiated. In the case of Anaerobic TD (AnTD), methane is produced in digestion, which can be further processed for clean energy and is used to fire a boiler to maintain digestion temperature. However, while all bio-solids have odor, AeTD and AnTD digested bio-solids tend to have significant odor issues. Further, the dewatering cost of TD Solids (TDS) is much more than that of Mesophilic DS. This difference can make dewatering cost can render ArTD or AnTD uneconomical.



ClearValue surmounted the dewatering challenges in U.S. Patent Nos. 5,846,435 and 5,906,750. However, these patents do not incorporate a means of odor control. In a separate technological endeavor, ClearValue surmounted the technological challenges associated with sulfides and ammonia in U.S. Patents 5,705,072 and 6,136,193. Finally, in a technological endeavor to control protein degradation, ClearValue developed a stabilizer in U.S. Patent No. 6,066,349. All of these technologies have been combined into a new bio-solids management process, Nutro™, which can be viewed in WO 03/035554 and issued in the US as U.S. Patent No. 8,123,944.



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Nutro™ efficaciously produces Class “A” product by thermophilic digestion. The Nutro™ product has no sulfide or ammonia odor; the Nutro™ product looks and smells like soil. Further, being primarily a biological process, Nutro™ is economical; Nutro™ competes very well with mesophilic systems, operating at much less cost than other Class “A” processes.



Nutro™ is an efficacious and efficient means to manage bio-solids, eliminate pathogen transport, provide an economical/organic fertilizer, and recycle nutrients. Nutro™ is a modification of Mother Nature's Process of nutrient management along with a natural, biological means, of pathogen and odor control.

Nutro™ can further be combined with another ClearValue® Technology, Negative Carbon Energy™ to produce clean electrical power, water and organic food nutrients. Negative Carbon Energy™ takes methane and sunlight to cleanly produce electrical power at \$0.02 to 0.03 per kWhr. As compared to natural gas systems that only produce 100 kWhr per mcf, Negative Carbon Energy™ minimally produces 140 kWhr per mcf methane, while further producing pure water and organic food nutrients for livestock production. Negative Carbon Energy™ produces electrical power and water via ClearValue's proprietary HyOx™ hydrogen/oxygen power system.

Nutro™ combined with Negative Carbon Energy™ provides an attractive ROI that turns the wastewater treatment operation into a profit center with sales of: organic odor free nutrient fertilizer, organic nutrient livestock feed and electrical power. In arid climates or local where water resources are limited, the water produced by Negative Carbon Energy™ can be a significant asset.



Aerobic
(Pat. Pend. WO/035554)

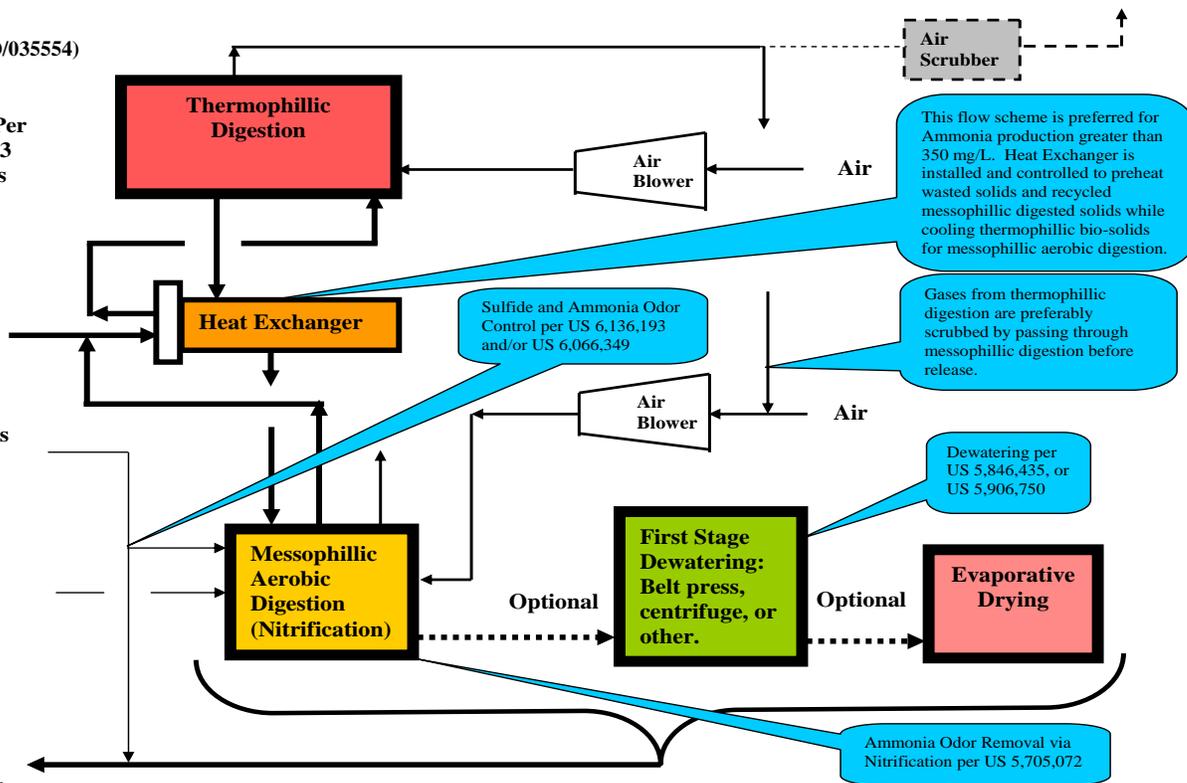
Class "A"
Bio-solids Per
US EPA 503
Regulations

Wasted
Solids
From
1° & 2°

MgO/
Thiobacillus
Addition
System

Nitrifiers &
CO₃²⁻
As needed

Final
Product
ready for
recycling,
preferably
as fertilizer.





Anaerobic
(Pat. Pend. WO 03/035554)

