

Wastewater Treatment Practices Around the World

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Drought, Changing Regs, and Desire for Renewable Energy Results in Unique Public-Private Partnership

Kevin Litwiller, B.BA, Director of Business Development, Lystek International Inc.

Excitement is building in Fairfield, California around a new wastewater recovery project, scheduled for completion this coming summer. Lystek International, a Cambridge, Ontario-based biosolids management firm is launching its first, US-based, organic material recovery center (OMRC). The project is a partnership with the Fairfield-Suisun Sewer District (FSSD) in Fairfield, California and is expected to have a significant, lasting impact on biosolids and organics management and wastewater treatment in the District and surrounding San Francisco Bay Area.

While advances have certainly been made, the basic premise of traditional wastewater treatment has not changed dramatically over the course of the last half-century. The process has evolved to incorporate new techniques and align with new requirements, such as the reduction and/or elimination of many historical concerns (i.e., heavy

metals), but the overall objective of producing clean water from wastewater remains the same.

However, one rapidly changing area is the treatment and management of biosolids, which have historically been used as a Class B soil amendment, compost or daily cover at landfills. While these practices have worked for many years, regulations in California are changing. Plus, the use of biosolids for land application has not been consistent across the state because regulations are enforced on a county-by-county basis.

Fairfield-Suisun's existing water and wastewater treatment plant was constructed in the late 1970s. The plant has long produced a biosolid typically used as a daily cover at the local landfill. This unique, private-public partnership will bring a new technology to the area as well as additional uses for this valuable material. Not only will this

undertaking support the existing FSSD wastewater treatment facility in managing its biosolids, but it will also convert what is sometimes considered 'waste' into a range of fully recoverable resources with a variety of uses, including a higher quality effluent.

The forward-thinking leadership team at FSSD recognized the potentially limited lifespan of their daily landfill cover program. As a result, the search for new and innovative uses for biosolids generated at the plant was amplified and conversations were initiated with Lystek. At the same time Lystek was looking for innovative expansion opportunities in the US market, particularly in California. After many positive conversations, it was agreed there were great synergies between the two organizations, including the fact that the project would make use of existing, under-utilized infrastructure (such as a decommissioned lime stabilization building and system that has been inactive for over 20 years and surplus digester capacity at the FSSD plant).

California is serious about developing waste diversion programs and, consequently, very serious about timelines and targets, unlike Ontario where participation in organics diversion programs is still voluntary. There are presently no firm regulations setting priorities or forcing the industry, markets or residents to fully comply. In contrast, waste diversion from landfills in California has been mandated by regulation for over 25 years, with a minimum 50% diversion target. This has recently been expanded to include multi-family and commercial

What are Class A, Class A EQ and Class B Biosolids?

The US Environmental Protection Agency (EPA) issued a *40 CFR Rule* categorizing biosolids as Class A, Class A EQ, (Exceptional Quality) or Class B. The difference has to do with the level of pathogens and the ability of the material to meet/exceed vector attraction reduction (VAR) requirements. VAR refers to processing which makes the biosolids less attractive to vectors, such as flies and mosquitoes, which have the potential for transmitting diseases directly to humans or can play a role in the life cycle of a pathogen as a host.

Class A biosolids are biosolids treated to the point where pathogen levels have been reduced to virtually non-detectable levels and the material complies with standards regarding metals content, odours and VAR, as specified in the US EPA, *Part 503 Rule*. Class A biosolids can be legally used as fertilizer on farms and vegetable gardens and can be sold commercially as compost or fertilizer.

A Class A EQ is a biosolids product that exceeds all Class A criteria.

Class B biosolids are biosolids that have been treated but contain higher levels of detectable pathogens than Class A biosolids. The use of Class B biosolids may require an EPA permit with conditions on land application, crop harvesting and public access.

entities with a corresponding goal of 75% diversion by 2020. As a result, wastewater treatment facilities, industry, municipalities and residents alike must achieve very clear objectives. For example, organics, (primarily food and yard waste), are to be removed from landfills by 2020. If this is not adhered to, it will result in a loss of diversion credits. It is also widely believed that a complete landfill organics ban, including biosolids, will soon follow.

Another difference between Canada and the US is that, in many states, waste management is primarily driven by private industry. In Ontario, these services are predominantly run by municipalities. It is therefore natural that the US organics management culture tends to be more entrepreneurial and less risk averse. Even agencies that are publicly funded and run are more willing to enter into self-crafted, public-private partnerships that can result in projects being negotiated and implemented far more rapidly. There are many examples of this kind of business arrangement in existence in California, in water and wastewater, solid waste management and alternative fuel development. In the case of the Lystek-FSSD project, the combination of a firm and clear regulatory regime and good, old-fashioned entrepreneurship has resulted in the opportunity to leverage the full extent of the system's capabilities, from the outset, with little to none of the inertia that is often experienced here in Ontario.

With the two organizations working together as partners, the FSSD plant will continue to produce clean water and the new Organic Material Recovery Center (OMRC – FSSD) will make extensive use of this low temperature, thermal hydrolysis process to advance wastewater treatment at the district. The system will convert biosolids and other organic feedstock into a

Class A EQ (Exceptional Quality) biofertilizer product (as defined by US EPA), which will then be marketed and utilized in agriculture, horticulture and a variety of other applications. The liquid biofertilizer is rich in organic matter and can be sub-surface injected or blended with other organic materials to enhance the health and tilth of soil and its ability to retain valuable moisture. This designation also opens the market with little to no restrictions, far more consistency, and greater certainty that re-use and diversion goals can be achieved far into the future, even when landfill bans are extended to include biosolids.

The initiative will also leverage the technology to optimize treatment plant operations. In this step, the treated material is re-introduced (fed back) to the anaerobic digesters (AD) with the net results being reduced overall biosolids volumes and increased biogas production for conversion into green energy. This will subsequently help to power the FSSD plant. The additional biogas will initially be used to fuel co-generation engines at the treatment plant, thus decreasing the need to import natural gas. As time goes by, and the process and partnership continue to evolve, the potential for additional advancements will also be explored, including co-processing of organic food waste. As biogas quantities increase, it is likely that it will be converted into a transportation fuel, such as compressed natural gas (CNG).

Co-digestion is also being studied and planned at numerous, other facilities throughout the state because of the current and evolving diversion rules and interest in source-separated organics collection programs. This is expected to result in even more demand for enhanced digestion processes. As projects are implemented, carbon footprint will be further reduced and opportunities for agencies to offset costs of operations with

revenue-generating products as part of the movement to convert traditional WWTP's into water resource recovery centers (WRRC's) will be enhanced.

Through need, mutual cooperation and proactive, forward planning, a unique, Public-Private Partnership has emerged between the FSSD and Lystek and the project will become a reality in the early summer of 2016, when construction and initial testing are completed.

This development is expected to play an important role in helping to move the biosolids and organics management industry forward in the Bay Area. It will produce a Class A EQ (exceptional quality) liquid biofertilizer for use by area growers who are stressed by drought and depleted soil conditions. It will enhance wastewater treatment plant operations through the implementation of processes that will reduce overall biosolids volumes, while increasing biogas for conversion to green energy. Aside from local enthusiasm, there is also great interest from similar organizations across California and throughout the US and Canada, all of them keen to see the outcome of this partnership. ♦



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For additional info contact:

Dale Sanchez: 905-979-8660 - dale@vectorprocess.com
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