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New Innovations in Biosolids Land Application Equipment Technology

By Mark Janiec, CCA

Land application equipment for biosolids has undergone a significant change over the last 20 years. Gone are the days of tanker trucks driving into the field, turning on a valve and spreading their load. This practice quite often resulted in an uneven distribution of nutrients across the field, a high potential for soil compaction and the possibility of the tanker getting stuck in the field. Also, the once common practice of spray irrigating sewage biosolids onto a living crop (generally corn or soy) has been phased out as the Nutrient Management Regulation has banned the use of high trajectory irrigation guns for this purpose.

Most biosolids contractors have embraced modern technological advancements so that today's land application equipment is highly sophisticated compared to 20 years ago. The industry's land application equipment is evolving and for the better!

Modern land application equipment utilizes some or all of the following: global positioning systems (GPS), liquid flow meters, radio controlled shut off valves, direct injection and high floatation technologies to name but a few. Today it is quite common to see liquid biosolids land applied with a tractor and drag hose system that utilizes direct soil injection technology (*Figure 1*). Direct soil injection greatly controls odours, reduces nitrogen losses and prevents runoff of material to environmentally sensitive areas. Radio controlled shut off valves

prohibit the flow of biosolids at the injectors and prevent excess flow and over application of material at the edge of the field when the application equipment is raised from the ground. GPS technology in conjunction with a flow meter accurately record location data and apply liquid material at the prescribed rate.

Liquid or Dewatered Biosolids

Sewage biosolids have traditionally been applied to agricultural land as either a liquid or solid (dewatered) material. Generally, the odours associated with land application of dewatered biosolids are more intense than with liquid biosolids. This is a function of how the material is processed at the wastewater treatment plant but more importantly how the material is handled and land applied at agricultural fields during the day of spreading.

Liquid biosolids are generally land applied at approximately 2% - 5% total solids. At these low solids contents, the material can be quite easily pumped and land applied using a wide variety of existing technologies. Dewatered biosolids are handled and land applied as a solid material varying from 22% - 30% total solids (70% water) depending on the source. They are typically surface applied to agricultural land with equipment that spreads them evenly at controlled rates and then are incorporated into the soil with a tillage implement on the day of spreading (*Figure 2*). In an effort to manage and reduce potential

nuisance odours, incorporation of the material into soil is usually done within a couple of hours of land application.

Dewatered Biosolids Direct Injection System (DBDIS)

The latest technological advancement in the land application of dewatered biosolids is the Dewatered Biosolids Direct Injection System (DBDIS).

The DBDIS is composed of a dry box container which utilizes a hydraulic ram push blade to move dewatered biosolids to the rear of the container where there is a high pressure pump capable of pumping material with up to 40% total solids content. The biosolids are pumped to a distribution box and are evenly distributed to the soil injection knives. The injection equipment is similar to liquid injection technology although it is rated to accommodate the increased pressures required for this relatively solid material. The DBDIS has proven extremely effective at reducing the odours associated with the land application of dewatered biosolids and is used extensively where odour control is required.

The application equipment utilized to land apply sewage biosolids to agricultural land continues to evolve as a result of investment in new technology and increased environmental regulation. New and innovative technological advancements in the industry allow biosolids to be land applied in a sustainable and environmentally friendly manner.



Figure 1

Tractor and drag hose system land applying sewage biosolids utilizes state of the art technologies.



Figure 2

Surface application of dewatered sewage biosolids



Figure 3

Dewatered Biosolids Direct Injection System (DBDIS)



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